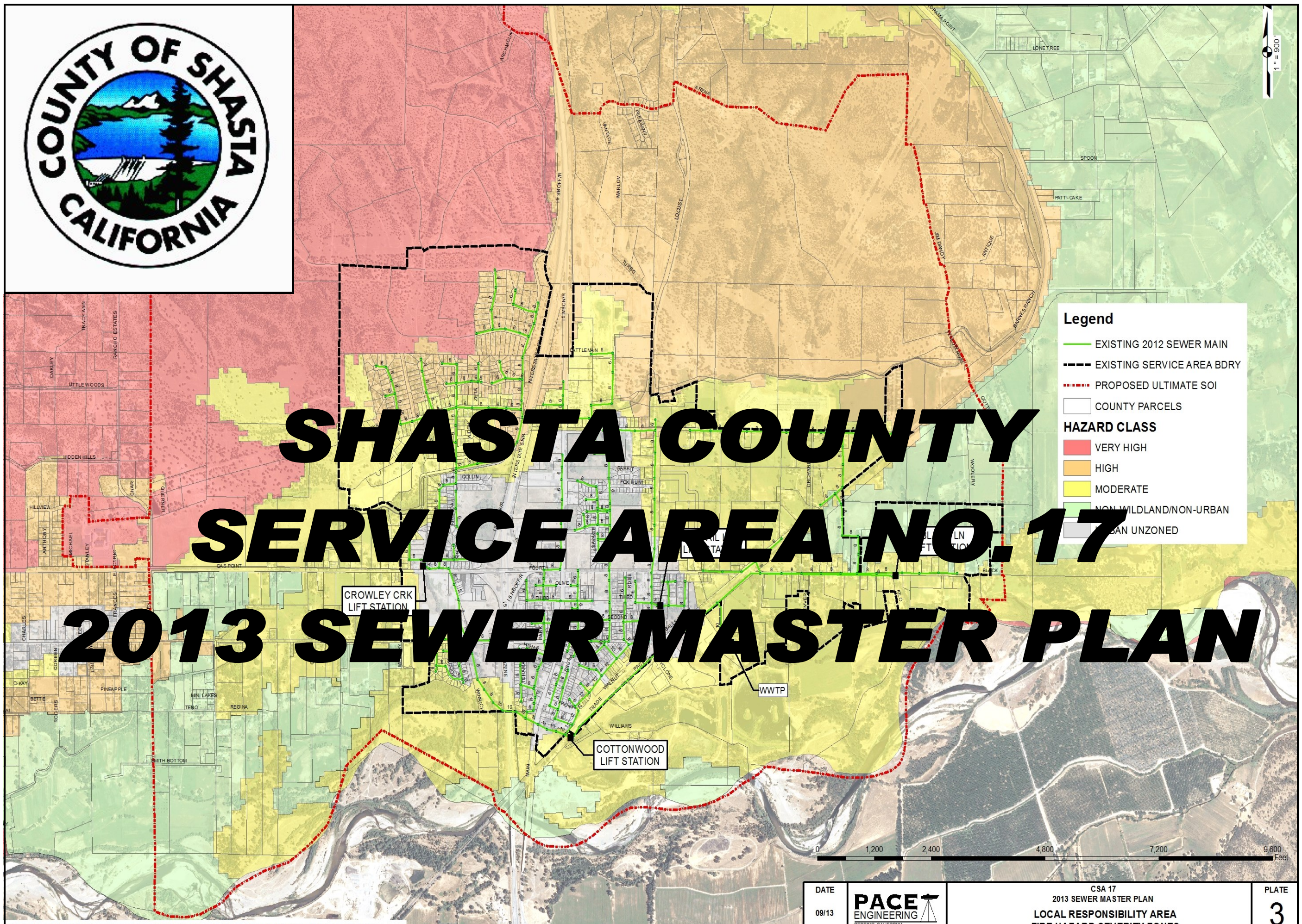
SHASTA COUNTY SERVICE AREA NO.17 2013 SEWER MASTER PLAN



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PACE ENGINEERING
REDDING, CALIFORNIA

PACE ENGINEERING

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Shasta County Administration Center
1450 Court Street, Suite 108
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We are pleased to present our engineering report entitled:

SHASTA COUNTY
SERVICE AREA NO. 17
2013 SEWER MASTER PLAN

This report contains the results of our investigation of the CSA 17 sewer system, including collection system, lift stations, and wastewater treatment facilities. The report includes preliminary plans and cost estimates for major capital improvements recommended over the next 20 years. Emphasis has been placed on planning and staging of improvements necessary to correct existing deficiencies, growth, and disaster response should it occur. An executive summary of the report, including our recommendations, follows the Table of Contents.

The 2013 Sewer Master Plan and accompanying Wastewater Utility Rate Study were funded through Community Development Block Grant No. 10-DRI-6792. PACE Engineering is very pleased to have participated in this project. We thank your staff for their able assistance in its preparation and are available to meet at your convenience to discuss the 2013 Sewer Master Plan and Wastewater Utility Rate Study in detail.

Sincerely,

Laurie McC

Laurie McCollum
Staff Engineer

REGISTERED PROFESSIONAL ENGINEER
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c: Al Cathey, Shasta County Department of Public Works
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COUNTY SERVICE AREA NO. 17

2013 SEWER MASTER PLAN

COUNTY OF SHASTA
DEPARTMENT OF HOUSING
AND COMMUNITY ACTION PROGRAMS
CDBG GRANT NO. 10-DRI-6792

JOB NO. 35.26

BY:

PACE
ENGINEERING
REDDING, CALIFORNIA

TABLE OF CONTENTS

TABLE OF CONTENTS Cont.

PHOTOS **PAGE NO.**

TABLES **END OF TEXT**

TABLE OF CONTENTS Cont.

ABBREVIATIONS

Certain terms and abbreviations have been used in this report for convenience. Definitions are as follows:

AF	Acre-Feet
ACID	Anderson-Cottonwood Irrigation District
ADWF	Average Dry Weather Flow (The average rate of wastewater flow during summer months.)
AWWA	American Water Works Association
Basin Plan	Water Quality Control Plan for the CRWQCB Sacramento River Basin and San Joaquin River Basin
BPTC	Best Practicable Treatment or Control
CDBM	Chlorodibromomethane
CDPH	California Department of Public Health
CEI	Compliance Evaluation Inspection
CF	Cubic Feet
CIP	Capital Improvement Plan
County	Shasta County
CRWQCB	California Regional Water Quality Control Board
CSA 17	County Service Area No. 17 Cottonwood
CT	Contact Time
CWD	Cottonwood Water District
DBP	Disinfection Byproduct
DCBM	Dichlorobromomethane
DWR	Department of Water Resources
EPA	Environmental Protection Agency
ENR CCI	Engineering News Record Construction Cost Index
GIS	Geographic Information System
GPAD	Gallons per Acre per Day
GPD	Gallons per Day
GPM	Gallons per Minute
HDPE	High Density Polyethylene

ABBREVIATIONS Cont.

HE	Household Equivalent
HP	Horsepower
I&I	Infiltration and Inflow
I-5	Interstate 5
kW	Kilowatt
LAFCO	Local Agency Formation Commission
Lbs	Pounds
LRA	Local Responsibility Area Fire Hazard Severity Zone
LS	Lift Station
MG	Million Gallons
MGD	Million Gallons per Day
MLSS	Mixed Liquor Suspended Solids
MPN	Most Probable Number
MSR	Municipal Services Review
NFPA	National Fire Protection Association
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
PSI	Pounds per Square Inch
PWWF	Peak Wet Weather Flow
RAS	Return Activated Sludge
SDR	Standard Dimension Ratio
SF	Square Feet
SMP	Sewer Master Plan
SOI	Sphere of Influence
SOP	Standard Operating Procedure
SRA	State Responsibility Area Fire Hazard Severity Zone
SSB	Sludge Storage Basin
SVI	Sludge Volume Index
TDH	Total Dynamic Head

ABBREVIATIONS Cont.

WAS	Waste Activated Sludge
WDRs	Waste Discharge Requirements
WWTP	Wastewater Treatment Plant
USGS	United States Geological Survey
UV	Ultraviolet

SUMMARY AND RECOMMENDATIONS

SUMMARY

Development of the 2013 Sewer Master Plan (SMP) consisted of an engineering analysis of the Shasta County Service Area No. 17 Cottonwood (CSA 17) wastewater collection system, lift stations, and wastewater treatment plant (WWTP), and potential effects current and future wastewater flow conditions have on each of these components. The wastewater collection system was analyzed using the Innovyze® H_2OMAP Sewer computer program for wastewater flow determination and pipeline sizing. Analysis of the sewer collection system and WWTP was accomplished with the assistance and review of Shasta County Department of Public Works (County) staff.

As shown on Plate 5 located at the back of this report, the CSA 17 service area boundary consists of approximately 1,665 acres (2.6 square miles). The ultimate sphere of influence (SOI) boundary, based on the General Plan ultimate boundary for CSA 17, includes areas outside the current CSA 17 boundary, and is projected to be approximately 5,595 acres (8.7 square miles).

A portion of the CSA 17 collection system is within the high and moderate hazard class of State Responsibility Area (SRA) and Local Responsibility Area (LRA) Fire Hazard Severity Zones. As such, redundancy of major processes was a consideration for recommendations at facilities located in these areas. Refer to Plates 2 and 3 for SRA and LRA Fire Hazard Severity Zones, respectively. The water distribution system in CSA 17 is owned and maintained by Cottonwood Water District (CWD) and is shown on Plate 4. Locations of existing fire hydrants in CSA 17 are also shown on Plate 4 and fire flow testing results recently completed by Cottonwood Fire Protection District are shown in Table 1.

Wastewater Collection System: The existing wastewater collection system is shown on Plate 1. In 2012, it consisted of about 88,000 feet of 6-inch and 8-inch collector sewer mains, and about 9,000 feet of 10-inch and 12-inch interceptor sewers.

Construction of the CSA 17 wastewater collection and treatment systems were completed in 1986; therefore, portions of the existing systems are more than 25 years old. As such, CSA 17 has a moderate peak wet weather flow (PWWF = 0.99 MGD) to average dry weather flow (ADWF = 0.3 MGD) ratio of 3.3 compared to similar communities.

The collection system in general appears to have adequate capacity for existing conditions and projected flows, with a couple of exceptions. One sewer segment within the existing collection system has shown signs of surcharging during peak rain events and requires further consideration for corrective action in order to increase sewer capacity (i.e., sewer near Gas Point Road and West Cottonwood Junior High). Another sewer shows a potential for blockage and possible overflow due to apparent deficiencies in sewer grade and construction (i.e., sewer east of Main Street just prior to Cottonwood Lift Station).

Sewage Lift Stations: There are presently four sewage lift stations in CSA 17: Cottonwood, Black Lane, Quail Lane, and Crowley Creek. Cottonwood Lift Station is a main lift station, pumping about 90% of all wastewater to the WWTP, with an effective capacity of 600 gallons per minute (GPM) (0.86 MGD). Black Lane Lift Station pumps wastewater from east Cottonwood to the WWTP with an effective capacity of 150 GPM (0.22 MGD). Quail Lane Lift Station only serves a few homes, is a tributary of Cottonwood Lift Station, and has an effective capacity of 60 GPM (0.09 MGD). Crowley Creek Lift Station primarily serves Cottonwood Elementary School, is also a tributary to Cottonwood Lift Station, and has an effective capacity of 250 GPM (0.36 MGD).

Wastewater Treatment Plant: The CSA 17 WWTP has an existing design ADWF capacity of approximately 0.43 million gallons per day (MGD), and a PWWF capacity of 1.32 MGD as indicated in the original 1985 WWTP Operations and Maintenance (O&M)

Manual. The 2012 ADWF estimated at 0.3 MGD is 70% of the current plant capacity. PWWF at the WWTP has been recorded as high as 0.99 MGD, or 75% of peak design capacity.

FUTURE WASTEWATER FLOWS

The current number of household equivalents (HEs) is estimated to be approximately 1,425. Given the current trend in active water services over the last 10 years, growth and population is likely to remain relatively static into the foreseeable future. As such, CSA 17 is more in an O&M mode rather than one of system expansion to accommodate new development. According to the Shasta County General Plan, the California Department of Finance indicated the population of Shasta County as a whole increased by 4% over the last five years (annual average growth rate of 0.8%). In 2010, the Department of Finance predicted a growth of 17% from year 2010 to 2020 (annual growth rate of 1.7%). Also noted in the General Plan, the Department of Finance now states that assumptions used to project future population may no longer be applicable, and these projections could change with their next estimate cycle which is every five years. At an annual growth rate of 1.7%, the current 0.43 MGD ADWF capacity of the WWTP could be met in 20 years.

That having been said, there are a few proposed developments that have tentative maps and/or preliminary plans already completed and approved. These developments were utilized in this Master Plan, together with the highest predicted future development densities per the Shasta County General Plan and Housing Element at an annual growth rate of 1.7% to forecast growth in the next 20 years. This equates to a possible 542 HEs being added to the system. HEs have been pre-purchased in various areas of CSA 17 during approval of tentative projects, thereby ensuring their future ability to discharge to the collection and treatment system. Yet many of these areas have already been developed and are not likely to further develop in the future. As such, only those parcels with five or more outstanding pre-purchased HEs were considered herein to possibly develop in the future. A review of County GIS mapping indicated 38 parcels consisting of 393 pre-purchased HEs fall into this category. Of these, eight parcels with 115 pre-purchased HEs were located in the same growth areas already accounted for in the 1.7% annual growth rate considered herein. As such, for the purpose of determining appropriate future capacity charges and monthly user fee rate increases, it is anticipated only 427 additional non-pre-purchased HEs (542 – 115) will be added to CSA 17 over the next 20 years. It should be emphasized this is simply an example of what could occur. Thus, if the actual rate of development is slower or faster, improvements shown herein should be proportionately shifted in time.

Ultimate growth was considered to determine the ultimate required size of the Interstate 5 (I-5) undercrossing serving west Cottonwood. Using the anticipated ultimate SOI, the highest projected development densities from the General Plan and Housing Element were utilized as shown on Plate 6 to project ultimate build out and corresponding wastewater flows in west Cottonwood.

Full build out of proposed developments is not likely to occur in the next 20 years, and the County intends to update this Master Plan prior to such development taking place. Therefore, other than consideration to the I-5 undercrossing, collection system, and WWTP improvements needed to serve ultimate build out were beyond the scope of this Master Plan.

Existing and future I&I allowances were calculated from analysis of historical lift station ADWF and PWWF pumping records. Although every effort has been made to assign reasonable I&I allowance values within the wastewater system, flow monitoring could not be completed due to a lack of seasonal precipitation prior to completion of this Master Plan (i.e., Winter 2012). **It is imperative the County continue its flow-monitoring program in order to confirm the estimated I&I allowances assumed herein are valid.**

ANALYSIS AND RECOMMENDED IMPROVEMENTS

After reviewing the existing wastewater system deficiencies under current conditions, the wastewater collection system was analyzed under future 2032 conditions. Considerations were also made for providing redundancy at facilities located in fire hazard severity zones as shown on Plates 2 and 3. Primary improvements recommended are as follows:

1. Complete infiltration and inflow (I&I) flow monitoring. Depending upon results, develop a comprehensive ongoing multi-stage I&I reduction program as needed. Upon completion of initial I&I flow monitoring, starting with identification of an initial I&I target area, the I&I reduction program should aggressively pursue reduction of high I&I if/when it is identified during monitoring. The first stage of the program would involve investigation and identification of I&I sources. The second stage would involve rehabilitation and repair. A flow-monitoring program should be continued in subsequent years to provide reliable data for verification of estimated flows, as well as provide flow information needed for evaluating the ongoing I&I reduction program.

2. Parallel or replace existing sewers in order to relieve current or impending surcharging, possible blockages, and provide sufficient sewer capacity for projected future conditions. In some areas where sewers are in poor condition, it may be necessary to replace existing sections of sewer instead of adding a parallel relief sewer.

3. Rehabilitate equipment at existing lift stations that has met its useful service life, are inefficient, or are considered to have operational deficiencies. In particular, upsize pumps at Cottonwood and Black Lane Lift Stations to meet future PWWF.

4. Rehabilitate equipment at the WWTP that is inefficient and has operational deficiencies. In particular, increase capacity and ease of O&M by adding an additional filter and biological selector, and modify the existing filter, chlorine contact basin, sludge storage basin, and sludge drying beds among other miscellaneous improvements.

5. Annually update GIS information and mapping gathered by the County and included in this report to improve disaster response preparedness. A CD of GIS mapping coordinating the CSA 17 system with Cal Fire mapped Fire Hazard Severity Zones is included in Appendix E. This can be used as a working document, updated to graphically depict percent of sewer capacity in each of the five-year increments among other things.

Infiltration and Inflow Control: This SMP assumes future I&I flow monitoring will be completed, and I&I reductions will be made as needed depending on flow monitoring results. I&I contribution projections developed for this Master Plan are based on historical flow records rather than I&I monitoring. Therefore, in order to pursue accurate I&I reduction, a phased comprehensive I&I Reduction Program should be implemented. Phase 1 of this reduction program should begin with identification of high I&I target areas. This would include an investigative stage that involves video inspection of all sewer mains and laterals, manhole inspection and inventory, and analysis of collected data. The following repair and rehabilitation stage would attempt to correct collection system defects (identified in Phase 1) that are allowing I&I into the system. The repair and rehabilitation stage would involve such things as grout sealing, lining, and replacement of leaking sewers, laterals, and manhole repair or replacement. Upon completion of initial I&I monitoring, an estimated cost for addressing I&I in the target area should be determined, along with identification of the potential associated I&I reduction expected to occur.

Wastewater Collection System Improvements: Analysis of the existing wastewater system has indicated that, overall, the system has adequate capacity for the next 20 years given that verification of I&I flows is completed. However, analysis indicates that some existing 8-inch and 10-inch sewer segments are at capacity during PWWF conditions, and a portion of these sewers may not have the grade needed for proper solids transport. It is recommended the County perform further investigations of these sewers. If it can be determined a specific sewer reach is significantly flatter than current design criteria, it should be replaced to reduce the potential of blockage and overflow. Other immediately recommended improvements include the following: a new grinder and backup float system at Cottonwood Lift Station; new submersible pump railings and generator with automatic transfer switch at Black Lane Lift Station; and all new mechanical and generator at Quail Lane Lift Station.

Over the next 20 years, the County should consider constructing relief sewers at locations shown on Plate 5 as bold red lines between circled numbered points in order to eliminate potential bottlenecks to future development. In addition, it is estimated capacity of Cottonwood and Black Lane Lift Stations will need to be expanded if anticipated growth occurs. All existing pumps at these lift stations, as well as Quail Lane, have met their useful service life and are recommended to be replaced at sizes adequate to accomodate future development.

<u>Wastewater Treatment Plant</u>: Wastewater Treatment Plant Design criteria shown in Table 3 outlines process units and loading under the original 1983 design, existing 2012 flow conditions, and future 2032 flows. Future 2032 design criteria were determined to meet anticipated 20-year PWWF conditions assuming a 1.7% growth rate and future I&I rate of 1,500 gallons per acre per day (GPAD). Major components of recommended improvements are shown on Figure 4.

In order to correct current WWTP deficiencies, several improvements are immediately recommended including the following:

- Constructing a new biological selector
- Replacing aeration basin and sludge storage basin aerators
- Rehabbing existing clarifiers

- Replacing existing RAS, WAS, scum, sludge, water, and drainage pumps
- Installing additional RAS pump
- Rehabbing existing filter backwash system
- Replacing existing chlorine contact basin slide gates
- Replacing freeze-proof yard hydrants
- Replacing inoperable chemical dosing and monitoring equipment
- Constructing a new office building
- Installing new chart recorders and lab equipment
- Updating all controls and alarms, including those at all lift stations
- Installing a new generator

The above recommended improvements are needed to adequately and more efficiently treat current wastewater flows, and are not growth-related. Additional improvements are recommended in subsequent years to improve efficiency and redundancy of existing processes, as well as to expand capacity to keep pace with anticipated growth.

Master Plan Key Elements and Costs: The total cost for all wastewater system general improvements (i.e., upgrading existing collection system, lift stations, and WWTP improvements) is approximately $8,108,000, of which about $2,349,000 is needed in the next five years. The Master Plan of Improvements needed to correct existing sewer system deficiencies and to provide anticipated future capacity for 20-year development is shown on Plate 5 at the end of this report. A summary of costs and recommended staging of wastewater collection system and WWTP improvements is shown in Table 11.

Table 11, along with Plate 5, is in essence the 2013 Sewer Master Plan. The sewer improvements and their proposed construction periods are based on the computer model developed for the wastewater system and observed deficiencies. As indicated hereinbefore, I&I rates used in this model are based on historical flow records rather than flow-monitoring information. Consequently, it is recommended the County continue to pursue wet weather I&I monitoring before major expenditures are made on sewer capacity increases. The future improvement design process should include additional wet weather studies to confirm I&I rates. In general, no sewer suspected of being inadequately sized should be replaced or paralleled with a new relief sewer until it is either demonstrated that overflows or lateral flooding is imminent under wet weather conditions, or the sewer is shown to be poorly constructed and there is potential for sewer blockage. Since the computer model only flags trunk sewers inadequately sized by normal standards with moderate surcharge taken into account, it is possible some proposed sewer construction can be postponed by allowing greater surcharges to occur. Such sewers require more constant monitoring during wet weather periods. Also, it is possible that confirming flow measurements during wet weather periods will show some sewers flagged for construction to be unnecessary, i.e., if I&I rates are actually lower than assumed or can be reduced by rehabilitation or replacement of existing sewers. Potential postponement of some relief sewer construction and elimination of others will likely be offset by other unforeseen replacement projects; therefore, construction costs in the long term will likely be similar to the expenditure forecast.

<u>Estimates of Costs</u>: A detailed cost breakdown of the immediate, near, intermediate, and long term improvement costs is shown in Table 11 at the end of this report. As CSA 17 grows, additional improvements involving wastewater collection, treatment, and disposal will be required to meet future development system demands.

Projected improvement costs for the Master Plan are as follows:

Time Period	General Collection System Improvements	WWTP Improvements	Total
2013 - 2017 Immediate Term	$940,000	$1,409,000	$2,394,000
2017 - 2022 Near Term	$724,000	$1,595,000	$2,319,000
2022 - 2027 Intermediate Term	$967,000	$1,089,000	$2,056,000
2027 - 2032 Long Term	$413,000	$971,000	$1,384,000
TOTAL	**$3,044,000**	**$5,064,000**	**$8,108,000**

Costs include a 60% adder for construction contingencies and indirect costs including environmental and engineering. Budgeting $41,000 per year for the next 20 years to replace the worst of the aging sewer mains was also included. Figures are based on November 2013 dollars and do not include any allowance for inflation or financing costs.

The conceptual location and size of new trunk sewers needed to serve future developments are not shown herein as they would be purely speculative at this point in the planning process. The County may want to consider contributing to the cost of oversizing sewers in new developments where such sewers are necessary for service to an area larger than, or located beyond, the proposed development. This policy could lead to an orderly expansion of the wastewater system in the future.

<u>Financial Considerations</u>**:** Currently, CSA 17 has a capacity charge of $3,600 per household equivalent (HE) as shown in Appendix D. As a part of this plan, a determination was made of an appropriate capacity charge based on actual and future costs for general improvements. A portion of some improvements recommended beyond the immediate first five years benefit both future and existing customers. Therefore, a proportional share in the cost burden is recommended. The computed fee, which accounts for 23% of future improvement costs attributed to growth based on possible future HEs, as shown in Table 11, is $4,844. It is also recommended this fee be adjusted annually by the increase in the Engineering News Record Construction Cost Index (ENR CCI), which currently stands at 9666 for November 2013.

The County calculates capacity charges for apartments, duplexes, motels, and hotels on a proportional HE basis. The capacity charge for commercial and industrial customers is based upon the size of service requested by the customer and approved by the County, and the equivalent AWWA capacity ratios for different sized meters.

The County evaluated the monthly service charge, including base and commodity components, as part of the 2007 fee increase. A rate study has been completed based on recommendations of this Master Plan. The amount of funds needed to fix known deficiencies and construct needed improvements described herein during the first five year increment of this 20-year study is further detailed in the rate study included in Appendix A. All recommended improvements in the first five years are needed to improve the existing collection and treatment system and are not growth-related. As such, these improvements should be funded by existing rate payers as discussed in the rate study.

It is recommended the County review this Master Plan report carefully, and, if in agreement, it be adopted as the CSA 17 2013 Sewer Master Plan, with any corrections or supplements as may be applicable.

INTRODUCTION

HISTORY

From 1966 to 1971, the Cottonwood County Water District acted as sponsoring agency for a proposed wastewater collection and treatment system for the community. However, funding for the project was rejected by voters in a bond election in 1971. In 1976, the California Regional Water Quality Control Board (CRWQCB) adopted a Prohibition of Waste Discharge from septic tank and leach field systems by Board Order 76-230. This Board Order specified discharge of waste from these systems would be prohibited after January 1, 1981.

In August 1977, the Anderson-Cottonwood Irrigation District (ACID) assumed the role as lead agency for preparation of a Facility Plan to improve wastewater disposal practices in the community. This Facility Plan was completed in late 1979.

In 1980 and 1981, the Cottonwood County Water District sponsored studies and reviews of the proposed sewer project. On September 16, 1981, Shasta County Board of Supervisors adopted a resolution consenting to the formation of an assessment district by the Cottonwood County Water District. However, in December 1981, the Board of Supervisors received a request from project proponents urging the County to assume role as lead agency for the project. The matter was subsequently referred to the Shasta County Community Development Committee for review.

On July 23, 1982, the CRWQCB adopted Cease and Desist Order No. 82-101 against the County Water District and property owners in the prohibition area. In September 1982, the County Board of Supervisors authorized County staff to form a sponsoring agency; and in January 1983, the Board approved formation of CSA 17. CSA 17 is currently administered and operated by the Shasta County Department of Public Works, CSA Division (County).

PREVIOUS STUDIES

Some of the key previous studies referenced in this Sewer Master Plan (SMP) include:

- Cottonwood Wastewater Treatment Plant Operations and Maintenance Manual, 1986.
- Cost Estimate for Cottonwood Wastewater Treatment Plant Expansion, PACE Engineering, February 1996.
- Capacity Study for Cottonwood Sewer System, County Service Area No. 17, Shasta County Department of Public Works, Special Projects Division, August 1996.
- Leaking Sludge Storage Basin Report for Cottonwood Wastewater Treatment Plant, CSA 17, PACE Civil, Inc., June 2002.
- Municipal Services Review for the County of Shasta and County Service Areas, Shasta LAFCO, May 2003.
- Shasta County 1998 General Plan, 2004 Update, Shasta County Planning Division.
- Cal Fire Hazard Severity Zone Maps, State Responsibility Area maps adopted November 2007 and Recommended Local Responsibility Area maps.
- Mixing Zone & Dilution Study for the County of Shasta, Service Area No. 17, Cottonwood Wastewater Treatment Plant, PACE Engineering, February 2009.
- Pollution Prevention Plan for the County of Shasta, Service Area No. 17, Cottonwood Wastewater Treatment Plant, PACE Engineering, December 2009.
- Antidegradation Analysis for the County Service Area No. 17, Cottonwood Wastewater Treatment Plant, PACE Engineering, December 2009.
- Annual Best Practicable Treatment or Control Review for the County of Shasta, Service Area No. 17, Cottonwood Wastewater Treatment Plant, PACE Engineering, December 2010.
- Shasta County 2009-2014 Housing Element, Shasta County Department of Resource Management, Planning Division, March 22, 2011.

NEED AND SCOPE OF CURRENT STUDY

The CSA 17 wastewater collection and treatment system began operation in 1986 to alleviate problems resulting from failing septic systems. As such, the system has now been in service for more than 25 years. Mechanical equipment such as pumps typically have a service life of 15 to 20 years, so much of the existing WWTP and lift station equipment is beyond its useful service life or has already been replaced. Additionally, Cottonwood has since experienced rapid growth, particularly in west Cottonwood. The existing system was designed to serve a limited number of customers, so continued growth will eventually overtax the existing collection and treatment facilities.

Photo 1: CSA 17 WWTP

An original sewer master plan is not known to exist for CSA 17; therefore, the County desired to develop a comprehensive SMP. In December 2012, the County authorized PACE Engineering to work jointly with County staff to prepare an SMP for CSA 17. The emphasis of this planning effort was to review and analyze the existing wastewater collection system and WWTP, and develop a computer model that could be used to determine the need for future improvements. Projection of future PWWF was made, and a master plan of improvements was developed to meet wastewater collection, treatment, and disposal needs at current and future flows. Evaluation of redundancy and consideration of Cal Fire mapping of CSA 17 as a Fire Hazard Severity Zone was included as well.

This study relies in large part on previous studies completed and information provided by County staff. Much of the records search, sewer trunk lines inventory and review, and data gathering was provided by County staff so we are indebted to their service in making this a useful SMP. Data gathered and evaluated included the following:

- Determination of historical and future wastewater flows
- Development of an existing and 20-year collection system computer model
- Evaluation of the existing collection, treatment, and disposal system
- Development of a staged five to 20-year plan of improvements
- Estimation of the current cost of proposed improvements
- Determination of the ultimate size required for the Interstate 5 undercrossing serving west Cottonwood
- Completion of a rate study to fund recommended existing and future improvements
- GIS mapping and consideration of Fire Hazard Severity Zones

The findings of this evaluation of the wastewater collection system and WWTP are presented herein and comprise the CSA 17 2013 Sewer Master Plan (SMP or Master Plan). The associated rate study can be found in Appendix A of this SMP.

SEWER SYSTEM REVIEW

A plan of the existing CSA 17 wastewater system is shown on Plate 1. For the purpose of this report, the proposed ultimate SOI boundary, as anticipated by the County, was divided into 13 currently sewered subareas as shown on Plate 1. Tables, figures, and plates are located at the end of the text.

WASTEWATER COLLECTION SYSTEM

In 2012, the CSA 17 collection system included approximately 16 miles of mainline sewer, 1.5 miles of pressure force main, outfall piping, and four wastewater lift stations. The collection system was installed primarily to serve the town of Cottonwood and surrounding residences that experienced leach field disposal problems due to high groundwater levels. The system currently consists primarily of 6-inch and 8-inch diameter collection sewers, and 10-inch and 12-inch diameter interceptor sewers. The system can be broken down into three subsystems: west, central, and east Cottonwood.

Cal Fire adopted Fire Hazard Severity Zone Maps for State Responsibility Areas (SRA) in November 2007. According to Cal Fire, fire hazard is a way to measure the physical fire behavior so people can predict the damage a fire is likely to cause. Fire hazard elements considered include vegetation, topography, weather, crown fire potential, and ember production and movement. Additionally, Fire Hazard Severity Zones in Local Responsibility Areas (LRA) were recommended by Cal Fire. A portion of the CSA 17 collection system is within the high and moderate hazard class of both the SRA and LRA. Refer to Plates 2 and 3 for SRA and LRA Fire Hazard Severity Zones, respectively. The water distribution system in CSA 17 is owned and maintained by Cottonwood Water District (CWD) and is shown on Plate 4. Locations of existing fire hydrants in CSA 17 are also shown on Plate 4 and fire flow testing results recently completed by Cottonwood Fire Protection District are shown in Table 1.

SEWAGE LIFT STATIONS

CSA 17 topography generally slopes downward from northwest to southeast towards the Sacramento River, with the WWTP being located southeast of the service area as shown on Plate 1. All raw wastewater must be pumped to the WWTP from two main sewage lift stations. There are two smaller intermediate lift stations that divert flow from one drainage area to another, prior to reaching the major lift stations.

The majority of wastewater flows from west and central Cottonwood which is tributary to the Cottonwood Lift Station. This station pumps about 90% of all raw wastewater to the WWTP via a 10-inch force main. Black Lane Lift Station pumps wastewater from east Cottonwood directly to the WWTP via a 6-inch force main. Quail Lane and Crowley Creek Lift Stations are smaller, with Quail Lane only serving a few homes and Crowley Creek primarily serving Cottonwood Elementary School. Both lift stations are tributary to the Cottonwood Lift Station. CSA 17 lift station data is shown in Table 2.

Cottonwood Lift Station consists of an inlet manhole, two wet wells, a valve vault, control panel, and 50 kW diesel engine standby generator. Wastewater enters the inlet manhole through a 12-inch pipe, where it passes through 10-inch pipes into each wet well. Each wet well contains a 150 GPM pump and a 300 GPM pump. Therefore the lift station effective capacity with the largest pump out of service is 600 GPM (0.86 MGD). The wet wells are interconnected with an 8-inch pipe. All four submersible centrifugal nonclog pumps are controlled by an air bubbler type level control system. A standby diesel-powered generator is provided to allow the pump station to continue operating during a power outage. Cottonwood Lift Station is outside of the SRA Fire Hazard Severity Zone, but is within the moderate LRA hazard zone as shown on Plates 2 and 3, respectively. As such, it is recommended County staff maintain adequate defensible space clearance around this lift station at all times. Fire protection standards will be considered for all improvements to this lift station recommended herein.

Black Lane Lift Station consists of an inlet manhole, wet well, valve box, and control panel. Wastewater flows to the inlet box through an 8-inch pipe. A sluice gate on this pipe allows the pump station to be isolated. The wet well contains two submersible centrifugal nonclog pumps, each with a rated capacity of 150 GPM, for an effective lift station capacity of 0.22 MGD. Black Lane Lift Station is outside of the SRA Fire Hazard Severity Zone, but is within the moderate LRA hazard zone. As such, it is recommended County staff maintain adequate defensible space clearance around this lift station at all times. Fire protection standards will also be considered for all improvements to this lift station recommended herein.

Quail Lane Lift Station pumps raw wastewater from a low portion of the collection system into the main portion of the collection system in central Cottonwood via a 3-inch force main, where it flows by gravity to Cottonwood Lift Station. There are two grinder pumps at this lift station, each with a capacity of 60 GPM, for an effective lift station capacity of 0.09 MGD. Quail Lane Lift Station is outside of the SRA Fire Hazard Severity Zone, and is in the urban unzoned LRA hazard class.

Crowley Creek Lift Station pumps sewage primarily from Cottonwood Elementary School into the main portion of the collection system in west Cottonwood via a 4-inch force main, where it flows by gravity to Cottonwood Lift Station. There are two submersible centrifugal nonclog pumps at this lift station, each with a capacity of 250 GPM, for an effective lift station capacity of 0.36 MGD. The Crowley Creek Lift Station is outside of the SRA Fire Hazard Severity Zone, and is in the urban unzoned LRA hazard class.

Only Cottonwood and Crowley Creek Lift Stations are provided with high wet well level alarms, power failure alarms, and pump failure alarms that send a signal via telephone to County staff. Additionally, only these lift stations have automatic transfer switches to provide emergency power in the event of a power outage. Black Lane and Quail Lane Lift Stations do not have alarms or generators.

WASTEWATER TREATMENT PLANT

As originally constructed in 1986, the WWTP has an ADWF design capacity of 0.43 MGD, and a PWWF of 1.32 MGD. The WWTP is currently operating at an ADWF of 0.3 MGD, or 70% of the original design, and a PWWF of 0.99 MGD, or 75% of design. Few major improvements have been made to the original WWTP which consists of the following treatment processes:

1. Headworks for the screening of course materials and for influent flow measurement

2. Biological secondary treatment for the removal of soluble organic material and suspended material

3. Filtration for final suspended solids reduction to produce a high-clarity effluent which meets discharge requirements

4. Chlorination for effluent disinfection and dechlorination for chlorine removal prior to discharge

5. Solids handling system consisting of sludge storage ponds and sludge drying beds for dewatering of waste activated sludge prior to disposal

A process flow diagram of the current facility is shown in Figure 1. Refer to Table 3 for a complete listing of unit processes with related design criteria for the WWTP. CRWQCB Waste Discharge Requirements (WDRs) Order No. R5-2010-004 for the WWTP is in Appendix B. The WWTP is outside of the SRA Fire Hazard Severity Zone, but is within the moderate LRA hazard zone. As such, it is recommended County staff maintain adequate defensible space clearance around the WWTP at all times. Fire protection standards will be considered for all improvements recommended herein located at the WWTP. The following is a description of each major treatment unit process.

Photo 2: Auger Monster®

Headworks: Raw wastewater enters the headworks through a 10-inch pipe from Cottonwood Lift Station and normally flows through a JWC Environmental Auger Monster®. The Auger Monster® is a combination Muffin Monster® grinder which shreds clumps of rags and long stringy material, and captures and removes solids via a perforated screen and rotating auger. The auger conveys solids to the discharge point where the integrated compactor squeezes out water before depositing the cleaned and dried material into a dumpster. A manually cleaned bar screen is provided in the event the mechanically cleaned screen is taken out of service. The bar screen can be run manually or automatically at pre-set time intervals. The screen may also run automatically in response to high water levels just upstream (overriding the timer), which indicates abnormal buildup on the screen.

Screened wastewater is then metered in a 6-inch Parshall flume prior to flowing to the secondary treatment process. The flume is accurate for a free flow up to 4 MGD. The staff gauge installed in the flume reads to 2.5 MGD, with one foot of freeboard remaining.

Aeration Basin: The secondary treatment system utilizes an aeration basin activated sludge process consisting of two aeration basins with mechanical aerators, two secondary clarifiers, and a return activated sludge (RAS) and waste activated sludge (WAS) pump station.

Screened wastewater is mixed with RAS at the headworks and gravity flows to a splitter box which equally distributes flow to two aeration basins. Manual slide gates allow for isolation of either of the basins if necessary. Each basin has 215,000 gallons of volume, with hydraulic detention times of 34 hours and 10 hours at average and peak flows, respectively. The food to microorganism ratio at average flows and a mixed liquor suspended solids (MLSS) of 2,000 mg/L is 0.07, and the mean cell residence time is about 11 days.

Each basin contains one 15 HP aerator that transfers oxygen to the wastewater and keeps the flow circulating around the ditch. The amount of oxygen transferred to the wastewater is controlled by a variable position effluent weir gate in each basin.

Photo 3: Secondary Clarifier

Secondary Clarifiers: MLSS from the aeration basins gravity flows to a splitter box which distributes flow to two 35-foot secondary clarifiers, each with 12-foot sidewater depths. The clarifiers are center feed, peripheral overflow, and provide a relatively quiescent condition that permits MLSS to separate into a settled sludge with a relatively clear overflow. Under normal operating conditions both units are in service with an overflow rate of 160 GPD/SF at ADWF, and 520 GPD/SF at PWWF. The overflow is low in organics which gravity flows from the secondary clarifiers, into a splitter box, and then to the filter. Settled sludge is removed from the clarifiers through sludge suction lines attached to the lower rotating clarifier mechanisms. Pumping of the settled sludge is controlled via the RAS/WAS pump station.

RAS/WAS Pumps: Settled activated sludge is pumped back to the headworks by two 5 HP RAS pumps, each with a rated capacity of 140 GPM, operated in a lead/lag run mode with a manual alternator switch. The return flow typically ranges from about 100% to 110% of the total plant influent flow. A 3 HP WAS pump with a rated capacity of 100 GPM pumps excess waste to either the sludge storage basins or sludge drying beds.

Traveling Bridge Filter: The filter consists of a 35-foot by 9-foot dual media automatic backwash traveling bridge sand filter. It employs a carriage-mounted backwash hood that travels the length of the filter when a preset head is reached, allowing for backwashing without ceasing operation of the filter. Backwash water is returned to the headworks just upstream of the aeration basins at a rate of approximately 270 GPM.

The current filter loading rates during ADWF and PWWF are 0.7 GPM/SF and 2.2 GPM/SF, respectively. The filter is operated at all times.

Chlorine Contact Basin: Chlorine solution for effluent disinfection is injected into the 12-inch line from the filters to the chlorine contact basin. The chlorine solution is mixed with filter effluent via an in-line static mixer.

Chlorine gas is metered via two chlorinators, each with a capacity of up to 150 Lbs of chlorine per day. One chlorinator supplies chlorine solution for plant effluent disinfection, while the other normally supplies chlorine to the other application points as required for process control. The chlorinators are fed by three of six 150-Lb cylinders manifolded together through an automatic switchover system. Chlorine solution is circulated by a distribution panel, and a variety of operating modes are possible. Chlorine consumption is currently at an average 55-80 Lbs per day, with maximum demand at about 100 Lbs per day, to maintain a residual of about 7 mg/L.

An automated flow and concentration-based dosing control and electronic, real-time residual chlorine analyzer chlorination/dechlorination system was installed in October 2011, resulting in less chlorine being used at the plant.

Photo 4: Chlorine Contact Basin

After chlorine injection, effluent passes through the serpentine chlorine contact basin which has a total volume of 27,300 gallons and is designed to provide 30 minutes of contact time at a design PWWF of 1.32 MGD. Detention time at an ADWF of 0.43 MGD is approximately 1.5 hours. The basin is divided into two chambers with slide gates so one chamber can continue to operate when the other is drained for cleaning. However, normally both chambers are operational.

Sulfur dioxide is added at the outlet of the contact basin for dechlorination from one 150-Lb cylinder. Sulfur dioxide consumption is currently at an average 15 Lbs per day, with maximum demand at 50 Lbs per day. After dechlorination, effluent gravity flows through a 14-inch outfall line and is discharged into Cottonwood Creek. Soda ash is added to the effluent for pH control as needed.

Effluent Diffuser: A new diffuser was installed July 2008, consisting of a high flow winter diffuser and a low flow summer diffuser. The high flow diffuser was used for one winter, but only the low flow diffuser has been in service since summer 2009. The high flow diffuser consists of 16-inch flanged SDR17 HDPE pipe with 4-inch diameter holes opposite each other at 12-inch spacing 90° apart for a total of 16 ports. The low flow diffuser is 8-inch flanged SDR9 HDPE pipe with 2-inch diameter holes opposite at 12-inch spacing at 0°, 90°, and 270° for a total of 144 ports. The diffuser disperses effluent along its length into Cottonwood Creek. As the level of the creek drops, during the mid to late summer months, the once submerged ports become exposed. These ports are then plugged, leaving the remaining submerged ports to disperse effluent.

Sludge Storage Basins: WAS is pumped from the clarifiers to either the sludge storage basins (SSBs) or the sludge drying beds. There are currently two SSBs totaling about 4.9 acre-feet (AF). The northern aerated SSB (SSB 1) is 4.3 AF, while the southern aerated SSB (SSB 2) is 0.63 AF. SSB 1 was recently constructed to replace the original SSB which was found to be leaking in March 2002. A new 10 HP aerator was installed in SSB 1 at this time as well. SSB 2 utilizes a 5 HP aerator.

Photo 5: Sludge Storage Basin 1

Storage of the sludge in the SSBs is a simple, low maintenance process that allows solids to be stored over the winter months and then dried in the summer prior to disposal. Further decomposition in the SSBs also makes the sludge more stable and reduces its volume. WAS is currently produced at an average 560 Lbs per MG of treated wastewater. Operators typically fill one SSB and then switch to the second while decanting and sending the first SSB sludge to the drying beds. Since only one pond is dewatered each year, the ponds each receive the equivalent of one year of sludge production prior to dewatering. The 5 HP sludge transfer pump is used to pump sludge from the basins to the drying beds.

Sludge Drying Beds: The concrete lined sludge drying beds are divided into four separate beds, three of which are currently in use. Liquid sludge is pumped to the drying beds and dried as a result of both evaporation and drainage of excess water through the sand. Dried sludge is then removed from the beds and taken to a landfill. Drainage water from the beds flows to the drainage pump station. The drying beds were originally designed to be loaded five times per season at a rate of 0.9 CF of wet sludge per SF of drying area. Currently, there is only one cycle per season and the beds are loaded at 4.5 CF per SF.

Support Facilities: Potable water is supplied to the plant by a 210-foot deep well and a 5 HP pump with a rated capacity of 50 GPM located on-site. Nonpotable water is provided using chlorinated plant effluent supplied via two 5 HP pumps, each with a rated capacity of 60 GPM, located at the end of the chlorine contact basin.

The drainage pump station located near the drying beds receives flow from the drying bed underdrain, supernatant from the SSBs, backwash water from the filter, and drainage from the control and chlorine buildings. Discharge from this pump station is to the downstream end of the headworks.

The general purpose pump located in the control building is used to dewater either the aeration basin or the bar screen channel at the headworks. This pump also discharges to the downstream end of the headworks.

CONTROL SYSTEMS

The WWTP control panel located in the control building provides a central location for control of most plant equipment and annunciation of abnormal conditions. A diesel-powered emergency generator is available to run all essential WWTP processes in the event of a power outage. An automatic phone dialer system is provided at the WWTP and Cottonwood and Crowley Creek Lift Stations to warn personnel of alarm conditions when no one is on duty.

WASTEWATER FLOWS

SERVICE AREA

The CSA 17 service area boundary shown on Plate 1 is also the current Local Agency Formation Commission (LAFCO) SOI boundary according to the 2003 Municipal Services Review (MSR). It consists of approximately 1,665 acres (2.6 square miles). According to the MSR, in 2003, CSA 17 had 1,094 service connections, of which 981 were active, serving an estimated 2,460 people. In 2012, there were a reported 1,271 service connections, 1,146 of which were active, serving an estimated 2,475 people. This equates to an average annual growth rate in connections of 1.8%, while the population remained about the same. This growth corresponds relatively well with the prediction made by LAFCO in the 2003 MSR wherein it was stated that growth and population in the CSAs will remain relatively static into the foreseeable future. Therefore, CSA operations are more in a preventative maintenance mode than one of system expansion to accommodate new development.

With growth presently remaining static in CSA 17, an attempt was made to establish a rational ultimate boundary. The projected ultimate SOI boundary shown on Plate 5 encompasses a larger area than the existing service area boundary and is based on the General Plan ultimate boundary for CSA 17. It is anticipated to be approximately 5,595 acres (8.7 square miles). The projected ultimate SOI northern boundary meets with the southernmost boundary of the City of Anderson SOI for the most part. A portion of the northeasterly General Plan boundary was not included in CSA 17 due to existing topography and the need to pump rather than gravity feed to the existing collection system should development occur in that area. The southern boundary of the projected ultimate SOI for CSA 17 ends at Cottonwood Creek.

This Master Plan outlines staged sewer improvements needed to service existing deficiencies and anticipated 20-year growth. To determine CSA 17 collection system needs, the study area was divided into 13 currently sewered subareas as shown on Plate 1. Household equivalent (HE) wastewater loadings were then estimated for each subarea based on 20-year estimated growth pursuant to the County's General Plan, Housing Element, and additional known developments currently being considered for potential future growth. Subareas were established based on existing sewer locations, topography, and other pertinent factors such as lot lines and existing streets and drainages.

In addition to anticipated 20-year growth and subsequent recommended improvements, ultimate growth was also considered to determine the ultimate size of the Interstate 5 (I-5) undercrossing serving west Cottonwood. Using the anticipated ultimate SOI, the highest projected development densities from the General Plan and Housing Element were utilized to project ultimate build out and corresponding wastewater flows in west Cottonwood.

EXISTING WASTEWATER FLOWS

HE Determination

An HE is defined as the average dry weather wastewater flow generated from a single-family dwelling. Wintertime household water consumption is assumed to be a gauge of dry weather household wastewater flow, based on the assumption that the majority of winter water usage (about 80%) is discharged into the wastewater collection system. The five-year average wintertime water usage in the CWD from 2008 to 2012 was approximately 0.38 MGD, 80% of which is about 0.31 MGD as shown in Table 4. The five-year summertime ADWF recorded at the WWTP for the same time period was 0.30 MGD as shown in Table 5. The minimal difference between summertime WWTP wastewater flow and winter water consumption can be attributed to a number of factors including: summertime groundwater exfiltration; illegal sump pump discharges; gravity sewer flushing and cleaning; flow meter accuracy; and other factors. Utilizing 80% of the average winter water consumption, along with a 10% vacancy rate in the County based on active to standby users, results in an HE of approximately 240 gallons of wastewater per day as shown in Table 6. This compares reasonably well with similar communities in the region. For example, the City of Weed has a rate of 210 GPD per HE, and the Cities of Redding and Anderson both have rates of 300 GPD per HE. Therefore, for the purpose of this study, a flow factor of 240 GPD per HE was used for existing and future development throughout CSA 17 when determining ADWF.

Inflow and Infiltration (I&I)

Based on review of the 2008 to 2012 influent WWTP flow records, the five-year ADWF was approximately 0.30 MGD. According to County staff, historical instantaneous PWWFs at the WWTP have reached 0.99 MGD. Thus, during wet weather conditions, the current peaking factor is 3.3, which points towards an increased I&I component when compared to the original design peaking factor of 3.07. While this I&I component is significant, some communities have peaking factors of six times or greater.

The State Water Resources Control Board (SWRCB) Clean Water State Revolving Fund (CWSRF) requires an evaluation of excessive I&I in sewer systems to obtain project funding as follows:

> "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 an SSES to determine whether is it 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, an 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."

Utilizing an ADWF of 0.30 MGD, together with an estimated population of 2,475, results in a flow rate of 121 GPCD. A PWWF of 0.99 MGD, together with an estimated population of 2,475, results in a peak flow rate of 400 GPCD. Therefore, should CWSRF funding be pursued, an SSES would need to be prepared.

Infiltration refers to groundwater that leaks into cracks and breaks in sewers and manholes. Inflow refers to stormwater that enters the sewer system directly from such sources as illicit roof drain connections, cross connections to storm drains, surface drainage that directly enters a broken sewer, cleanouts without lids, or leaky manhole covers, etc. Infiltration tends to be prolonged leakage until the groundwater table subsides. Inflow tends to be more noticeable during a storm event when surface water is present. Since the two are very hard to separate, it is common practice to simply refer to the entire leakage problem as I&I.

I&I has significant impact on sizing of sewers in a collection system, and can increase costs significantly. The total I&I rate that occurs at the worst condition is referred to as peak I&I, and although this may last for only a short time, such as minutes in a small system or an hour or so in larger systems, wastewater facilities must be sized to handle peak I&I. Thus, the size of wastewater collection and interceptor facilities are governed mainly by the combination of peak I&I and peak wastewater flow components, with I&I often being the largest component. The second type of I&I that affects the cost of a wastewater system is simply the total amount of I&I, usually referred to as annual I&I. This affects annual operating costs including pumping, treating, and disposal of I&I.

A review of CSA 17 WWTP records suggests that at PWWF, a large portion (70% or 0.69 MGD) of wastewater flow is due to I&I, and most of this is likely from infiltration. This is based on the observation that it takes a prolonged period of rain to significantly increase I&I flows at the WWTP. Furthermore, plant flows appear to drop off relatively slowly following a period of intense rainfall.

It should be noted, sewers that leak in can also leak out. Although leaks flowing out tend to become plugged, significant outflow can occur in leaky sewer systems. This partially defeats the purpose of a sewer system, which is to collect and convey sewage in a manner not harmful to humans or the environment.

Although leakage out of sewers is a potential health and pollution problem, leakage into sewers is the most noticeable problem. Overflowing sewers and periodic violations of effluent discharge requirements can cause the CRWQCB to issue a Cease and Desist Order should these issues reoccur time and time again. Further violations or failure to proceed with needed improvements will result in fines and/or a building moratorium.

Such a ban was implemented in CSA 17 in 1996, in response to a series of sewage overflows that occurred during a storm event in which I&I quadrupled flows to the WWTP. Studies were undertaken which revealed the collection system suffered from excessive I&I, and major deficiencies at the Cottonwood Lift Station and WWTP. In response to these deficiencies, a moratorium on new sewer connections was established in west and central Cottonwood. Several improvements were made to the system eliminating the immediate problems, including additional sludge handling facilities and a new effluent diffuser. Refer to the Cottonwood Sewer System Capacity Study (Capacity Study), completed by Shasta County in August 1996, detailing these issues.

I&I Field Investigations

In an effort to identify key areas that may be prone to I&I problems, and to determine the relative severity of current I&I in various areas of the system, PACE and County staff prepared to complete a systematic flow measurement program in the winter of 2012. Strategic manholes disbursed throughout the collection system as shown on Plate 1 were selected for flow monitoring on the basis of upstream service area, historical observed flows, flow isolation, and sewer size. Verification of these manholes was completed to ensure available access for flow monitoring equipment.

Photo 6: I&I Monitoring Station Verification

Unfortunately, 2012 was a dry winter, and no significant rainfall events occurred at opportune times for wet weather flow monitoring to take place. It is recommended the County complete I&I flow monitoring at designated monitoring station manholes during the next significant storm event to better identify and evaluate I&I prone areas in the system. The field flow monitoring effort should consist of going through the collection system at night and early morning, when the wastewater component of the flow is minimal, to measure flow at designated manholes. In some cases, measured flow will include flow(s) measured in upstream monitoring stations which will be deducted from measured flow to derive I&I contributions in the lone service area. Because measurements are taken at different times, and flows vary over time, this can compound errors; however, the data will be interpreted to provide a basis for additional future planning efforts.

Without I&I monitoring data, assumptions had to be made for completion of this Master Plan. Lift station pumping records were utilized to calculate and apply I&I rates to corresponding subareas shown in Plate 1. The historical PWWF I&I component observed at each lift station (PWWF minus ADWF) was evenly distributed throughout the corresponding subareas. Flow weighted average I&I rates were applied to Subareas 3 and 8 in which Crowley Creek and Quail Lane Lift Stations are located, respectively, due to only a portion of sewers in the overall subarea contributing to these lift station pump records. Calculated I&I distribution is likely not a precise representation of what actually occurs in the system, but is currently the most appropriate estimate using limited available data. All assumptions herein must be verified when I&I flow monitoring is completed.

A summary of the calculated I&I data is presented in Table 7. Columns 5 and 6 indicate the estimated existing and future sewered area, in acres, for each monitoring subarea. Estimated I&I flow rates for each subarea are shown in Columns 8 and 10. Columns 12 and 14 show the estimated existing and future ADWF and PWWF per subarea.

Typically, sewered areas with I&I rates at or below 1,500 GPAD are considered to be within acceptable limits. As can be seen in Table 7, using the assumptions explained above, a majority of the monitoring stations had I&I values less than 1,500 GPAD, indicating sewers that appear to be very tight. I&I rates in excess of 2,500 GPAD are considered high and indicate sewers that have defects and are sources of I&I. Table 7 indicates there are 2 subareas with I&I rates near 3,000 GPAD (subareas into Black Lane Lift Station), indicating these areas are potential sources of I&I. Since most pump records utilized herein resulted in relatively low I&I rates, the need for accurate I&I flow monitoring to be completed at the next available opportunity is further emphasized. This will provide verification that recommendations and needed improvements indicated herein are adequate and representative of those actually needed in the collection system.

It is important to note flow monitoring data is based on instantaneous flow measurements. Thus, any conclusions derived based on its analysis should be considered a possible trend and not absolute fact. For example, it would be ideal to focus any smoke testing work on areas that appear to have a high inflow component first, rather than smoking the entire system.

GROWTH PROJECTIONS

In 2003, CSA 17 had 1,094 service connections, of which 981 were active, serving an estimated 2,460 people according to the MSR. In 2012, there were a reported 1,271 service connections, 1,146 of which were active, serving an estimated 2,475 people. This equates to an average annual growth rate in connections of 1.8%, while the population actually declined slightly.

According to the Shasta County General Plan, the California Department of Finance indicated the population of Shasta County as a whole increased by 4% over the last five years (annual average growth rate of 0.8%). Current data shows a predicted growth of 17% between the years 2010 and 2020 (annual average growth rate of 1.7%) in a report previously completed by the Department of Finance. Also noted in the General Plan, the Department of Finance now states that assumptions used to project future population may no longer be applicable, and these projections could change with their next estimate cycle which is every five years.

In the 2003 MSR, LAFCO stated that growth and population in the CSAs will remain relatively static into the foreseeable future; therefore, CSA operations are more in a preventative maintenance mode than one of system expansion to accommodate new development. That having been said, there are a few proposed developments which have tentative maps and/or preliminary plans already completed and approved. This Master Plan utilizes these developments, together with the highest predicted future development densities per the General Plan and Housing Element, at an annual growth rate of 1.7% to forecast growth in the next 20 years. See Plate 6 for densities utilized. Recommended improvements to accommodate this growth are shown on Plate 5. It is important to note these improvements are only preliminary, as development details are yet to be determined. Additional studies needed to verify how to serve each of these developments are beyond the scope of this Master Plan. Therefore, improvements and details must be further investigated and evaluated at such a time prior to development occurring.

If development in the future is less than 1.7%, improvements designed to accommodate growth for the next 20 years will be satisfactory for a longer period of time than indicated herein. If growth and development are greater than that anticipated herein, improvements will reach their design capacity sooner than projected.

20-Year Growth Projections

For this study, a portion of proposed developments which have tentative maps and/or preliminary plans already completed and approved, together with the highest predicted future development densities per the General Plan and Housing Element, were anticipated to be built within the next 20 years at an annual growth rate of 1.7%. An analysis of this growth suggests that by year 2032, an additional 542 ADWF HEs may be added (i.e., 1,967 total ADWF HEs) to the CSA 17 wastewater system due to development. Table 7 indicates the number of existing and future HEs, as well as the anticipated I&I contribution from each of the 13 currently sewered subareas.

Figure 2 represents future WWTP ADWF based on varying growth rates. As shown in this figure, projected WWTP flows could exceed the current 0.43 MGD ADWF capacity of the plant within the next 20 years if the assumed 1.7% growth rate is realized.

Ultimate Growth Projections

Ultimate growth was considered to determine the ultimate required size of the I-5 undercrossing serving west Cottonwood. Using the anticipated ultimate SOI, the highest projected development densities from the General Plan and Housing Element were utilized as shown on Plate 6 to project ultimate build out and corresponding wastewater flows in west Cottonwood.

Full build out of proposed developments is not likely to occur in the next 20 years, and the County intends to update this Master Plan prior to such development occurring. Therefore, collection system and WWTP improvements needed to serve ultimate build out were not analyzed beyond application to the I-5 undercrossing.

FUTURE WASTEWATER AND I&I FLOWS

To obtain meaningful flow projections for use in developing a plan to meet future sewer needs, it is not only important to know how much growth is expected to occur in the next 20 years, but also where this growth is likely to occur.

After estimating expected growth in specific subareas, and determining the number of HEs associated with that growth, existing 2012 and future 2032 wastewater and I&I flow contributions were estimated for each subarea. Estimated 2032 flows were used to determine the required sewer size needed to serve that subarea.

Existing sewered subarea boundaries are shown on Plate 1 and are approximate limits of service. Boundaries can be shifted slightly to change the subarea without significantly impacting sewer sizing. However, large changes in service areas should be reviewed to determine how downstream sewers are impacted.

In existing subareas with calculated I&I values less than 1,500 GPAD, it was assumed I&I rates would gradually increase due to degradation of the collection system over time to 1,500 GPAD under future conditions. I&I flows in subareas with values between 1,500 and 4,000 GPAD were assumed to remain the same in the future due to the combination of some rehabilitation being completed, but also some degradation due to age. All future sewered areas were assigned an I&I allowance of 1,500 GPAD. It is again emphasized these values and assumptions should be re-evaluated when meaningful I&I flow monitoring data can be obtained.

All of the above mentioned estimates of HEs, sewered area, and I&I rate data for each subarea are summarized in the service area tabulation for all subservice areas as shown in Table 7.

DESIGN CRITERIA SUMMARY

Sewer sizing was based on handling PWWF, which equals the sum of the peak dry weather wastewater flow rate and peak I&I allowance.

This data was utilized in developing a computer model of the CSA 17 wastewater system. The diurnal curve shown in Figure 3 was developed based on pump station records of several north state utilities. This diurnal curve was used in the hydraulic model to simulate affects of daily flows into the CSA 17 collection system.

HYDRAULIC COMPUTER MODELING

H_2OMAP Sewer by Innovyze® was used to model the CSA 17 collection system. Two computer models were created for this Master Plan: an existing 2012 PWWF model and a 20-Year 2032 PWWF model. The existing PWWF model was created using existing CSA 17 collection system mapping, GPS surveying of all manhole locations, and field measurements of sewer inverts at each manhole. County mapping of the existing collection system was used to confirm collection system pipe size, length, and material for input into the modeling software. Manhole lid elevations and invert depths were surveyed to verify mapping accuracy. ADWF was distributed throughout a 24-hour period by applying it with the diurnal curve. Lift station flow records were used to determine approximate I&I rates for the collection system. I&I for each subarea was determined by multiplying the estimated I&I rate for the subarea by the number of inch-miles of pipe in that subarea. This modeling technique assumes a rain event will last for 24 hours, and I&I is

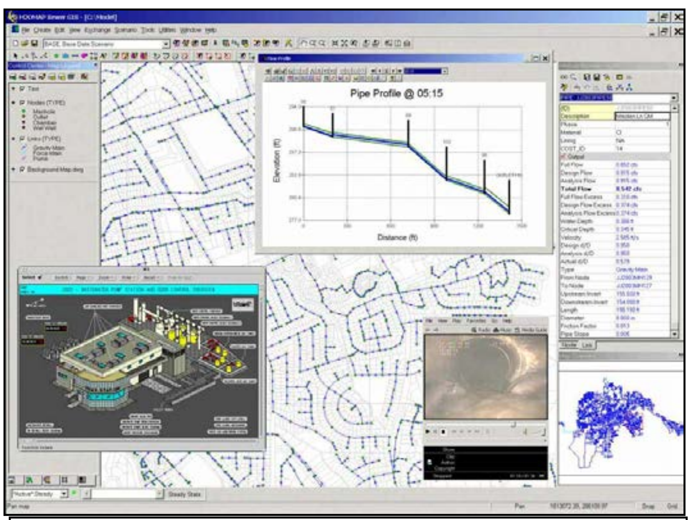

Photo 7: Innovyze® $H_2$0MAP Sewer Program

constantly introduced into the collection system during this event. The composite diurnal wastewater and I&I hydrograph for all subareas were then merged together to create a real time 2012 PWWF model of the system. Thus, the model takes into account the potential flow dampening due to lag time associated with peak flow from each service area reaching the WWTP at different times. The 2012 PWWF model was then used as the basis for the 20-year model. The 2032 model includes estimated growth projections previously described herein. An ultimate PWWF model was beyond the scope of this Master Plan.

As previously indicated, model I&I allowances were estimated via analysis of historical lift station flows. It is possible that some sewer mains are impeded by roots, failing or disconnected pipes, or other problems, while other pipes are in good condition. However, the model cannot determine the condition of pipes and assumes all sewer pipes have free flow. As the County investigates areas known to have high I&I, it may find some sewer flows are impeded or have other problems not reflected in the model.

Once the hydraulic models were created and calibrated to existing system performance, they were analyzed and collection system limitations were addressed. Where modeled sewer capacities were limited, parallel or replacement sewers were sized in order to resolve these limitations. Table 8 summarizes hydraulic model results and also shows sewer capacities needed to reduce the potential for existing or future sewer surcharge, given an assumed future I&I rate of 1,500 GPAD. These improvements are shown on Plate 5.

More or less parallel and/or replacement sewers may be needed if actual I&I is found to be greater than or less than that which was calculated herein.

ANALYSIS AND RECOMMENDED IMPROVEMENTS

GENERAL

The first step in analysis of the wastewater system was to compare the capacity of existing gravity sewer lines with calculated 2012 and 2032 flows using the hydraulic models. Plate 1 shows the existing sewer collection system pipes 6-inch and larger which were the focus of the modeling effort. By reviewing output from the computer models, which is shown in Table 8, deficiencies in the existing collection system were identified. Once critical slopes and pipe diameters were determined, the models were used to verify size requirements. New sewers needed to parallel or replace existing sewers, or those anticipated to be inadequate in the future, are shown on Plate 5.

In order to effectively utilize this Master Plan, it is recommended service area tabulations shown in Table 7 of this report be reviewed prior to construction of major trunk sewers. If actual development is significantly more or less dense than anticipated herein, appropriate adjustments in proposed sewer sizes and downstream sewer sizes should be made. Locations and sizes of pipes for new development were not shown, as they would be purely speculative at this point in time.

Where existing sewers are not large enough to convey existing or year 2032 flows, a new parallel or replacement sewer is indicated on Plate 5 and Table 8. Parallel sewers were sized based on handling the differential flow between future demands and existing capacity. This assumes the existing sewer will remain in service and can be restored to acceptable standards utilizing currently available rehabilitation techniques, if necessary. Prior to paralleling or replacing any existing sewer, a detailed review, including video inspection, should be made of the existing sewer to determine if it is desirable to keep in service. The capital cost of a total sewer replacement, which would require a larger new sewer and lateral re-connections, is considerably greater than installing a parallel relief sewer in most cases.

INFILTRATION AND INFLOW REDUCTION PROGRAM

Sizing of parallel relief sewers and replacement sewers and future expansion of the WWTP is often dependent upon estimated existing and future I&I rates. As previously mentioned, these estimates represent the largest contingency in the development of this SMP. In view of the large expenditures which will be necessary for parallel relief sewers and upgrade of the WWTP, it is imperative the County invest in I&I monitoring and measurement to verify I&I flow estimates herein before proceeding with any improvements. If significant I&I is measured, an I&I reduction program should be implemented.

Accurately identifying and reducing I&I will result in long-term savings to CSA 17 by reducing the volume of wastewater treated at the WWTP, and delay or possibly eliminate the need for parallel or replacement sewers. Industry experience has shown that installing relief sewers without correcting major sources of I&I relieves existing bottlenecks, but eventually results in even higher PWWF downstream. Sewer systems in poor condition continue to deteriorate, and, if not corrected, the volume of I&I only increases with time.

The peak I&I rate for most sewers within CSA 17 was calculated to be about 1,000 GPAD, which is low. However, this is only an estimate based on lift station pumping records. Therefore, for this Master Plan, it is assumed the County will complete I&I flow monitoring in the future to obtain a more accurate representation of system I&I. Should flow monitoring indicate areas of significant I&I problems (i.e., areas with I&I much larger than 1,500 GPAD), the County will develop a plan to aggressively correct these I&I problems in the future. As with most I&I reduction programs, the initial I&I reduction tasks will be relatively easily identified (e.g., broken sewer mains and leaking manholes) and relatively cost effective to correct. However, successive I&I reduction efforts tend to be much more difficult and expensive in terms of dollars per gallon of I&I removed.

Laterals and House Connection I&I

For any I&I reduction program to be effective, improvements to leaky laterals and building sewers are necessary, in addition to improvements to collection sewer mains. There have been several studies that point to sewer laterals and building connections as contributors of up to half of all I&I entering a collection system.

In a study for the U.S. Environmental Protection Agency (EPA), Conklin (1981) noted that many sewer rehabilitation programs that did not address sewer laterals had a maximum I&I removal rate of about 30%. Furthermore, the EPA study also concluded that building connections and private sewer laterals contribute 50% of total I&I into the system. Therefore, without a committed effort by the County to correct I&I from laterals and house connections, the best that can be hoped for in any I&I reduction program is about a 30% reduction.

The sewer connection from the house to the County sewer main is separated into two parts. The sewer pipe from the house to the property line is called the “house connection,” and the sewer pipe from the property line to the sewer main is called the sewer “lateral.” Currently, County Standards stipulate the property owner is responsible for the sewer connecting the house to the property line, while the County is responsible for the lateral and cleanout. Property line cleanouts are required on all laterals in CSA 17. Generally, the lateral is located in the public right-of-way. In order for the property owner to repair the sewer lateral, he/she would be required to obtain an encroachment permit from the County in order to work on the lateral within the public right-of-way.

Should I&I become a significant problem in the system, it is recommended a frequently scheduled event result in lateral testing and cleaning, such as the sale of property. Instituting a County ordinance that establishes a maximum rate of leakage from a house connection could be enforced at the time of property sale. If the sewer lateral does not meet the leakage rate standard, the sale of the house would be contingent upon repair of the lateral. As a minimum, the County should consider having the private lateral video inspected in order to determine any gross defects in the pipe that need to be corrected prior to sale.

It is suggested the County implement a two-phased I&I reduction program. Accurate I&I flow monitoring should be completed, followed by a repair and rehabilitation phase if high I&I areas are identified. Initially, the first phase would consist of field evaluation of existing sewers. This field effort should include the following:

- Smoke and dye test sewers to determine open sewer cleanouts, illegal connections from downspouts, basement sump pumps, etc;
- Video inspection of both main line sewers and laterals where access is possible to determine defects and sources of I&I;
- Inspect manholes to reveal I&I sources that are caused by poor manhole construction and degradation; and,
- Review field data, summarize where sources of I&I are evident, and formulate the best way to repair these defects.

The second phase of the I&I reduction program would involve implementing repair and replacement of leaking sewer infrastructure. This should include grouting of sewers and lateral joints, lining, pipe bursting, or replacing main line sewers and manholes, and addressing laterals by installing cleanouts as needed so specific laterals can be evaluated and repaired if necessary. It is recommended the County purchase a hydro jet cleaner for CSA 17 in order to more easily clean roots, debris, clogs, and other causes of I&I in the collection system.

Costs for a comprehensive I&I reduction program within CSA 17 are not included herein. When I&I monitoring is complete, an I&I reduction program can be developed based on review of the field data. Until such time, costs for performing I&I reduction work cannot be accurately forecasted.

The City of Dunsmuir offers one recent example of I&I investigation and repair costs. I&I monitoring completed for the City's 2007 Master Sewer Plan found an area of approximately 100 homes to have unusually high I&I rates from 8,200 to 28,000 GPAD. Upon completing video inspection, sewers in these areas were found to be constructed of PVC and in good condition; therefore, it was concluded I&I must be coming from laterals. The City put out to bid in May 2013, a public works project for additional video inspection of laterals, followed by replacement of laterals from the sewer main to the property line with installation of a two-way cleanout for future I&I investigation. The average contractor price for 3,100 feet of lateral replacement, plus installation of 104 two-way cleanouts, was approximately $500,000. This equated to a unit price of $4,810 per cleanout with 30 feet of lateral replacement.

Dunsmuir certainly presents an argument that any I&I reduction program performed should be verified using flow monitoring and video inspection. Using flow monitoring data generated for successive Master Plans as a basis, subsequent flow monitoring data in those areas that have been rehabilitated will need to be gathered and compared in order to verify reductions in I&I. It is strongly recommended the County perform such flow monitoring of the existing system at least every five years during PWWF.

WASTEWATER COLLECTION SYSTEM IMPROVEMENTS

Recommended sewer improvements are shown on Plate 5. Trunk sewer design flows and required sewer sizes were determined for 2012 and 2032 flow conditions as described below. Specific improvements recommended below are primarily based on repairing existing system deficiencies and allowing for future growth previously described herein.

PWWF for each reach of trunk sewer was determined using the Innovyze® H_2OMAP Sewer computer program. Summary of the H_2OMAP program outputs, assuming a future I&I rate of 1,500 GPAD, is shown in Table 8. The table indicates analysis year, model pipe number, sewer length, diameter, slope, capacity, model PWWF, surcharge depth, and recommended replacement or parallel sewer pipe sizes. Using an input sewer slope and diameter of the existing trunk sewer, together with compiled PWWF, the program computes existing sewer capacity. Table 8 indicates a recommended size of a parallel sewer if the existing sewer condition is adequate. A replacement sewer size is also shown on the table in case the existing sewer is to be abandoned. For example, Table 8 shows moderate to severe surcharging could occur in the 10-inch interceptor prior to the Cottonwood Lift Station. Analysis indicates 2032 PWWF conditions will require the existing interceptor be paralleled with 8-inch to 12-inch interceptor in several locations, or replaced with 10-inch to 15-inch interceptor, in order to handle anticipated 20-year flows. Slopes of all existing sewers noted as needing improvements should be verified prior to construction.

The following are brief descriptions of sewer improvements (general improvements) projected to be needed where existing sewers are of inadequate size, now or in the future:

<u>Gas Point Road</u>: Computer model analysis indicates that during present day conditions, approximately 830 feet of existing 8-inch sewer along Gas Point Road and West Cottonwood Junior High (see Points 1 to 2 on Plate 5) can encounter surcharging conditions during PWWF. This surcharging condition has not been observed in the field, but that may be due to relatively deep sewers in this area. Future PWWF conditions will increase the amount of surcharging. Upon verification of surcharging, it is recommended the existing 8-inch sewer be paralleled with 8-inch and 10-inch sewer as shown on Plate 5.

<u>East of Main Street</u>: Analysis indicates at anticipated 2032 PWWF conditions, a section of existing 10-inch sewer east of Main Street just prior to the Cottonwood Lift Station (see Points 3 to 4 on Plate 5) can encounter surcharging conditions. Exacerbating this surcharge condition is the flat slope on one section of the existing 10-inch sewer which is anticipated to have about half the slope required for proper sewage flow and solids transport. While the hydraulic model does not indicate surcharging to occur until

20-year conditions, County staff have reported overflowing manholes for some time in this area when Cottonwood Lift Station backs up. In the Capacity Study it was noted, "The existing mains under the freeway and between the freeway and Cottonwood Pump Station are very deficient." As such, it is recommended the County video inspect the existing 10-inch sewer main in this area, and closely monitor it during the next large storm event. In order to relieve this potential surcharge condition and to reduce the possibility of sewer blockage due to solids deposition, the hydraulic model indicates approximately 200 feet of existing 10-inch sewer should be replaced with 15-inch sewer as shown on Plate 5. It is anticipated the new replacement sewer can be constructed at the same slope as the existing sewer, or approximately 0.1%. It is recommended the remaining portion of sewer in this area be paralleled with approximately 220 feet of 8-inch relief sewer and 130 feet of 10-inch relief sewer as shown on Plate 5. These improvements are the minimal required, and may need to be expanded upon or completed sooner depending on results of the video inspection and I&I monitoring.

Near Cinabar Road and Wincrich Lane: Approximately 1,070 feet of existing 8-inch sewer south of Cinabar Road near Wincrich Lane (see Points 5 to 6) appears to have minor surcharging during current PWWF, but is anticipated to have more than five feet of surcharge at 2032 PWWF conditions. This surcharge was reflected in the hydraulic model even though it has not been observed in the field. However, the sewer is deep in this area as well. It is recommended the County monitor this pipeline during the next PWWF event. If I&I monitoring shows existing surcharging, it is recommended this sewer be paralleled with 8-inch and 10-inch relief sewer as shown on Plate 5.

Park Drive: Approximately 150 feet of existing 8-inch sewer on Park Drive near the intersection of Rhonda Road (see Point 7) is likely to surcharge at 2032 PWWF conditions and cause backup further upstream. It is recommended this sewer be paralleled with an 8-inch relief sewer prior to 20-year conditions as shown on Plate 5.

Interstate 5 (I-5) Crossing: The existing sewer main crossing under I-5 is a 10-inch gravity main within a 15-inch steel casing. Zoning from the Shasta County General Plan and Housing Element, whichever indicates greater density as shown on Plate 6, was used to determine the required size of this main expected at ultimate build out. Approximately 3,330 additional ADWF HEs are anticipated in west Cottonwood at ultimate build out, for a total of about 4,020 ADWF HEs. When this growth is realized, an additional 21-inch gravity main within a 30-inch casing pipe will need to be bored and jacked under the freeway to accommodate an ultimate PWWF of about 6.1 MGD. Additionally, approximately 1,300 feet of 21-inch parallel gravity sewer would need to be constructed from the I-5 crossing to the Cottonwood Lift Station, as well as upsizing the lift station and paralleling the existing force main with a new 10-inch force main to accommodate ultimate flows. The cost for these improvements is approximately $2 million in November 2013 dollars as shown in Table 9. Land acquisition is not anticipated to be needed for these improvements.

An alternative to the above scenario, recommended as Alternative 1 in the Capacity Study, is to construct a new pump station just west of the I-5 crossing to serve west Cottonwood and install approximately 7,000 feet of 15-inch force main to the WWTP. An existing shallow culvert could be utilized for the force main crossing, therefore the need to bore and jack under I-5 would be eliminated. The new lift station and force main, and subsequent diversion of the west Cottonwood flows, would also allow for increased build out of central Cottonwood using the existing Cottonwood Lift Station and 10-inch force main. The approximate cost of this alternative is $2.7 million in November 2013 dollars as shown in Table 10. Land acquisition is not included in this cost but will be required to construct the new lift station.

It is recommended the County pursue the alternative of boring and jacking a new gravity sewer to the Cottonwood Lift Station when growth requires it. This is the least costly alternative and land acquisition will not be required. These costs have not been included with recommended improvements herein, as ultimate growth is not anticipated to occur until beyond the scope of this SMP.

Recommended improvements herein do include the eventual complete replacement of collection system mains as they continue to deteriorate. Given that sewer mains have an approximate lifespan of 100 years, and many of the CSA 17 sewers were installed more than 25 years ago, the County should anticipate having to replace much of the system mains within the next 70 years. Complete system replacement within this time would amount to more than $12 million, or about $176,000 per year in November 2013 dollars. It is not possible to evaluate the condition of each section of the sewer system at this time without performing extensive field testing. Therefore, sequencing of the replacement work will likely be determined by the frequency of repairs required in various areas. Considering the magnitude of potential replacement costs, the County should develop a financial plan that provides for replacing sewer mains in order to minimize I&I. As such, costs indicated in Table 11 include about 325 feet of system wide sewer replacements each year for the next 20 years. It is recommended the County budget as much as possible for replacements needed in upcoming years.

LIFT STATION IMPROVEMENTS

Photo 8: Cottonwood Lift Station Electrical

Cottonwood Lift Station: The existing pump motors are original to the lift station, with the pump bowls having been replaced more than 10 years ago. The rail system was recently replaced. The effective capacity of 0.86 MGD is adequate to meet current PWWF, but is not large enough to meet the anticipated 20-year PWWF of 0.97 MGD. Therefore, it is recommended the existing 150 GPM pumps be replaced with 300 GPM pumps, and the existing 300 GPM pumps be replaced with 700 GPM pumps by year 2029, if the 1.7% annual growth rate assumed herein is realized, for an effective lift station capacity of 1.8 MGD. Assuming these flows, the existing 10-inch force main is adequate to handle future 20-year PWWF; however, the 4-inch lift station piping and valving will need to be upsized to accommodate a larger pump. There are high pump alarms at this lift station, however there is not a float backup system, and the controls are obsolete. It is recommended all new pumps, motors, and controls be installed, along with a backup float system. Additionally, a Taskmaster Grinder® or similar is recommended to be installed prior to the screen to minimize pump clogging which has been an issue according to County staff. A new generator should be installed, as the existing diesel generator does not meet current air quality regulations and electrical components cannot be ordered due to the obsolete equipment. A reliable generator is imperative for this lift station, as it is located in a moderate LRA Fire Hazard Severity Zone. Any additional future improvements to this lift station should consider fire protection standards as well.

Photo 9: Black Lane Lift Station

<u>Black Lane Lift Station</u>: This lift station is more than 20 years old, with all original equipment, and the pump equipment has met its useful service life. As such, it is recommended all mechanical be replaced, including the existing railing, pumps, and motors. The effective capacity of 0.22 MGD is equal to the current PWWF, but is not large enough to meet the anticipated 20-year PWWF of 0.30 MGD. Therefore, it is recommended both of the existing 150 GPM pumps be replaced with 230 GPM pumps for an effective lift station capacity of 0.33 MGD. The existing 6-inch force main is adequate to handle future 20-year PWWF; however, the existing 4-inch lift station piping and valving will need to be upsized to accommodate larger pumps. It is also recommended piping be installed to allow for connection of a portable gas driven trash pump for bypass piping. The existing pumps constantly clog due to excessive large debris that accumulate in this section of the

collection system. The auto-dialer was recently replaced at this lift station; however, there is no emergency generator or alarms. As such, it is recommended a generator be installed with an automatic transfer switch in case of power outages and alarms be installed. Similar to Cottonwood Lift Station, a reliable generator and alarms are imperative for this lift station, as it is also located in a moderate LRA Fire Hazard Severity Zone. Any additional future improvements to this lift station should consider fire protection standards as well.

Photo 10: Crowley Creek Lift Station

Crowley Creek Lift Station: The effective capacity of 0.36 MGD at this lift station is more than adequate to meet anticipated 20-year PWWF. This lift station is relatively new with a diesel generator and automatic transfer switch. However, the diesel gas tank does not have adequate secondary containment, given that an existing pipe runs through the "secondary containment" CMU wall onto the ground. It is recommended adequate secondary containment be installed, as well as a cover over the existing controls for protection from the elements. It is also recommended piping be installed to allow for bypass pumping.

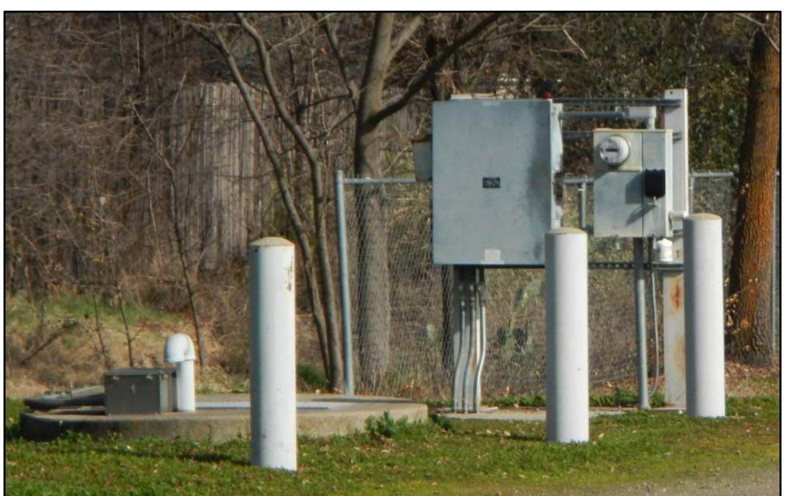

Photo 11: Quail Lane Lift Station

Quail Lane Lift Station: The effective capacity of 0.09 MGD at this lift station is more than adequate to meet anticipated 20-year PWWF. However, this lift station is more than 20 years old and the pump equipment has met its useful service life.

As such it is recommended all mechanical be replaced including rails, pumps, motors, electrical, and controls. The lift station should be fenced, all electrical should be covered, and a generator should be installed, as one is not currently available for this lift station. It is also recommended piping be installed to allow for bypass pumping.

WASTEWATER TREATMENT PLANT IMPROVEMENTS

The existing WWTP produces final effluent that is currently discharged to Cottonwood Creek as described in the WDRs in Appendix B. The existing WWTP was designed for an ADWF of 0.43 MGD, and a PWWF of 1.3 MGD. The WWTP is currently operating at an ADWF of 0.3 MGD, or 70% of the original design, and a PWWF of 0.99 MGD, or 75% of design. According to recent discussions with the CRWQCB, it is anticipated any growth beyond the current 0.43 MGD design capacity will require significant WWTP improvements, including consideration of possibly moving the discharge from Cottonwood Creek to the Sacramento River and/or effluent storage during low dilution periods. This is due to more stringent anticipated future dilution requirements for discharge to Cottonwood Creek. Assuming the 1.7% annual growth rate utilized herein, this WWTP capacity could be reached by year 2032. WDRs require a discharger to notify the CRWQCB by January 31st when any project shows that capacity of any part of the facilities may be exceeded in four years. For CSA 17, this could happen by year 2028. Within 120 days of the notification, the discharger must 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.

In order to meet future flows, several improvements are recommended, in addition to immediate improvements needed to correct existing deficiencies. An NPDES Compliance Evaluation Inspection (CEI) of the WWTP was completed by PG Environmental, LLC, a USEPA contractor, and the CRWQCB February 20, 2013, in which several major findings were noted as violations of the WDRs. Refer to Appendix C for the CEI and associated Notice of Violation (NOV).

Most of the major findings of note in the CEI were related to required record keeping and reporting, calibration of flow meters, self-monitoring program requirements, laboratory operations and procedures, and processes for O&M. As such, it is recommended standard operating procedures (SOPs) and O&M manuals be created and/or updated for all major processes and equipment at the WWTP. Costs for completion of these were considered and included in the rate study in Appendix A.

WWTP design criteria shown in Table 3 outlines the process units and loading under the original 1983 design, existing 2012 flow conditions, and future 2032 flows. Future 2032 design criteria were determined to meet anticipated 20-year PWWF conditions, assuming a 1.7% growth rate and future I&I rate of 1,500 GPAD. A site plan of the major recommended improvements is shown on Figure 4.

<u>Headworks</u>: CSA 17 recently ordered new bearings for the Auger Monster® grinder. While it has performed well, it is over 10 years old and has met its useful service life. A new Auger Monster® is recommended to be installed.

<u>Aeration Basin</u>: While aerator motors have been rebuilt, the existing aerators have met their useful service life and should be replaced. The gear boxes have never been rebuilt, and the backup motor and gear box have been sitting on the shelf for many years in a damp location with original oil.

<u>Secondary Clarifiers:</u> One of the clarifier drive units was replaced in 1999, however the other unit now needs new parts. It is recommended both clarifiers be sand blasted and recoated, with new launders and weir baffles. In order to keep the sludge blanket down in the clarifiers, the RAS pump rate must be extremely high. If the RAS rate drops to about 50% to 80% of influent flow, only clear water is returned and the clarifier has about an 8-inch thick sludge blanket. If the RAS rate is cut in half, the sludge blanket rises to about three feet. The sludge blanket issue was noted in the CEI, as some solids carryover was observed in one of the two secondary clarifiers. This is likely due to the presence of filamentous bacteria and a reported sludge volume index (SVI) of

about 350 mL/gm. SVI is a measure of the amount of settling that occurs in a certain time period. An SVI of 150 mL/gm typically results in good quality settling. As such, it is highly recommended CSA 17 install a biological selector and route the continuous RAS into the selector. Addition of a selector prior to the aeration ditches will provide higher food to microorganism ratios which favor a better settling sludge. This is turn will improve the nitrification and denitrification process, thereby reducing effluent ammonia and nitrate concentrations. Selectors are currently in service at City of Redding Stillwater and Clear Creek WWTP and City of Red Bluff WWTP, and one is currently under construction at City of Dunsmuir WWTP. Construction of a biological selector and another filter at the CSA 17 WWTP will likely allow for more time before additional aeration basins and secondary clarifiers are needed.

RAS/WAS Pumps: The existing RAS, WAS, scum, and sludge pumps are all original to the WWTP and are pitted from cavitation. It is recommended all pumps be replaced. It is also recommended an additional RAS pump be installed for redundancy. The existing two RAS pumps are only capable of pumping 0.39 MGD together. It is desired to return approximately 100% to 150% of ADWF, which would be upwards of 0.6 MGD at design ADWF.

Traveling Bridge Filter: Filter sand was replaced in October 2011, and a new filter pump and air compressor were recently installed as well. The carriage-mounted backwash hood has wheels that run along plates which are not evenly aligned, thereby resulting in uneven and inadequate backwashing and a plugged filter bed. As such it is recommended the existing filter be rehabilitated with a rail mounted backwash system. The filter is operated at all times, and therefore cannot be taken

Photo 12: Traveling Bridge Filter

off-line for maintenance. Additionally, the existing filter overflows often and easily downstream of the mixer. Backwashing is done two to four times a day in order to keep the level low enough to avoid overflows. As such, an additional filter is highly recommended for ease of operations, maintenance, and redundancy.

Chlorine Contact Basin: The existing slide gates of the chlorine contact basin channel are leaking and therefore need replacing. Additionally, the WWTP discharge has issues with disinfection byproducts (DBPs) as a result of adding so much chlorine due to low contact times. As such, it is recommended the existing chlorine contact basin be modified to provide more volume, and therefore longer contact time (CT). California Department of Public Health (CDPH) recommends achieving a minimum 90-minute modal chlorine CT in order to result in a minimum 450 mg-min/L at all times when sending effluent to Cottonwood Creek where reclamation may occur. It is highly recommended the chlorine contact basin be enlarged from 27,300 gallons to 81,900 gallons to provide a minimum 90 minute CT during future PWWF.

A new automated flow and concentration-based dosing control and electronic, real-time residual chlorine analyzer chlorination/dechlorination system was installed in October 2011, resulting in less chlorine being used at the plant. However, this system continues to require substantial calibration attention by County staff.


Photo 13: Automated Chlorination System

There are nine standpipes throughout the WWTP which do not work well with highly chlorinated secondary effluent. The freeze-proof valve malfunctions, causing the pipes to freeze and leak and the WWTP No. 2 water loses pressure. It is recommended freeze-proof yard hydrants be installed with an isolation valve below grade that can be turned on and off.

It is also recommended chlorine and sulfur dioxide automatic shut-off valves be installed, along with a chlorine detector. Existing chlorine rotometers and valves need replacing, as the parts wear out and are hard to find as they are no longer readily available. Existing scales for the chlorine gas and sulfur dioxide gas are corroding and need to be replaced. Finally, soda ash is injected with chemical feed pumps to control low pH conditions due to nitrification. It is recommended pH controls be added to the chemical feed pumps so as not to add to the dissolved solids loading as a best management practice. Improvements should allow for accurate reporting obtained from continuous monitoring as required in the WDRs rather than daily grab samples.

Photo 14: Chlorine Gas

In order to avoid equipment deterioration due to chlorine and the possibility of an accidental or intentional release of chlorine gas, the County should consider converting from chlorine gas to ultraviolet (UV) disinfection. There are several benefits to UV over the existing disinfection process including the following:

- Once installed, the UV system only needs power to operate; i.e., no need to rely on hazardous chemical (chlorine and sulfur dioxide) deliveries
- Existing filtration removes total suspended solids from the secondary effluent and improves efficacy of the UV disinfection process
- Regulated disinfection byproducts, such as total trihalomethanes, are not created as a result of the disinfection process
- Equipment is easy to operate and maintain, although maintenance must be performed on a regular basis to prevent fouling of UV glass
- No storage of large quantities of hazardous materials on-site is required

- Total dissolved solids will be reduced in the final effluent by not using chlorine and sulfur dioxide, thus meeting a Salinity Evaluation and Minimization Plan goal
- Green house gas emissions will be reduced by not trucking chemicals from the supplier to the WWTP
- Possibility of a release of gaseous chlorine and/or sulfur dioxide to operators and the public is eliminated

The benefits of converting from chlorine gas to UV disinfection are further emphasized due to the WWTP being located in a moderate LRA fire hazard severity zone. It is recommended County staff ensure adequate defensible space clearance around the WWTP and related facilities at all times. However, this will not eliminate the possibility of a fire occurring, thus allowing for the possibility of an unintentional release of chlorine gas. Fortunately, the WWTP is located away from the general public in a relatively remote area. As such, the increased cost for converting to UV versus replacement of chlorine injection and monitoring equipment is not justified at the present time. However, it is recommended CSA 17 begin measuring UV transmittance to better determine the viability of conversion to UV in the future. Increased community growth will make the use of chlorine gas a more immediate threat to public safety in the future, therefore requiring a greater need for a safer disinfection process.

Photo 15: Low Flow Diffuser

<u>Effluent Disposal Facilities</u>: Cottonwood Creek is an intermittent stream and a tributary to the Sacramento River. The Water Quality Control Plan for the CRWQCB Sacramento River Basin and San Joaquin River Basin (Basin Plan), adopted by the CRWQCB in 1975, discourages discharges to intermittent streams. Thus, CSA 17

WDRs require specific dilution requirements during the discharge period. As previously noted, it is likely that any growth beyond the current 0.43 MGD design capacity will require significant WWTP improvements. Assuming the 1.7% annual growth rate utilized herein, this could be required by year 2032. Detailed analysis of effluent discharge options is beyond the scope of this SMP, but is anticipated to include seasonal discharge to Cottonwood Creek with nearby storage with reclamation alternatives, or discharge to the Sacramento River as a costly, most likely infeasible alternative. Costs have been included herein for completion of a feasibility study prior to year 2032, in which these and other potentially viable effluent discharge alternatives will be considered.

Sludge Storage Basins: Enzymes are added to the SSBs in an attempt to encourage biodegradation of the WAS and subsequent reduction in the volume of sludge sent to the drying beds. The northern aerated SSB (SSB 1) is 4.3 AF compared to 0.63 AF for SSB 2. At the current size, a substantial amount of water must be decanted and sent back through the WWTP before the sludge can be reached. Consequently, it fills the drying beds up with wet sludge. As such, it is recommended SSB 1 be split in half for ease of operations in cleaning and allow for alternation between the two SSBs.

Photo 16: Sludge Drying Beds

Sludge Drying Beds: The sludge drying beds are divided into four separate beds, three of which were fully constructed with an underdrain system. Three beds are currently required to desludge SSB 1. As such, is it recommended the fourth bed be made fully operational. Additionally, it is recommended design of the existing drying beds be modified. The current design does not allow for operators to drive along the south wall because the sludge never dries in this area. It is recommended the beds be rebuilt with concrete side walls and concrete floors sloped to a center drain to allow for better drying and ease of operations. Piping currently on top of the drying bed walls should be relocated down into the beds to avoid pipe saddles failing in the heat which occasionally occurs. Currently all of the drying beds are connected, therefore, only one drying cycle per season can be completed. Valving should be added to enable isolation of the individual beds.

Support Facilities: The WWTP recycle water #1 pump was replaced a few years ago, but already has a worn out shaft and the #2 pump rattles. It is recommended both pumps be replaced.

Photo 17: Office/Storage Space

The existing WWTP control building is too small with inadequate room for office and storage space. It is recommended the existing building be converted to only a control building, and a new office building be constructed adjacent to the existing building. The new building should be constructed of noncombustible, limited-combustible, or low flame spread materials according to adequate fire protection building construction standards. Refer to National Fire Protection Association (NFPA) 820, Standard for Fire Protection in Wastewater Treatment and Collection Facilities for further standards, requirements, and details applicable to improvements at the WWTP and lift stations. The new building would house SCADA equipment, with reasonable work stations for processing CRWQCB monthly reports.

Nearly all existing lab and recording equipment is outdated, obsolete, inoperable, or inadequate. New chart recorders are needed for influent and effluent flows, turbidity, pH, pre and post chlorine, and sulfur dioxide. New auto samplers are recommended, as the existing composite samplers are original to the plant and are time-based which does not allow for a flow proportioned composite sample. The 2013 CEI noted the need for influent and effluent composite samples to be flow proportional per requirements of the WDRs. It is recommended all existing lab equipment be replaced as needed, as there has been no recent quality assurance and/or quality control of existing outdated sampling and testing equipment.

Pumps in the drainage pump station are original to the plant and experience cavitation. As such, it is recommended they be replaced. Additionally, the drainage pump station received a marginal rating in the 2013 CEI due to the lack of metering the return flows. It is recommended drainage pump run times be utilized to determine the flows being returned, or a magnetic flow meter be installed.

The WDRs require all flow measurement devices be calibrated at least once a year to ensure continued accuracy. As such, it is recommended the County enter into a performance services agreement to calibrate necessary equipment each year. Costs for this were considered in the rate study in Appendix A.

Potential reasonably foreseeable regulatory changes were discussed at a meeting held between the County, PACE, and the CRWQCB on August 14, 2013. CRWQCB staff indicated no new constituents were anticipated to be added for monitoring or effluent limitations in the next permit renewal cycle, aside from those already considered in the 2010 WDRs. A review of those constituents currently being monitored for reasonable potential but not yet having effluent limits include carbon tetrachloride, aldrin, beta-BHC, and gamma-BHC. Sampling results of these constituents since 2011 have indicated future effluent limits may be required for carbon tetrachloride. The other constituents being monitored have all been non-detect in the effluent. Further analysis of assimilative capacity, reasonable potential, and the possibility of obtaining dilution

credits for carbon tetrachloride will be needed at the time of the next permit renewal cycle. Recommended WWTP improvements herein are expected to improve effluent quality and may minimize the presence of effluent carbon tetrachloride.
CRWQCB indicated evaluation of the diffuser performance will likely be required during the next permit renewal cycle. Review of downstream receiving water sampling to date has indicated the diffuser is working as designed, will all effluent limits being met.

CRWQCB also indicated a more stringent total coliform limit may be included in the next permit. A total coliform value of 2.2 MPN/100 mL will likely be required when dilution of less than 20:1 occurs when discharging to Cottonwood Creek. USGS Gauging Station 11376000 is located on Cottonwood Creek approximately two creek miles downstream of the WWTP outfall. There are no major tributaries or outfalls between the CSA 17 outfall and this gauging station. As such, this will enable determination of the dilution that occurs. It is anticipated the additional filter being recommended herein will allow for all flows to be filtered, and an expanded chlorine contact basin should substantially increase the ability to meet a total coliform limit of 2.2 MPN/100 mL.

CSA 17 is currently collecting dissolved copper and zinc water quality data in the downstream receiving water as required per the WDRs. Additionally, quarterly total and dissolved water quality data is collected at Department of Water Resources (DWR) Monitoring Station Number A0352050, located less than one-mile upstream of the CSA 17 WWTP outfall, which has been in existence since 1951. This data could be useful for future permit renewal cycles should assimilative capacity and/or metal translator determinations be needed for continued dilution credits to be granted. As such, it is recommended the County continue monitoring dissolved data even if this is not a requirement in future permits.

CSA 17 received dilution credits for ammonia, nitrate, copper, zinc, chlorodibromomethane (CDBM), dichlorobromomethane (DCBM), cyanide, and bis-2-ethylhexylphthalate (bis-2) during the last permit renewal recycle. CRWQCB will likely continue to grant these dilution credits as long as the County can show the best practicable treatment or control (BPTC) is being used as is feasible to treat these pollutants. As indicated in the WDRs, BPTC for removal of copper, zinc, and bis-2 is through use of the filters and effluent diffuser. BPTC for removal of cyanide, CDBM, and DCBM is through use of the filters, effluent diffuser, and the automated flow/concentration-based chlorination/dechlorination system. BPTC for removal of ammonia and nitrate is use of the WWTP nitrification and denitrification processes and capabilities. Addition of a new filter, anoxic biological selector, and chlorination/dechlorination system improvements recommended herein will substantially improve BPTC for all of these constituents by producing a better quality effluent with reduced total suspended solids.

CONTROL SYSTEM IMPROVEMENTS

Photo 18: WWTP Control Panel

The WWTP control panel located in the control building provides a central location for control of most plant equipment and annunciation of abnormal conditions. However, all controls are obsolete for which the County cannot get replacement parts. It is recommended all controls be upgraded. Additionally, the WWTP diesel standby generator is also obsolete and does not meet current air quality regulations.

The need for redundancy of all system pumps, operational water facilities, and updated controls, alarms, and generators is further emphasized due to the CSA 17 WWTP being located in a moderate LRA Fire Hazard Severity Zone.

ESTIMATES OF COST AND FINANCIAL CONSIDERATIONS

BASIS OF COST ESTIMATES

Gravity sewer, force main, and other facility costs have been prepared using information from comparable projects in the area where construction contracts were competitively bid. Gravity sewer construction costs from these previous projects, projected to November 2013 costs and an Engineering News Record (ENR) Construct Cost Index (CCI) of 9666, are illustrated on the curves in Figure 5. The figure accounts for varying depths and types of backfill required. Values from these curves and recent projects were used as a guide in preparing the estimate of pipeline costs herein.

Note that these estimates are based, in many instances, on preliminary information. Even in developed areas, at the report stage it is often difficult to determine underground conditions relative to the amount of groundwater, rock excavation, and conflicts with existing utilities that would be encountered. These cost elements cannot be properly evaluated until final design. Consequently, estimates in this report should be considered as "order-of-magnitude" estimates which may vary from actual construction costs for a particular project element. However, overall Master Plan costs should be reasonably close and satisfactory for the basis of planning a financial program.

To obtain total project costs, construction contingencies, and indirect costs were added to construction costs. Construction contingencies at this stage are usually estimated to be 25% of construction costs. Indirect costs include engineering, administration, legal, and environmental costs, typically amount to about 25% of construction cost plus 10% contingency. These figures will vary considerably depending upon the complexity of the work, and the uncertainties of construction costs and raw materials. Costs for acquiring necessary rights-of-way, interest during construction, and/or other financing costs should be added when preparing any financial plan.

All costs indicated in this report are based upon November 2013 dollars. For future or delayed work, an allowance for construction cost increases must be considered. During the last 10 years, general construction costs have increased at an average rate of about 3.6% per year. Similarly, the average rate of increase for the last three years has been about 2.8% per year. In projecting future costs, both short-term and long-term inflationary trends should be considered.

Note that costs shown in Table 11 of this report are capital improvement costs only, which do not include any O&M costs of the wastewater system. Projected capital costs do not include the annual cost for an I&I correction program if I&I monitoring indicates one is necessary. O&M costs are considered and included in the rate study in Appendix A.

The need for sewer improvements has been determined using the best available information regarding existing design capacity and flow conditions. However, current flow conditions are based on fluctuating flow measurements, and future flow estimates are based on assumed growth rates and future I&I rates. Due to the approximate nature of these estimates, improvements identified in this study are preliminary, but with a reasonable margin of error with which to base a rate increase upon. Future detailed analysis of each problem area using video inspecting and smoke testing will undoubtedly uncover good and bad sewer alike.

Time Periods

Immediate Term (2013 to 2017): Improvements where existing capacity is clearly less than the calculated theoretical and are thus needed as soon as possible, or are needed to improve safety or performance of existing facilities (preferably completed within three to five years).

Near Term (2017 to 2022): Other improvements that are marginal in capacity, or will be over theoretical capacity in the next five to ten years, or are needed to improve performance or efficiency.

Intermediate Term (2022 to 2027): Improvements that are marginal in capacity, or will be over theoretical capacity in the next 10 to 15 years, or are needed to improve performance or efficiency.

Long Term (2027 to 2032): Remaining improvements that are theoretically needed to have adequate capacity to meet proposed 20-year development. Scheduling of these wastewater facilities will likely be more definitive in future Master Plan updates; however, funding needs should be addressed now.

A preliminary cost estimate for the staged WWTP and general wastewater collection system improvements is shown in Table 11. Table 11, together with the recommended improvements shown on Plate 5, in essence, is the Master Plan of Sewer Improvements. As shown in Table 11, approximately $940,000 and $1,409,000 (November 2013 dollars) worth of general wastewater collection improvements and WWTP improvements, respectively, is anticipated to be needed in the immediate term. These costs include a 60% adder for construction contingencies, environmental, and engineering. The cost estimate in Table 11 includes staged improvements needed to first correct existing system deficiencies, then to allow for collection system growth up to the current WWTP ADWF capacity of 0.43 MGD.

Additional improvements are scheduled for the following subsequent time periods: Near Term (2017 to 2022); Intermediate Term (2022 to 2027); and Long Term (2027 to 2032). Project costs scheduled in these time periods are based upon the projected growth of 1.7% and estimated future I&I rate of 1,500 GPAD. Final timing of the individual projects will be dependent upon actual growth experienced in each subservice area, as well as confirmation of the estimated I&I rate via subsequent flow monitoring. If sewer service is extended into currently nonsewered areas, or the rate of growth is higher than anticipated, improvements may be needed prior to the dates indicated herein. Table 11 also includes costs to complete an effluent disposal feasibility study in the next 10 to 15 years, depending on growth experienced. It is recommended this Master Plan of sewer improvements be re-evaluated upon completion of I&I flow monitoring, and updated every 10 years.

FINANCIAL CONSIDERATIONS

As a part of this SMP, a recommendation for a Capacity Charge for the CSA 17 sewer system has been prepared. In 2007, CSA 17 had a $3,600 Capacity Charge for one HE. This charge is strictly a Capacity Charge, and costs for the actual sewer lateral are an additional Service Connection Fee if the County installs the connection. The Capacity Charge should be updated annually based upon the ENR CCI which stands at 9666 as of November.

Capacity Charges are often referred to as Connection Fees, but this is a misleading term applied to a charge that is intended to be a revenue producer for capital improvements. Such fees are also often called capital improvement fees. In the American Water Works Association (AWWA) Manual M26, “Water Rates and Related Charges”, these fees are referred to as System Development Costs.

Herein, such fees will be referred to as Capacity Charges which are intended as a fair share payment towards capital improvements, specifically referred to herein as General Improvements. Although the purpose of this engineering analysis is to develop an updated Capacity Charge, other common charges will first be discussed, termed herein as Service Connection Costs and Local Improvement Costs.

Service Connection Costs

The County charges a Service Connection Cost unique to each installation based upon cost incurred including:

1. Lateral and cleanout
2. Sewer extensions

Refer to Appendix D for CSA 17 Sewer Service Charges as of 2007. The Capacity Charge should be independent of Service Connection Costs, even though both are typically imposed at the time of building permit application or time of actual connection. For most sewer services currently being installed, the subdivision developer has already installed the lateral and cleanout (Item 1). However, if no lateral and cleanout exist, the new customer must pay for both. If the County does the work, it charges on a time and expense basis because each service is unique.

In some cases, it is necessary to have a sewer main extension (Item 2) to serve a new property. In this case, the new customer must also pay for the main extension, including possible manholes and/or rod holes. Each sewer main extension will be different, so the County charges on a time and expense basis. The portion of any sewer extension that is in front of a given parcel being served is called a local improvement as discussed below. The portion of a sewer extension that is off-site but necessary to get to the property being served is referred to as off-site improvements. The costs for such off-site improvements are usually borne by the developer, although the County does share in these costs if it benefits. The County issues Sewer Service Charges to new customers so a potential customer is not surprised by additional costs they were not fully aware of.

Local Improvement Costs

When it is necessary to distribute costs of a sewer system to the ones it serves or will serve, it is customary to require each property owner to pay for their fair share of the sewer collection system that is needed to serve their property. In the simple case of a property that is on one side of the street, the cost of the sewer in the street in front of that parcel should be shared 50/50 with the properties on the other side of the street. The sewer size needed to serve the property is usually a minimum size of 6-inch or 8-inch. In addition, each property owner pays for their share of the cost of manholes and rod holes that generally serve it and several other parcels.

These costs are commonly referred to as Local Improvement Costs. Local Improvement Costs for sewer facilities are typically paid for through the developer or the County if it is interested in completely serving an area. The main principle to establish in trying to have an equitable system of finance is that Local Improvement Costs should be paid for by property owners that benefit. Local Improvement Costs can also include sewage lift stations if such facilities are needed for specific properties over and above the typical General Improvement Costs.

General Improvement Costs (Used To Determine Capacity Charge)

General Improvement Costs are defined as those improvements needed for a total wastewater collection, treatment, and disposal system that are not funded by Local Improvement Costs and Sewer Connection Fees. These costs include the following:

1. Wastewater treatment facilities.

2. Sewer collection systems.

3. Sewage lift stations benefiting large areas.

4. Over-sizing of sewers, usually greater than 8-inch diameter, to provide benefit to properties other than the property being served.

5. Interconnections of piping that are not necessary for service to existing properties (e.g., pipelines across government land).

6. Other improvements which the County decides are of benefit to the entire area. For example, an office building, monitoring facilities, etc.

Capacity Charge

The purpose of the Sewer Capacity Charge is to generate capital from new customers to pay for their fair share of General Improvements. The following describes three possible ways this charge can be determined:

Method 1: Determine all capital costs of general improvements that have been paid in the past and divide by the number of present users being served. This is a buy-in cost, or a proportionate cost share of the current system. AWWA Manual M26 refers to this approach as the “equity” method.

Method 2: Determine all capital costs of general improvements that have been paid in the past and those that are planned in the future, and divide this total cost by the total of both the present and future users. This is a combination of Methods 1 and 3.

Method 3: Determine all capital costs of general improvements needed to serve future users and divide that amount by the number of future users that will benefit. This method often uses a defined planning period, such as a 10 to 20 year period, or a specific growth amount (number of new connections). AWWA Manual M26 refers to this approach as the “incremental cost” method. However, under the incremental cost method, the capacity charge is determined by dividing a project cost by the number of users benefiting. In this case, the project may or may not have already been built, but is reflective of the costs needed to serve future users.

Each method has its application. Each also has advantages and disadvantages. Capacity Charges have become the norm (especially since Proposition 13, Jarvis-Gann Initiative), and the purpose is to raise revenue for capital improvements and to bring about equity so new customers pay for a fair share of the capital cost of general improvements.

For CSA 17, Method 3 (future improvement costs divided by future connections benefitting) is believed to be the most applicable for several reasons: Methods 1 and 2 would require a considerable effort to determine past costs and depreciation of the present system, and would involve discretionary decisions regarding how to treat previous grants, debt financing, depreciation, and replacement costs. Method 3 is likely more representative of the true cost incurred for future users and, thus, is more easily supported. AWWA Manual M26 states “this method is considered most appropriate when a significant portion of the capacity required to serve new customers must be provided by the construction of new facilities.”

Refer to Table 11, RECOMMENDED IMPROVEMENTS & CAPACITY CHARGE BASIS. The General Improvement Costs were developed based on the in-depth study of the wastewater collection and treatment system discussed herein. Following the cost for each item in Table 11 is a percentage assigned for new development. A portion of some improvements benefit existing users and are needed to resolve existing deficiencies. For those improvements that benefit both future and existing customers, a proportional share in the cost burden is recommended.

Cost proportioning is based upon the number of future HEs that are expected to occur over the next 20 years based upon the 1.7% growth rate assumed herein. Given these estimates, CSA 17 will add 542 HEs over the next 20 years. HEs have been pre-purchased in various areas of CSA 17 during approval of tentative projects, thereby ensuring their future ability to discharge to the collection and treatment system. Yet many of these areas have already been developed and are not likely to further develop in the future. As such, only those parcels with five or more outstanding pre-purchased HEs were considered herein to possibly develop in the future. A review of County GIS mapping indicated 38 parcels consisting of 393 pre-purchased HEs fall into this category. Of these, eight parcels with 115 pre-purchased HEs were located in the same growth areas already accounted for in the 1.7% annual growth rate considered herein. As such, for the purpose of determining appropriate future capacity charges and monthly user fee rate increases, it is anticipated only 427 additional non-pre-purchased HEs (542 – 115) will be added to CSA 17 over the next 20 years. This represents 23% [427 / (427 + 1,425] of the total number of HEs. Based upon the estimates presented here, the Wastewater Capacity Charge as calculated in Table 11 is $4,844 per HE. Customers that represent more than one HE, such as a commercial development, should pay a proportionately larger fee based upon the estimated number of HEs as determined by the County's engineer.

The remaining portion of the Capital Improvement Plan (CIP) ($8,108,000 - $531,000 = $7,577,000) not paid by future customers is paid by existing customers through the bimonthly user fee. This cost spread over the existing 1,425 HEs for the next 20 years amounts to a bi-monthly charge of $44.31 per HE.

It is highly recommended the County continue to adjust these fees annually, based on the ENR CCI to account for inflation, the anticipated growth rate, and annexations. It is also appropriate to recalculate the fee every five to ten years, especially at the time of preparation of an updated master plan. Before adopting a new Capacity Charge, County counsel should be consulted and shown this report and the rate study in Appendix A to ensure the process is done correctly pursuant to government code.

In adopting a Capacity Charge, the County should be aware of similar charges by other utilities. The State Water Resources Control Board publishes a biyearly report entitled *Wastewater User Charge Survey Report*. The most recent report available is for fiscal year 2012-2013, which surveyed 422 California service areas, three of which were in Shasta County. At that time, the Capacity Charge or connection fee ranged from $3,490 (City of Anderson) to $15,520 (City of Shasta Lake) with an average of $8,380. It is important to keep in mind there are a number of factors affecting an entity's capacity charges, such as:

- Age and condition of the existing collection system, as well as the number of lift stations in the system.
- Wastewater treatment processes and method of effluent disposal.
- Method used to finance latest system expansion and the capacity remaining.
- Date of latest master plan or rate study.

All of this, and Table 11, suggests that a fee of $4,844 appears to be a reasonable Wastewater Capacity Charge for new customers to CSA 17. A rate study in compliance with Proposition 218 and Proposition 26 was completed to further justify this Capacity Charge. The rate study can be found in Appendix A of this SMP. The amount of funds needed to be collected to fix known deficiencies and construct needed improvements described herein during the first five year increment of this 20-year study was identified and is further detailed in the rate study.

PACE Engineering, CDBG Grant No. 10-DRI-6792, $115,000.00

TABLE 1
CSA 17
2013 Sewer Master Plan
COTTONWOOD FIRE PROTECTION DISTRICT FIRE HYDRANT TEST RESULTS

Test No.	Location	Pressures (PSI)[1]			Field Flow (GPM)[2]	Field Flow @ 20 PSI (GPM)
		Static	Residual	Pitot		
1	End of Westhaven	80	60	50	1,190	2,154
2	North Cottonwood School	75	55	40	1,060	1,830
3	Della Ln	95	60	30	920	1,388
4	Crowley Ct	100	60	50	1,190	1,730
5	West Cottonwood School	100	70	50	1,190	2,021
6	3588 Park Dr	95	65	20	750	1,230
7	20675 Collin Ct	100	75	50	1,190	2,230
8	3875 Matthew	80	60	40	1,060	1,918
9	Sigma at Rhonda Rd	80	70	60	1,300	3,421
10	Marry Wood at Castlewood	70	60	50	1,190	2,838
11	Park Dr at Rhonda Rd	90	75	40	1,060	2,435
12	Holiday Market	100	80	50	1,190	2,516
13	20596 McCoy Rd	110	40	20	750	859
14	South end of Brush St	70	55	40	1,060	2,031
15	3346 Foothill Vista Dr	70	50	40	1,060	1,739
16	Park Way at 1st St	70	50	12	580	951
17	20751 2nd St	80	60	40	1,060	1,918
18	20800 4th St	65	65	60	1,300	[3]
19	End of the industrial park	80	60	50	1,190	2,154
20	Oak St at Main	90	75	70	1,410	3,240
21	Cattleman Dr at the arena	80	70	50	1,190	3,131
22	End of Vantage	60	35	30	920	1,186
23	20912 Trefoil Ln	100	80	60	1,300	2,748
24	20961 Foxhunt	100	70	60	1,300	2,208
25	3441 Locust Rd	70	60	20	750	1,789
26	Willow at 3rd St	80	55	40	1,060	1,701
27	20826 1st St	80	60	30	920	1,665
28	Chestnut at High St	80	80	40	1,060	[3]
29	21063 4th St	70	60	10	530	1,264

1. Pressures measured in the field on August 13 & 14, 2013.
2. Calculations assume a 2 1/2-inch outlet (Coefficient = 0.90) was flowing full when Pitot pressure was measured per AWWA Manual.
3. Pressure drop less than 10 PSI during field test.

TABLE 2

CSA 17

2013 Sewer Master Plan

EXISTING LIFT STATIONS

Lift Station	Type	Number of Pumps & Horsepower	Flow Meter (Y/N)	Current Effective Capacity [1] (MGD)	Number of HEs Served		Estimated PWWF[2] (MGD)		Recommended Improvements
					2012	2032	2012	2032	
Cottonwood	Submersible centrifugal nonclog	2-15 Hp 2-7.5 Hp	Y	0.86	1,326	1,805	0.64	0.97	Replace pumps, motors, and controls, and install new backup float system, grinder, and generator. Upsize existing 150 GPM pumps to 300 GPM and existing 300 GPM pumps to 700 GPM, piping, and valving by year 2029.
Black Lane	Submersible centrifugal nonclog	2-10 Hp	Y	0.22	99	163	0.22	0.30	Replace all mechanical and upsize existing 150 GPM pumps, piping, and valving to 230 GPM pumps. Install portable trash pump and piping, generator with automatic transfer switch, and alarms.
Quail Lane	Grinder	2-3 Hp	Y	0.09	24	33	0.023	0.024	Replace all mechanical including rails, pumps, electrical, and controls. Fence lift station, provide cover for electrical, and install generator and bypass piping.
Crawley Creek	Submersible centrifugal nonclog	2-2.8 Hp	Y	0.36	22	22	0.008	0.008	Modify secondary containment for diesel gas tank, cover electrical controls, and install bypass piping.

(1) Effective capacity assumes the largest pump is out of service.

(2) PWWF based on future 1,500 GPAD I&I rate.

TABLE 3

Shasta County Service Area No. 17

2013 Sewer Master Plan

WWTP DESIGN CRITERIA

	Description	Original 1983 Design (1)	Current 2012 Flows	2032 Design
1	**Population**	4,100	2,475	3,500
2	**Flows**			
3	Average Dry Weather Flow, ADWF (MGD)	0.43	0.30	0.43
4	Peak Wet Weather Flow, PWWF (MGD)	1.32	0.99	1.3
5	PWWF : ADWF	3.1	3.3	3.0
6	**Sewage Loadings**			
7	Biochemical Oxygen Demand (BOD_5)			
8	ADWF BOD_5 (mg/L)	200	200	200
9	ADWF BOD5 (Lbs/Day)	720	500	720
10	Total Suspended Solids (TSS)			
11	ADWF TSS (mg/L)	240	140	140
12	ADWF TSS (Lbs/Day)	860	350	500
13	**Headworks**			
14	Mechanical Screen	1	1	1
15	Number of Bar Screen (By-pass) Channels	1	1	1
16	Bar Screen (By-pass) Channel Width (in)	24	24	24
17	Minimum Clearance between bars (in)	0.75	0.75	0.75
18	Automatic Screening Unit w/ Grinder	-	1	1
19	Parshall Flume width (in)	6	6	6
20	Maximum Measurable Flow (MGD)	1.9	2.5	2.5
21	**Oxidation Ditch**			
22	Number of Oxidation Ditches	2	2	3
23	Water Depth (Ft)	7.5	7.5	7.5
24	Volume/Basin (CF)	28,700	28,700	43,100
25	Volume/Basin (Gal)	215,000	215,000	322,500
26	MLSS (mg/L)	4,000	2,000	2,000
27	RAS (mg/L)	-	4,000	4,000
28	SVI (mL/gm)	-	350	150
29	Q_{RAS} @ ADWF (MGD)	0.22	0.30	0.65
30	Q_{RAS}/ Q	0.50	1.00	1.50
31	Organic Loading Overall (Lbs BOD/1000 CF/Day)	12.5	8.7	5.6
32	F:M Overall (Lb BOD5/Lb MLSS/Day)	0.05	0.07	0.04
33	Hydraulic Retention Time @ ADWF (Hr) (2 basins)	24	34	36
34	Hydraulic Retention Time @ PWWF (Hr) (2 basins)	8	10	12
35	MCRT (Days)	44	11	16
36	Rotors (No.)	2	2	3
37	Aerator Motor Horsepower (Hp)	15	15	15
38	**Secondary Clarifier**			
39	Number of Clarifiers	2	2	2
40	Diameter (Ft)	35	35	35
41	Effective Water Depth (Ft)	12	12	12
42	Surface Area of Clarifier (SF)	960	960	960
43	Normal Operations			
44	No. of Clarifiers in service	2	2	2
45	Overflow Rate @ ADWF (GPD/SF)	220	160	220
46	Overflow Rate @ PWWF (GPD/SF)	690	520	680
47	Extreme Operating Conditions			
48	No. of Clarifiers in service	1	2	2
49	Overflow Rate @ ADWF (GPD/SF)	450	160	220
50	Overflow Rate @ PWWF (GPD/SF)	1,380	520	680
51	Solids Loading @ ADWF (Lbs/SF/Day) w/o Q_{RAS}	15	3	4
52	Solids Loading @ PWWF (Lbs/SF/Day) w/o Q_{RAS}	46	9	11
53	Solids Loading @ PWWF (Lbs/SF/Day) w/ 50% ADWF ML Recycle	68	13	17
54	Weir Overflow Rate @ ADWF (GPD/LF)	3,910	1,360	1,960
55	**RAS Sludge Pumps**			
56	Number	2	2	3
57	Hp	5	5	5
58	Flow (GPM) ea.	140	140	140
59	Flow (MGD) ea.	0.20	0.20	0.20
60	Max Return Rate w/all pumps on (MGD)	0.39	0.39	0.58
61	**WAS Sludge Pumps**			
62	Number	1	1	1
63	Hp	3	3	3
64	Flow (GPM) ea.	100	100	100
65	Head (Ft)			
66	**Scum Pump**			
67	Number	1	1	1
68	Hp	3	3	3
69	Flow (GPM) ea.	100	100	100
70	**Traveling Bridge Sand Filter**			
71	Number of Filters	1	1	2
72	Total Filter Bed Area (SF)	315	315	630
73	Filter Rate (GPM/SF) @ ADWF	0.9	0.7	0.5
74	Filter Rate (GPM/SF) @ PWWF	2.9	2.2	1.4
75	**Sludge Drying Beds**			
76	Number of Beds	3	3	4
77	Area, Total (SF)	19,500	19,500	29,500
78	Waste Sludge (design) (Lbs/day)	480	175	480
79	Loadings per season	5	1	5
80	Volume per load (CF)	17,550	87,750	26,550
81	Loading rate (CF/SF)	0.9	4.5	0.9

TABLE 3

Shasta County Service Area No. 17

2013 Sewer Master Plan

WWTP DESIGN CRITERIA

	Description	Original 1983 Design (1)	Current 2012 Flows	2032 Design
82	**Sludge Storage Basin**			
83	Number	2	2	3
84	North SSB (CF)	33,800	189,000	187,000
85	South SSB (CF)	33,800	27,300	27,300
86	**Sludge Transfer Pump**			
87	Number	1	1	1
88	Hp	5	5	5
89	Flow (GPM) ea.	420	420	420
90	**Chlorine Contact Basin**			
91	Number of Chlorine Basins	1	1	1
92	Average Water Depth (Ft)	5	5	5
93	Volume (CF)	3,650	3,650	10,950
94	Volume (GAL)	27,300	27,300	81,900
95	Detention Time @ ADWF (Hr)	1.5	2.2	4.6
96	Detention Time @ PWWF (Min)	30	40	91
97	**Chlorinators**			
98	Number	2	2	2
99	Capacity per Chlorinator (lbs/day)	150	150	150
100	Max Dosage @ ADWF (mg/L)	42	30	30
101	Max Dosage @ ADWF (Lbs/Day)	150	80	110
102	Max Dosage @ PWWF (mg/L)	13	12	12
103	Max Dosage @ PWWF (Lbs/Day)	140	100	130
104	**Dechlorinators**			
105	Number	1	1	1
106	Capacity per Dechlorinator (lbs/day)	150	150	150
107	Max Dosage @ ADWF (mg/L)	42	7	7
108	Max Dosage @ ADWF (Lbs/Day)	150	20	30
109	Max Dosage @ PWWF (mg/L)	13	6	6
110	Max Dosage @ PWWF (Lbs/Day)	140	50	70

(1) Design criteria as indicated in the original June 1985 WWTP O&M Manual.

(2) Influent BOD and TSS based on average Aug-Sep flows from 2007-2012.

TABLE 4
CSA 17
2013 Sewer Master Plan
COTTONWOOD WATER DISTRICT WELL CONSUMPTION (MG)

Month	Year					5-Year Avg
	2008	2009	2010	2011	2012	
Jan	11.2	14.0	13.0	11.6	12.9	12.5
Feb	10.1	11.3	10.6	10.7	11.8	10.9
Mar	15.9	14.5	13.8	10.8	11.4	13.3
Apr	26.8	24.2	13.6	15.4	14.4	18.9
May	37.1	36.4	26.1	25.0	36.1	32.2
June	44.4	36.9	39.3	32.7	38.7	38.4
July	47.5	52.8	51.7	46.6	49.5	49.6
Aug	46.6	46.9	49.4	45.5	47.6	47.2
Sept	42.2	38.4	35.1	38.7	38.3	38.5
Oct	28.1	23.3	25.1	14.5	26.5	23.5
Nov	12.2	14.3	12.3	13.6	7.5	12.0
Dec	12.4	13.4	10.6	12.6	11.2	12.0

Wintertime Avg (Nov-Feb) = 9.5 MG
Wintertime Avg (Nov-Feb) = 0.31 MGD

TABLE 5
CSA 17
2013 Sewer Master Plan
WWTP INFLUENT FLOWS (MG)

	2008		2009		2010		2011		2012		5-Year Avg	
Month	Total	MDD	Total	MDD	Total	MDD	Total	MDD	Total	MDD	Total	MDD
Jan	12.72	0.55	8.57	0.39	8.82	0.67	10.11	0.46	8.49	0.39	9.74	0.67
Feb	10.38	0.50	10.77	0.83	8.56	0.49	8.52	0.46	8.74	0.40	9.39	0.83
Mar	8.77	0.34	10.95	0.48	9.91	0.49	12.29	0.55	9.32	0.44	10.25	0.55
Apr	9.56	0.36	9.46	0.40	7.02	0.39	9.08	0.38	10.59	0.43	9.14	0.43
May	10.52	0.36	10.62	0.41	8.68	0.35	9.82	0.37	9.77	0.38	9.88	0.41
June	9.58	0.41	9.04	0.60	8.80	0.37	8.81	0.34	10.14	0.38	9.27	0.60
July	9.12	0.34	9.46	0.41	9.40	0.61	8.69	0.32	10.56	0.38	9.45	0.61
Aug	9.34	0.33	9.63	0.35	9.65	0.58	8.32	0.38	10.41	0.38	9.47	0.58
Sept	10.97	0.40	9.08	0.36	8.61	0.36	-	-	9.76	0.39	9.60	0.40
Oct	10.76	0.41	9.52	0.39	5.34	0.36	8.24	0.36	10.01	0.36	8.77	0.41
Nov	6.70	0.32	7.11	0.36	7.66	0.32	6.98	0.29	9.17	0.48	7.52	0.48
Dec	8.63	0.52	3.19	0.29	6.52	0.42	-	-	13.60	0.66	7.99	0.66

ADWF (Aug-Oct) = 9.28 MG
ADWF (Aug-Oct) = 0.30 MGD

MDD = 0.83 MGD Feb-09

MDD/ADD = 2.8

TABLE 6
CSA 17
2013 Sewer Master Plan
HOUSEHOLD EQUIVALENT DETERMINATION

Top User	Average Winter Water Use (CF/Month)[3]	Average Winter Water Use [3] (GPD)	Estimated Equivalent HEs
1	69990	16,888	70
2	35060	8,460	35
3	30558	7,373	31
4	25155	6,070	25
5	18791	4,534	19
6	17936	4,328	18
7	13781	3,325	14
8	11195	2,701	11
9	9568	2,309	10
10	9441	2,278	9
11	8671	2,092	9
12	8280	1,998	8
13	7851	1,894	8
14	6169	1,489	6
15	5232	1,262	5
16	4245	1,024	4
17	2943	710	3
18	2808	678	3
19	2745	662	3
20	2415	583	2
21	2191	529	2
22	2067	499	2
23	2013	486	2
24	1775	428	2
25	1606	388	2
TOTALS	**302,484**	**72,986**	**304**

Average Cottonwood Winter Water Consumption [1]	0.306	MGD
Average Treatment Plant Flow[2]	0.299	MGD
Metered Winter Water Use Top 25 users [3]	0.058	MGD
Dry Weather Sewage Component Distributed to Remaining Services	0.241	MGD
Total Connections[4]	1146	
Top 25 Service Connections	25	
Remaining active service connections = HEs	1121	
Estimated HE Dry Weather Flow	220	GPD
Adjusted HE Dry Weather Flow[5]	**240**	**GPD**
Total estimated HEs	1,425	HEs

[1] 80% of average winter (Nov-Feb 2008-2012) metered water use from Cottonwood Water District.
[2] Average Daily Treatment Plant flows for Aug-Oct 2008 to 2012.
[3] 80% of average winter (Nov 2011-Feb 2012) metered water use top users discharged to collection system.
[4] Number of active CSA 17 water connections billed for Nov 2012 water use.
[5] Adjusted ADWF/HE based on a 10 percent vacancy rate.

TABLE 7

CSA 17

2013 Sewer Master Plan

SERVICE AREA TABULATION TABLE

(1) Service Area No.	(2) Year	(3) Total ADWF HEs	(4) Length of Sewer Pipe (Ft)	(5) Existing Sewered Area (AC)[1]	(6) New Sewered Area (AC)	(7) Existing I&I Rate (GPD)	(8) Existing I&I Rate (GPM)	(9) I&I Equiv HEs	(10) Existing I&I Rate (GPAD)[2]	(11) Future I&I Rate (GPAD)	(12) ADWF (MGD)	(13) I&I Flow (MGD)	(14) PWWF[3] (MGD)
1	2012	314	17,045	78.3		72,287	50	301	924		0.08	0.07	0.25
	2032	516	17,045	78.3	132.7	316,419	220	1318	1500	1500	0.12	0.32	0.60
2	2012	93	4,337	19.9		18,393	13	77	924		0.02	0.02	0.07
	2032	164	4,337	19.9	3.6	35,217	24	147	1500	1500	0.04	0.04	0.13
3	2012	281	12,763	58.6		52,024	36	217	888		0.07	0.05	0.21
	2032	315	12,763	58.6	1.8	90,644	63	378	1500	1500	0.08	0.09	0.26
4	2012	107	5,989	27.5		25,398	18	106	924		0.03	0.03	0.08
	2032	157	5,989	27.5	2.5	44,966	31	187	1500	1500	0.04	0.04	0.13
5A	2012	28	1,852	8.5		7,854	5	33	924		0.01	0.01	0.02
	2032	28	1,852	8.5	0.0	12,754	9	53	1500		0.01	0.01	0.03
5B	2012	50	1,666	7.6		7,065	5	29	924		0.01	0.01	0.03
	2032	50	1,666	7.6	0.0	11,473	8	48	1500		0.01	0.01	0.04
6	2012	76	4,140	19.0		17,559	12	73	924		0.02	0.02	0.06
	2032	76	4,140	19.0	0.0	28,514	20	119	1500		0.02	0.03	0.07
7	2012	129	7,680	35.3		32,570	23	136	924		0.03	0.03	0.10
	2032	213	7,680	35.3	4.2	59,175	41	247	1500	1500	0.05	0.06	0.18
8	2012	122	8,279	38.0		46,062	32	192	1212		0.03	0.05	0.11
	2032	160	8,279	38.0	2.1	60,186	42	251	1500	1500	0.04	0.06	0.15
9	2012	40	2,644	12.1		11,211	8	47	924		0.01	0.01	0.03
	2032	40	2,644	12.1	0.0	18,206	13	76	1500		0.01	0.02	0.04
10	2012	86	7,224	33.2		30,639	21	128	924		0.02	0.03	0.08
	2032	86	7,224	33.2	0.0	49,754	35	207	1500		0.02	0.05	0.10
11	2012	50	6,104	28.0		82,303	57	343	2937		0.01	0.08	0.11
	2032	108	6,104	28.0	41.7	144,822	101	603	2937	1500	0.03	0.14	0.20
12	2012	49	8,180	37.6		110,297	77	460	2937		0.01	0.11	0.14
	2032	54	8,180	37.6	2.5	113,983	79	475	2937	1500	0.01	0.11	0.14
13	2012	0	734	3.4		3,114	2	13	924		0.00	0.00	0.00
	2032	0	734	3.4	0.0	5,055	4	21	1500	1500	0.00	0.01	0.01
Totals:	2012	1,425	88,636	407.0				2,153			0.34	0.52	1.30
	2032	1,967	88,636	407.0	191.0			4,130			0.47	0.99	2.08

1. Assuming 100 foot influence on each side of sanitary sewer length.
2. Existing I&I rate determined utilizing PWWF and ADWF pump records at each lift station.
3. Instantaneous PWWF

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TABLE 8

CSA 17

2013 Sewer Master Plan

HYDRAULIC MODEL SEWER CAPACITY AND FLOW SUMMARY

								2012		2032						
												REPLACEMENT SEWER		PARALLEL SEWER		
Model Pipe ID No.	From Model Manhole	To Model Manhole	Sewer Diameter (in)	Existing Or Future	Length (ft)	Sewer Slope (ft/ft)	Pipe Capacity (MGD)	Model PWWF (MGD)	PWWF Surcharge (ft)	Model PWWF (MGD)	Estimated PWWF Surcharge (ft)	Size (in)	Capacity (MGD)	Size (in)	Capacity (MGD)	Comments
101	182	180	8	E	464.0	0.006	0.60	0.05		0.08						
103	180	178	8	E	478.2	0.006	0.59	0.05		0.08						
105	178	592	8	E	117.1	0.001	0.30	0.06		0.08						
107	176	174	8	E	365.1	0.005	0.54	0.09		0.14						
109	174	606	8	E	151.4	0.008	0.69	0.10		0.14						
111	172	170	8	E	174.3	0.005	0.55	0.11		0.16						
113	170	168	8	E	414.8	0.004	0.49	0.11		0.16						
115	168	106	8	E	324.1	0.004	0.51	0.11		0.17						
117	110	108	6	E	222.4	0.007	0.30	0.00		0.00						
119	108	106	6	E	257.8	0.012	0.40	0.01		0.01						
121	106	104	8	E	408.1	0.008	0.69	0.13		0.18						
123	104	100	8	E	90.7	0.005	0.53	0.13		0.18						
125	100	98	10	E	62.8	0.005	1.04	0.20		0.30						
127	98	96	10	E	364.7	0.003	0.77	0.20		0.30						
129	96	88	12	E	448.5	0.003	1.20	0.36		0.48						
131	94	92	6	E	220.5	0.008	0.33	0.00		0.00						
133	92	90	6	E	148.9	0.016	0.46	0.00		0.01						
135	90	88	6	E	154.9	0.001	0.10	0.01		0.01						
137	88	82	12	E	409.0	0.002	1.13	0.37		0.49						
139	86	82	6	E	245.1	0.012	0.40	0.00		0.00						
141	82	80	12	E	397.5	0.002	1.12	0.36		0.49						
143	78	80	6	E	175.1	0.014	0.43	0.01		0.01						
145	80	76	12	E	111.1	0.002	1.09	0.37		0.50						
147	20	220	6	E	378.1	0.015	0.44	0.02		0.03						
149	76	220	12	E	289.6	0.002	1.14	0.37		0.50						
15	12	472	10	E	196.2	0.001	0.38	0.48	0.1	0.88	0.62	15	1.11	12	0.99	Replace w/15" due to slope
151	226	228	6	E	327.5	0.022	0.54	0.00		0.00						
153	228	22	6	E	434.2	0.013	0.42	0.01		0.01						
155	222	224	6	E	352.5	0.020	0.51	0.00		0.00						
157	224	18	6	E	413.1	0.011	0.38	0.01		0.01						
159	220	10	12	E	247.2	0.041	4.64	0.38		0.52						
161	260	252	6	E	170.2	0.015	0.44	0.00		0.00						
163	258	252	6	E	249.8	0.006	0.27	0.01		0.01						
165	254	256	6	E	52.2	0.012	0.39	0.00		0.00						
167	256	252	6	E	181.2	0.022	0.54	0.00		0.01						
169	252	250	6	E	340.7	0.007	0.29	0.02		0.02						
17	14	12	10	E	215.1	0.003	0.75	0.48		0.88	0.22	12	1.22	8	1.17	Parallel with 8"
171	248	244	6	E	407.2	0.007	0.29	0.00		0.00						
173	246	244	6	E	71.4	0.067	0.94	0.00		0.00						
175	250	244	6	E	261.2	0.008	0.33	0.02		0.02						
177	244	242	6	E	254.7	0.007	0.31	0.02		0.03						
179	242	240	6	E	65.1	0.005	0.26	0.03		0.03						
181	240	238	6	E	302.9	0.014	0.43	0.03		0.04						
183	238	584	6	E	56.7	0.022	0.53	0.03		0.04						
185	236	234	6	E	118.5	0.006	0.28	0.04		0.06						
187	234	232	6	E	143.4	0.010	0.35	0.05		0.06						
189	232	230	6	E	137.7	0.006	0.28	0.05		0.06						
19	24	16	10	E	234.8	0.005	1.04	0.45		0.84						
191	230	16	6	E	125.4	0.046	0.77	0.05		0.06						
195	102	98	6	E	289.8	0.015	0.44	0.00		0.00						
197	116	112	6	E	306.5	0.022	0.54	0.00		0.00						
199	118	114	6	E	196.2	0.007	0.29	0.00		0.00						
201	114	112	6	E	168.0	0.006	0.28	0.00		0.01						
203	120	112	8	E	99.0	0.004	0.52	0.07		0.11						
205	122	120	8	E	277.3	0.004	0.49	0.07		0.11						
207	124	122	6	E	156.5	0.007	0.29	0.00		0.00						
209	128	126	6	E	116.5	0.008	0.32	0.00		0.00						
21	16	14	10	E	283.0	0.004	0.88	0.49		0.90						
211	130	126	8	E	143.0	0.003	0.46	0.06		0.10						
213	132	130	6	E	320.6	0.006	0.28	0.00		0.00						
215	140	136	6	E	282.8	0.006	0.28	0.00		0.01						
217	138	136	6	E	148.3	0.019	0.50	0.00		0.00						
219	136	130	6	E	294.9	0.007	0.30	0.01		0.01						
221	134	130	8	E	345.0	0.005	0.53	0.05		0.09						
223	142	134	8	E	363.3	0.004	0.48	0.05		0.08						
225	264	262	6	E	376.1	0.010	0.37	0.00		0.00						
227	262	142	6	E	357.0	0.006	0.28	0.01		0.01						
229	144	142	8	E	275.3	0.005	0.53	0.04		0.07						
23	72	70	8	E	262.4	0.004	0.47	0.00		0.00						
231	146	144	6	E	167.4	0.010	0.37	0.00		0.00						
233	266	144	6	E	271.9	0.006	0.28	0.00		0.00						
235	148	144	8	E	128.5	0.011	0.82	0.03		0.05						
237	150	148	8	E	167.6	0.009	0.72	0.03		0.05						
239	152	150	8	E	354.2	0.004	0.48	0.02		0.04						
241	154	152	8	E	305.0	0.004	0.52	0.02		0.04						
243	156	154	8	E	249.9	0.004	0.51	0.02		0.04						
245	166	164	6	E	226.7	0.013	0.42	0.01		0.01						
247	164	162	6	E	233.6	0.011	0.38	0.01		0.02						
249	162	160	6	E	373.0	0.007	0.31	0.01		0.02						
251	160	158	8	E	445.5	0.005	0.53	0.01		0.03						
253	158	156	8	E	302.0	0.004	0.47	0.02		0.04						
255	126	122	8	E	226.9	0.004	0.50	0.06		0.10						
257	112	470	8	E	282.8	0.004	0.50	0.07		0.11						
259	280	278	6	E	472.2	0.010	0.36	0.00		0.00						
261	278	276	6	E	353.5	0.018	0.49	0.01		0.01						
263	276	270	8	E	334.7	0.004	0.52	0.18		0.22						
265	270	268	8	E	135.5	0.004	0.48	0.17		0.20						
267	268	96	8	E	362.2	0.005	0.55	0.17		0.21						
269	272	268	6	E	202.7	0.005	0.25	0.00		0.01						
27	66	706	8	E	59.7	0.002	0.32	0.08		0.29						
271	274	272	6	E	230.6	0.006	0.28	0.00		0.00						
281	290	288	6	E	395.3	0.007	0.29	0.01		0.01						

TABLE 8
CSA 17
2013 Sewer Master Plan
HYDRAULIC MODEL SEWER CAPACITY AND FLOW SUMMARY

								2012		2032						
												REPLACEMENT SEWER		PARALLEL SEWER		
Model Pipe ID No.	From Model Manhole	To Model Manhole	Sewer Diameter (in)	Existing Or Future	Length (ft)	Sewer Slope (ft/ft)	Pipe Capacity (MGD)	Model PWWF (MGD)	PWWF Surcharge (ft)	Model PWWF (MGD)	Estimated PWWF Surcharge (ft)	Size (in)	Capacity (MGD)	Size (in)	Capacity (MGD)	Comments
283	288	286	6	E	332.2	0.007	0.30	0.01		0.01						
285	286	284	8	E	324.0	0.004	0.52	0.27		0.27						
287	284	282	8	E	241.7	0.004	0.52	0.27		0.27						
289	282	276	8	E	348.6	0.003	0.45	0.20		0.21						
29	64	62	8	E	156.2	0.005	0.55	0.07		0.28						
297	322	320	6	E	425.2	0.008	0.32	0.01		0.01						
299	320	318	8	E	420.9	0.010	0.79	0.01		0.02						
301	318	316	8	E	475.0	0.006	0.61	0.02		0.02						
305	314	312	8	E	488.7	0.004	0.48	0.04		0.06						
307	312	310	8	E	439.3	0.004	0.50	0.04		0.07						
309	310	308	8	E	453.9	0.003	0.46	0.04		0.08						
31	62	60	8	E	469.8	0.004	0.48	0.07		0.28						
311	308	306	8	E	263.5	0.005	0.54	0.04		0.08						
313	306	286	8	E	299.3	0.004	0.46	0.05		0.09						
315	352	350	6	E	302.1	0.012	0.39	0.01		0.19						
317	350	348	8	E	323.1	0.004	0.48	0.01		0.17						
319	348	344	8	E	412.8	0.003	0.42	0.02		0.16						
321	344	346	8	E	260.2	0.005	0.57	0.08		0.21						
323	340	344	8	E	341.0	0.006	0.61	0.06		0.06						
327	342	340	6	E	257.4	0.007	0.31	0.00		0.00						
329	338	340	8	E	113.8	0.005	0.53	0.05		0.05						
33	60	58	8	E	392.0	0.004	0.52	0.07		0.27						
331	336	338	8	E	364.9	0.007	0.65	0.04		0.04						
333	334	336	8	E	364.9	0.007	0.65	0.04		0.04						
335	332	334	8	E	413.1	0.004	0.49	0.03		0.03						
337	330	332	8	E	424.7	0.004	0.48	0.03		0.03						
339	324	326	8	E	430.7	0.004	0.48	0.00		0.00						
341	326	328	8	E	373.9	0.004	0.51	0.02		0.02						
343	328	330	8	E	395.0	0.004	0.50	0.02		0.02						
345	394	392	8	E	411.3	0.004	0.50	0.00		0.01						
347	392	390	8	E	407.7	0.004	0.50	0.01		0.02						
349	390	384	8	E	345.6	0.004	0.50	0.02		0.02						
35	58	56	8	E	149.6	0.002	0.34	0.07		0.27						
351	388	386	8	E	365.7	0.004	0.50	0.00		0.00						
353	386	384	8	E	345.4	0.004	0.51	0.01		0.01						
355	384	382	8	E	244.5	0.004	0.48	0.04		0.04						
357	382	396	8	E	453.0	0.004	0.48	0.04		0.05						
359	396	380	8	E	420.0	0.004	0.49	0.05		0.05						
361	380	378	8	E	417.4	0.004	0.50	0.05		0.06						
363	378	468	8	E	409.1	0.004	0.50	0.06		0.06						
365	372	374	8	E	355.6	0.004	0.48	0.12		0.24						
367	370	372	8	E	340.6	0.004	0.50	0.12		0.24						
37	56	54	8	E	426.8	0.005	0.53	0.08		0.28						
373	364	366	8	E	310.3	0.004	0.50	0.11		0.23						
375	362	364	8	E	279.8	0.004	0.52	0.11		0.23						
377	354	356	8	E	414.6	0.004	0.47	0.09		0.21						
379	356	358	8	E	204.9	0.003	0.44	0.09		0.21						
381	360	358	8	E	372.4	0.004	0.52	0.00		0.00						
383	346	354	8	E	334.5	0.004	0.50	0.08		0.22						
387	406	404	6	E	392.6	0.006	0.28	0.00		0.00						
389	404	402	6	E	400.8	0.006	0.28	0.01		0.01						
39	54	52	8	E	453.3	0.004	0.47	0.08		0.28						
391	402	400	6	E	364.5	0.005	0.26	0.02		0.02						
397	374	376	8	E	415.2	0.003	0.46	0.19		0.30						
399	38	424	8	E	156.5	0.007	0.64	0.20		0.58						
401	424	422	8	E	203.3	0.006	0.60	0.93	1.7	1.28	4.25	12	1.77	10	1.69	Parallel with 10"
403	422	474	8	E	325.8	0.007	0.66	0.69	0.2	1.04	3.43	10	1.19	8	1.31	Parallel with 8"
405	420	418	8	E	447.8	0.013	0.90	0.49		0.86						
407	418	410	8	E	336.2	0.014	0.91	0.49		0.87						
409	416	410	6	E	258.3	0.017	0.47	0.03		0.03						
41	52	50	8	E	77.9	0.003	0.43	0.16		0.51						
411	412	410	6	E	167.4	0.032	0.64	0.00		0.01						
413	414	412	6	E	337.8	0.038	0.71	0.00		0.01						
415	410	408	8	E	271.6	0.016	0.98	0.52		0.91						
417	408	34	8	E	512.7	0.003	0.41	0.50	0.7	0.90	5.40	12	1.20	10	1.15	Parallel with 10"
421	454	456	8	E	202.5	0.002	0.34	0.03		0.25						
423	456	458	8	E	237.9	0.005	0.54	0.04		0.26						
425	458	446	8	E	263.5	0.003	0.46	0.04		0.26						
427	446	444	8	E	338.2	0.005	0.56	0.07		0.29						
429	444	442	8	E	320.6	0.015	0.97	0.07		0.28						
431	70	442	8	E	390.3	0.004	0.51	0.01		0.01						
433	442	66	8	E	296.4	0.004	0.48	0.08		0.29						
435	448	446	6	E	332.9	0.006	0.29	0.00		0.00						
437	440	438	6	E	370.7	0.006	0.27	0.00		0.00						
439	438	64	6	E	307.9	0.007	0.30	0.01		0.01						
441	50	436	8	E	203.7	0.005	0.55	0.16		0.51						
443	436	434	8	E	256.9	0.005	0.52	0.16		0.51						
445	434	432	8	E	130.4	0.003	0.44	0.16		0.51	0.14	10	0.80	8	0.89	Parallel with 8"
447	432	428	8	E	425.7	0.008	0.71	0.16		0.51						
449	428	426	8	E	442.0	0.009	0.74	0.17		0.52						
451	426	38	8	E	428.3	0.010	0.78	0.18		0.53						
453	466	464	6	E	333.5	0.011	0.38	0.00		0.01						
455	464	462	6	E	323.2	0.006	0.28	0.00		0.02						
457	462	460	6	E	372.3	0.006	0.28	0.01		0.03						
459	460	44	6	E	347.8	0.010	0.37	0.01		0.04						
461	468	374	8	E	345.2	0.005	0.57	0.07		0.07						
463	366	370	8	E	329.9	0.004	0.51	0.12		0.23						
465	194	708	8	E	242.9	0.004	0.48	0.02		0.03						
467	212	206	6	E	173.0	0.013	0.42	0.02		0.03						
469	470	100	8	E	275.4	0.004	0.51	0.07		0.12						
47	42	40	6	E	269.3	0.012	0.40	0.00		0.00						
471	472	10	10	E	192.8	0.005	1.00	0.47		0.87						
473	474	420	8	E	289.7	0.007	0.64	0.61		0.97	2.48	10	1.15	8	1.27	Parallel with 8"
479	480	416	6	E	194.6	0.026	0.58	0.03		0.03						

TABLE 8
CSA 17
2013 Sewer Master Plan
HYDRAULIC MODEL SEWER CAPACITY AND FLOW SUMMARY

								2012		2032						
												REPLACEMENT SEWER		PARALLEL SEWER		
Model Pipe ID No.	From Model Manhole	To Model Manhole	Sewer Diameter (in)	Existing Or Future	Length (ft)	Sewer Slope (ft/ft)	Pipe Capacity (MGD)	Model PWWF (MGD)	PWWF Surcharge (ft)	Model PWWF (MGD)	Estimated PWWF Surcharge (ft)	Size (in)	Capacity (MGD)	Size (in)	Capacity (MGD)	Comments
481	10	9002	12	E	129.1	0.003	1.16	0.81		1.38	0.13	15	2.11	10	1.88	Parallel with 10"
49	44	40	6	E	328.7	0.007	0.30	0.01		0.04						
491	502	500	8	E	459.2	0.004	0.49	0.00		0.00						
493	500	492	8	E	334.6	0.004	0.49	0.02		0.02						
495	496	494	6	E	153.7	0.006	0.28	0.00		0.00						
497	498	494	6	E	101.1	0.034	0.66	0.00		0.00						
499	494	492	6	E	441.7	0.012	0.40	0.01		0.01						
501	492	9004	8	E	171.6	0.006	0.61	0.04		0.04						
507	400	510	6	E	124.6	0.007	0.30	0.02		0.02						
509	376	510	8	E	411.4	0.004	0.47	0.20		0.31						
51	40	38	6	E	318.5	0.006	0.29	0.02		0.05						
511	510	9006	8	E	54.6	0.060	1.91	0.22		0.34						
517	524	526	6	E	115.2	0.004	0.23	0.00		0.00						
519	528	530	6	E	303.2	0.052	0.82	0.00		0.00						
521	526	532	6	E	199.1	0.013	0.41	0.01		0.01						
523	532	534	6	E	480.3	0.022	0.53	0.01		0.02						
525	534	536	6	E	264.6	0.008	0.32	0.02		0.03						
527	536	530	6	E	271.8	0.008	0.32	0.02		0.03						
529	538	526	6	E	334.5	0.017	0.48	0.00		0.00						
531	540	534	6	E	65.1	0.010	0.36	0.00		0.00						
539	554	552	8	E	241.6	0.009	0.73	0.01		0.01						
541	552	550	8	E	165.9	0.003	0.46	0.02		0.02						
543	556	552	8	E	236.8	0.010	0.77	0.00		0.00						
545	558	554	8	E	411.5	0.012	0.85	0.00		0.00						
55	34	26	8	E	241.7	0.010	0.80	0.51		0.90	0.68	10	1.44	8	1.59	Parallel with 8"
553	576	578	8	E	324.4	0.003	0.40	0.00		0.00						
555	580	578	8	E	350.0	0.020	1.09	0.01		0.01						
557	582	580	8	E	309.2	0.022	1.16	0.00		0.00						
559	584	236	6	E	166.0	0.007	0.31	0.04		0.06						
561	578	584	8	E	282.1	0.007	0.66	0.02		0.02						
563	588	322	6	E	397.6	0.005	0.26	0.00		0.01						
565	586	588	6	E	268.5	0.006	0.28	0.00		0.00						
567	590	320	6	E	196.4	0.007	0.31	0.00		0.00						
569	592	620	8	E	282.9	0.009	0.74	0.07		0.10						
57	26	28	8	E	303.3	0.012	0.86	0.48		0.88	0.13	10	1.55	8	1.71	Parallel with 8"
571	550	592	8	E	268.6	0.004	0.52	0.02		0.02						
573	600	598	6	E	309.0	0.018	0.49	0.00		0.00						
575	598	596	6	E	295.9	0.022	0.53	0.01		0.01						
577	596	594	6	E	64.1	0.010	0.35	0.01		0.02						
581	602	64	8	E	163.6	0.011	0.81	0.06		0.27						
583	594	602	8	E	393.7	0.011	0.83	0.05		0.27						
585	604	598	6	E	343.0	0.007	0.31	0.00		0.00						
587	606	172	8	E	191.6	0.003	0.40	0.11		0.16						
589	612	610	8	E	107.4	0.004	0.50	0.00		0.00						
59	28	30	10	E	244.9	0.004	0.91	0.47		0.86						
591	610	608	8	E	399.1	0.005	0.56	0.01		0.01						
593	608	606	8	E	239.4	0.005	0.56	0.02		0.02						
595	620	176	8	E	149.1	0.000	0.09	0.09		0.13						
597	614	616	8	E	216.5	0.008	0.70	0.00		0.01						
599	616	618	8	E	274.0	0.008	0.72	0.01		0.01						
601	618	620	8	E	264.8	0.006	0.61	0.02		0.03						
603	622	618	8	E	253.9	0.002	0.32	0.01		0.01						
605	624	616	8	E	250.4	0.006	0.59	0.00		0.00						
607	626	622	8	E	231.3	0.013	0.88	0.00		0.00						
609	628	622	8	E	208.5	0.011	0.82	0.00		0.00						
61	30	24	10	E	289.5	0.005	1.00	0.47		0.86						
611	630	610	8	E	195.3	0.005	0.56	0.00		0.00						
613	644	642	8	E	432.9	0.016	0.99	0.01		0.02						
615	642	640	8	E	365.7	0.032	1.39	0.01		0.02						
617	640	638	8	E	270.6	0.004	0.46	0.02		0.04						
619	638	636	8	E	308.6	0.010	0.80	0.02		0.04						
621	636	634	8	E	201.6	0.012	0.84	0.02		0.04						
623	646	648	6	E	263.8	0.035	0.68	0.00		0.00						
629	656	652	8	E	178.7	0.015	0.96	0.00		0.26						
63	22	18	6	E	186.7	0.011	0.37	0.01		0.01						
631	652	654	8	E	218.0	0.007	0.65	0.01		0.25						
633	654	634	8	E	270.9	0.026	1.25	0.01		0.23						
635	634	632	8	E	415.0	0.013	0.87	0.04		0.25						
637	632	594	8	E	410.7	0.013	0.88	0.04		0.26						
639	658	640	8	E	351.0	0.005	0.53	0.00		0.01						
641	660	644	8	E	330.0	0.035	1.46	0.00		0.01						
643	358	362	8	E	235.3	0.004	0.48	0.11		0.23						
645	664	666	6	E	144.7	0.008	0.32	0.00		0.00						
647	666	668	6	E	277.6	0.007	0.30	0.01		0.01						
649	668	670	6	E	307.2	0.006	0.28	0.01		0.01						
65	18	20	6	E	189.2	0.010	0.35	0.02		0.03						
651	670	672	6	E	336.8	0.006	0.28	0.01		0.01						
653	672	9010	6	E	137.4	0.008	0.32	0.01		0.02						
657	674	424	8	E	199.2	0.015	0.96	0.74		0.74						
659	676	678	8	E	224.6	0.018	1.03	0.00		0.01						
661	678	680	8	E	413.8	0.018	1.06	0.01		0.02						
663	680	456	8	E	430.2	0.018	1.04	0.01		0.02						
665	682	684	6	E	206.7	0.007	0.30	0.00		0.00						
667	684	686	8	E	264.8	0.031	1.38	0.01		0.01						

TABLE 8
CSA 17
2013 Sewer Master Plan
HYDRAULIC MODEL SEWER CAPACITY AND FLOW SUMMARY

								2012		2032						
												REPLACEMENT SEWER		PARALLEL SEWER		
Model Pipe ID No.	From Model Manhole	To Model Manhole	Sewer Diameter (in)	Existing Or Future	Length (ft)	Sewer Slope (ft/ft)	Pipe Capacity (MGD)	Model PWWF (MGD)	PWWF Surcharge (ft)	Model PWWF (MGD)	Estimated PWWF Surcharge (ft)	Size (in)	Capacity (MGD)	Size (in)	Capacity (MGD)	Comments
669	686	688	8	E	267.6	0.030	1.36	0.01		0.01						
67	218	216	6	E	262.6	0.016	0.45	0.01		0.01						
671	690	688	6	E	202.2	0.010	0.36	0.00		0.00						
673	688	692	8	E	315.4	0.038	1.52	0.02		0.02						
675	692	694	8	E	268.0	0.001	0.28	0.02		0.03						
677	694	696	8	E	245.6	0.004	0.51	0.02		0.29						
681	566	564	6	E	321.0	0.007	0.29	0.01		0.01						
683	568	566	6	E	140.9	0.001	0.12	0.01		0.01						
685	570	568	6	E	74.2	0.007	0.30	0.00		0.00						
687	574	568	6	E	338.3	0.019	0.50	0.00		0.00						
689	698	564	6	E	358.0	0.017	0.48	0.01		0.01						
69	216	212	6	E	173.0	0.012	0.40	0.02		0.02						
691	564	446	6	E	452.6	0.031	0.63	0.02		0.03						
693	702	564	6	E	213.0	0.002	0.18	0.00		0.00						
695	700	698	6	E	305.5	0.019	0.50	0.00		0.00						
697	530	408	6	E	296.7	0.009	0.34	0.03		0.03						
699	648	652	6	E	509.9	0.016	0.45	0.01		0.01						
701	706	52	8	E	130.6	0.036	1.48	0.08		0.28						
703	708	190	8	E	56.2	0.005	0.54	0.02		0.03						
707	696	454	8	E	266.5	0.006	0.58	0.03		0.25						
709	316	720	8	E	154.3	0.015	0.96	0.02		0.05						
71	214	212	6	E	420.0	0.030	0.63	0.00		0.00						
713	716	714	6	E	135.0	0.014	0.43	0.00		0.01						
715	718	716	6	E	125.0	0.012	0.40	0.00		0.00						
717	714	712	6	E	242.0	0.009	0.35	0.01		0.01						
719	710	712	6	E	394.0	0.011	0.37	0.00		0.00						
721	720	314	8	E	232.8	0.010	0.78	0.03		0.06						
723	712	720	6	E	478.0	0.010	0.36	0.01		0.02						
73	210	208	6	E	293.8	0.006	0.28	0.00		0.00						
75	208	206	6	E	244.4	0.007	0.30	0.00		0.01						
77	206	204	6	E	99.1	0.005	0.27	0.03		0.03						
79	204	190	6	E	475.6	0.008	0.31	0.03		0.04						
81	202	200	6	E	456.9	0.007	0.29	0.00		0.00						
83	200	198	6	E	358.9	0.017	0.47	0.01		0.01						
85	198	196	6	E	592.9	0.010	0.36	0.01		0.01						
87	196	194	8	E	443.2	0.004	0.51	0.01		0.02						
93	190	188	8	E	113.2	0.002	0.34	0.05		0.07						
95	188	186	8	E	143.4	0.006	0.59	0.05		0.07						
97	186	184	8	E	424.9	0.011	0.83	0.05		0.07						
99	184	182	8	E	302.0	0.017	1.00	0.05		0.07						

TABLE 9
CSA 17
2013 Sewer Master Plan
UPSIZE I-5 CROSSING ALTERNATIVE PRELIMINARY COST ESTIMATE[1]

No.	Item	Quantity	Unit	Unit Cost[3]	Total Cost
Construction Costs					
1	30-inch steel casing w/ 21-inch main, bore and jack	240	LF	$600	$144,000
2	21-inch main, Class A backfill	1300	LF	$175	$227,500
3	10-inch force main, Class A backfill	5100	LF	$100	$510,000
4	1,500 GPM centrifugal pumps, motors, and starters, complete with upsized piping and valving	4	EA	$75,000	$300,000
5	Tie-ins	2	EA	$10,000	$20,000
6	***Subtotal Construction Cost***				$1,202,000
7	***Construction Contingency @ 25%***				$301,000
8	***TOTAL CONSTRUCTION COSTS***				***$1,503,000***
Indirect Costs[2]					
9	Administration & Legal				$20,000
10	Engineering & Construction Admin @ 25% of Construction Costs				$376,000
11	Preliminary Engineering Report				$20,000
12	Environmental Documentation				$30,000
13	Bond Counsel				$20,000
14	***Subtotal Indirect Costs***				$466,000
15	***Indirect Costs Contingency @ 10%***				$47,000
16	***INDIRECT COSTS TOTAL***				$513,000
TOTAL PROJECT COST					***$2,016,000***

1. Construction of this project is not recommended at the current time, and should be reconsidered at such a time when west Cottonwood begins to reach ultimate build out.
2. Costs for land acquisition and easements not included.
3. All costs in November 2013 dollars at an ENR index of 9666.

TABLE 10 CSA 17 2013 Sewer Master Plan I-5 LIFT STATION ALTERNATIVE PRELIMINARY COST ESTIMATE[1]					
No.	Item	Quantity	Unit	Unit Cost[3]	Total Cost
Construction Costs					
1	15-inch force main, Class A Backfill	7000	LF	$125	$875,000
2	Clearing & Grubbing	1	LS	$4,600	$4,600
3	Road Subgrade	1	LS	$10,000	$10,000
4	Pump Station Subgrade	1	LS	$11,000	$11,000
5	Pavement	1	LS	$10,000	$10,000
6	Fence	1	LS	$8,000	$8,000
7	Erosion Control	1	LS	$3,000	$3,000
8	Cleanup	1	LS	$7,600	$7,600
9	Testing	1	LS	$12,500	$12,500
10	Shop Drawings	1	LS	$15,300	$15,300
11	O&M Manuals	1	LS	$4,000	$4,000
12	Discharge Piping	1	LS	$12,000	$12,000
13	Suction Header	1	EA	$20,000	$20,000
14	Discharge Header	1	EA	$20,000	$20,000
15	Pressure Station	1	LS	$6,500	$6,500
16	Pump Valving	1	LS	$15,000	$15,000
17	Misc. Piping & Valving	1	LS	$10,000	$10,000
18	Pump Pedestals	1	LS	$2,500	$2,500
19	1,500 GPM Pumps	4	EA	$75,000	$300,000
20	Footing Excavation	1	LS	$3,000	$3,000
21	Footing Concrete	10	CY	$1,400	$14,000
22	Floor Slab	29	CY	$950	$27,550
23	Masonry	1140	SF	$20	$22,800
24	Roof Framing	910	SF	$30	$27,300
25	Roofing	910	SF	$10	$9,100
26	Doors	1	LS	$3,000	$3,000
27	Gutters & Downspouts	1	LS	$1,200	$1,200
28	Building Misc.	1	LS	$6,000	$6,000
29	Painting	1	LS	$7,000	$7,000
30	Underground Electrical	1	LS	$12,000	$12,000
31	480 V MCC	1	LS	$80,000	$80,000
32	Generator J Box	1	LS	$3,000	$3,000
33	Interior Raceway	1	LS	$14,000	$14,000
34	Lighting	1	LS	$6,000	$6,000
35	ORT	1	LS	$1,600	$1,600
36	FAT	1	LS	$1,600	$1,600
37	Tie-ins	2	EA	$10,000	$20,000
38	***Subtotal Construction Cost***				$1,606,000
39	***Construction Contingency @ 25%***				$402,000
41	***TOTAL CONSTRUCTION COSTS***				***$2,008,000***
Indirect Costs[2]					
42	Administration & Legal				$20,000
43	Engineering & Construction Admin @ 25% of Construction Costs				$502,000
44	Preliminary Engineering Report				$20,000
45	Environmental Documentation				$30,000
46	Bond Counsel				$20,000
47	***Subtotal Indirect Costs***				$592,000
48	***Indirect Costs Contingency @ 10%***				$59,000
49	***INDIRECT COSTS TOTAL***				$651,000
TOTAL PROJECT COST					***$2,659,000***

1. Construction of this project is not recommended at the current time, and should be reconsidered at such a time when west Cottonwood begins to reach ultimate build out.

2. Costs for land acquisition and easements not included.

3. All costs in November 2013 dollars at an ENR index of 9666.

TABLE 11
CSA 17
2013 Sewer Master Plan
RECOMMENDED IMPROVEMENTS & CAPACITY CHARGE BASIS [1]

Item No.		Estimated Cost [2] Immediate Term (2013-2017)	Near Term (2017-2022)	Intermediate Term (2022-2027)	Long Term (2027-2032)	% Attributed to Growth	Cost Attributed to Growth
GENERAL COLLECTION SYSTEM IMPROVEMENTS							
1	Parallel 200' of 8" sewer along Gas Point Rd with 10," and 630' of 8" sewer near West Cottonwood Junior High with 8" (Pts. 1 to 2)	$112,000				0%	$0
2	Replace 200' of 10" sewer east of Main Street with 15" and parallel 215' of 10" sewer with 8" and 130' of 12" sewer with 10" (Pts. 3 to 4)		$82,000			23%	$18,860
3	Parallel 520' of 8" sewer near Cinabar Road and Wincrich Lane with 10," and 550' of 8" sewer with 8" (Pts. 5 to 6)			$144,000		23%	$33,120
4	Parallel 150' of 8" sewer on Park Dr with 8" (Pt. 7)				$20,000	23%	$4,600
5	Hydro Jetter sewer cleaner & trailer	$30,000				0%	$0
6	Aging sewer main replacements [3]	$205,000	$205,000	$205,000	$205,000	23%	$188,600
COTTONWOOD LIFT STATION IMPROVEMENTS							
7	Grinder	$75,000				0%	$0
8	Float Backup System	$10,000				0%	$0
9	Generator		$70,000			0%	$0
10	2-700 GPM & 2-300 GPM centrifugal pumps, motors, and starters, complete with upsized piping and valving			$184,000		23%	$42,320
BLACK LANE LIFT STATION IMPROVEMENTS							
11	Replace railings	$10,000				0%	$0
12	New generator w/ auto transfer switch	$50,000				0%	$0
13	2-230 GPM pumps, motors, and starters, complete with upsized piping, valving, and alarms		$42,000			23%	$9,660
14	Portable trash pump and piping			$40,000		0%	$0
CROWLEY CREEK LIFT STATION IMPROVEMENTS							
15	Diesel gas tank secondary containment		$5,000			0%	$0
16	Cover over electrical controls		$10,000			0%	$0
17	Install bypass piping				$10,000	0%	$0
QUAIL LANE LIFT STATION IMPROVEMENTS							
18	2-60 GPM grinder pumps and motors	$10,000				0%	$0
19	Replace all mechanical	$15,000				0%	$0
20	New generator w/ auto transfer switch	$40,000				0%	$0
21	Cover over electrical controls		$10,000			0%	$0
22	Install fence around lift station		$5,000			0%	$0
23	Install bypass piping				$10,000	0%	$0
	GENERAL COLLECTION SYSTEM IMPROVEMENTS SUBTOTAL:	**$557,000**	**$429,000**	**$573,000**	**$245,000**		**$297,000**
WWTP IMPROVEMENTS							
24	New Auger Monster®		$200,000			0%	$0
25	New biological selector w/ mixers	$120,000				0%	$0
26	Replace aeration basin aerators	$40,000				0%	$0
27	Recoat mechanical equipment & new drives on existing clarifiers	$75,000		$75,000		0%	$0
28	Replace existing RAS, WAS, scum, sludge, water, and drainage pumps	$25,000	$25,000	$25,000	$25,000	0%	$0
29	Install additional RAS pump	$25,000					
30	Rehab existing filter	$100,000				0%	$0
31	New traveling bridge filter		$700,000			0%	$0
32	Replace chlorine contact basin slide gates	$20,000				0%	$0
33	Enlarge chlorine contact basin				$150,000	0%	$0
34	Replace 9 freeze-proof yard hydrants	$10,000				0%	$0
35	New chemical dosing and monitoring equipment				$100,000	0%	$0
36	Effluent disposal feasibility study			$75,000		23%	$17,250
37	SSB 1 modifications				$100,000	0%	$0
38	New SSB aerators	$20,000	$20,000	$20,000		0%	$0
39	Sludge drying beds modifications			$200,000	$200,000	0%	$0
40	New office building			$250,000		0%	$0
41	New chart recorders	$20,000				0%	$0
42	New lab equipment	$50,000				0%	$0
43	Update all controls and alarms, including those at the WWTP and all lift stations	$250,000				0%	$0
44	New generator	$80,000				0%	$0
	WWTP IMPROVEMENTS SUBTOTAL:	**$835,000**	**$945,000**	**$645,000**	**$575,000**		**$17,000**
	TOTAL ESTIMATED CONSTRUCTION COSTS:	$1,392,000	$1,374,000	$1,218,000	$820,000		$314,000
	Construction Contingency (25%)	$348,000	$344,000	$305,000	$205,000		$79,000
	Environmental, Engineering & Indirect Costs (35%):	$609,000	$601,000	$533,000	$359,000		$138,000
	TOTAL ESTIMATED PROJECT COSTS:	**$2,349,000**	**$2,319,000**	**$2,056,000**	**$1,384,000**		**$531,000**
	Cumulative Project Costs:	$2,349,000	$4,668,000	$6,724,000	$8,108,000		
	Total Cumulative Project Costs w/o Growth Components:				$7,577,000		
	Average Yearly Cost for 20 Years:				$378,850		
	Number of Existing HEs:				1425		
	Average Yearly Cost per HE:				$265.86		
	Average Bi-Monthly Cost per HE:				**$44.31**		

Additional HEs Over Next 20 Years:	427
Additional Future Capacity Charge per HE:	$1,244
Existing Capacity Charge:	$3,600
Total Future Capacity Charge:	**$4,844**

(1) Based on a 1.7% annual growth rate.
(2) All costs in November 2013 dollars at an ENR index of 9666.
(3) Costs shown would result in ~325 feet of various sizes of pipe replaced every year.

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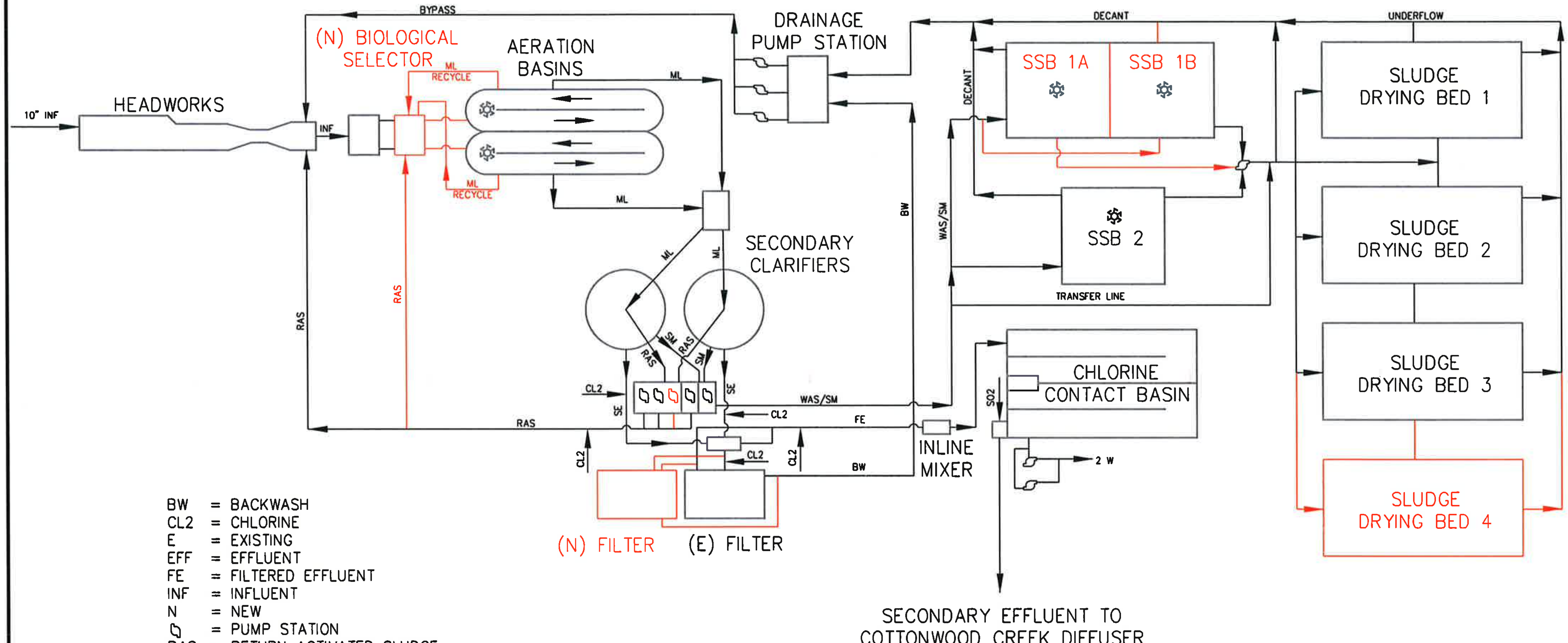
FIGURES



BW = BACKWASH
CL2 = CHLORINE
E = EXISTING
EFF = EFFLUENT
FE = FILTERED EFFLUENT
INF = INFLUENT
N = NEW
Ⴖ = PUMP STATION
RAS = RETURN ACTIVATED SLUDGE
SE = SECONDARY EFFLUENT
SM = SCUM
SO2 = SULFUR DIOXIDE

NOTE: MISCELLANEOUS IMPROVEMENTS TO (E) EQUIPMENT NOT SHOWN.

NOT TO SCALE

PACE ENGINEERING
REDDING, CALIFORNIA

CSA 17
2013 SEWER MASTER PLAN
EXISTING WWTP PROCESS FLOW DIAGRAM

FIGURE 1
DATE: 10/13
JOB # 35.26

FIGURE 2
CSA 17
2013 Sewer Master Plan
PROJECTED WWTP ADWF

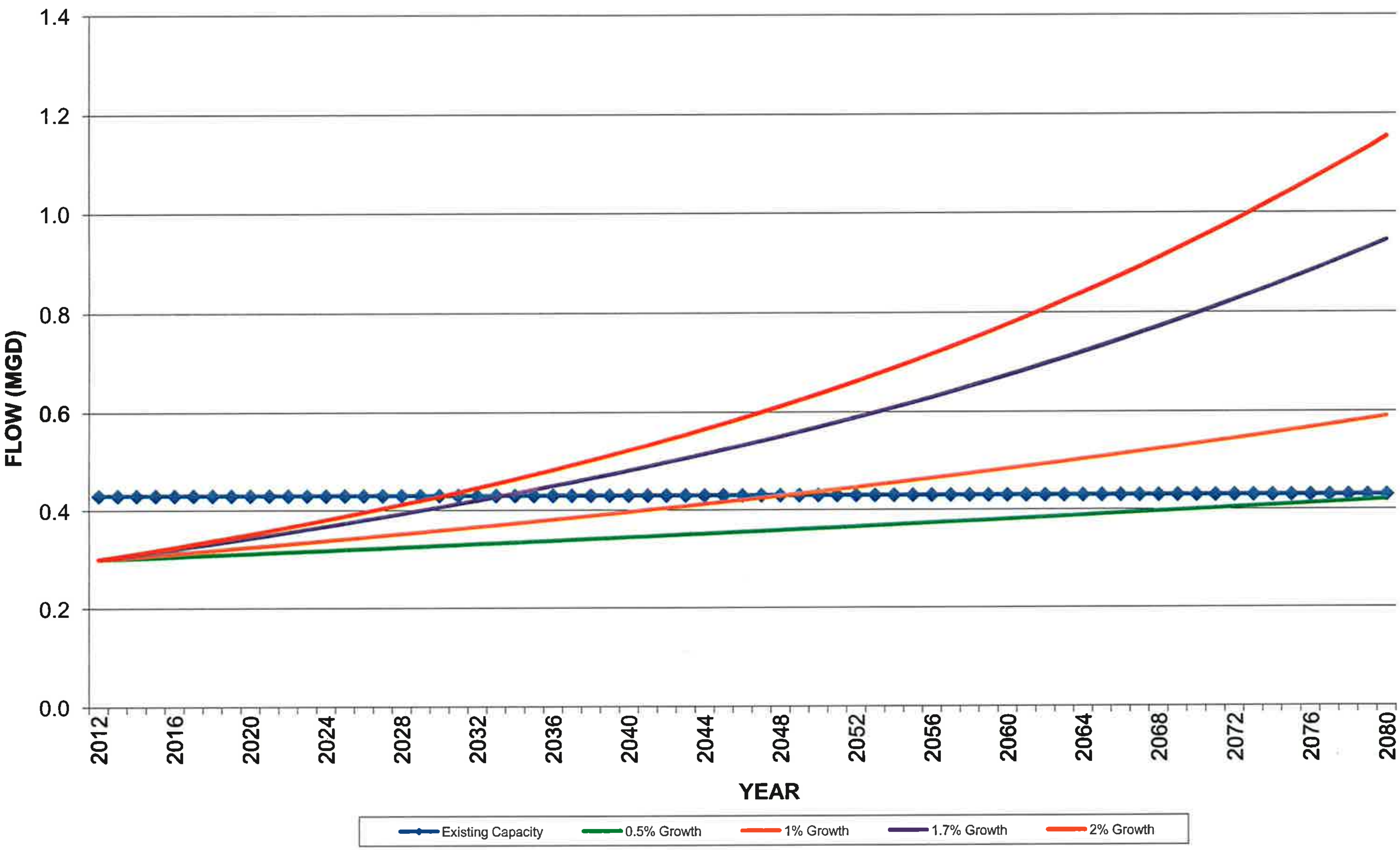
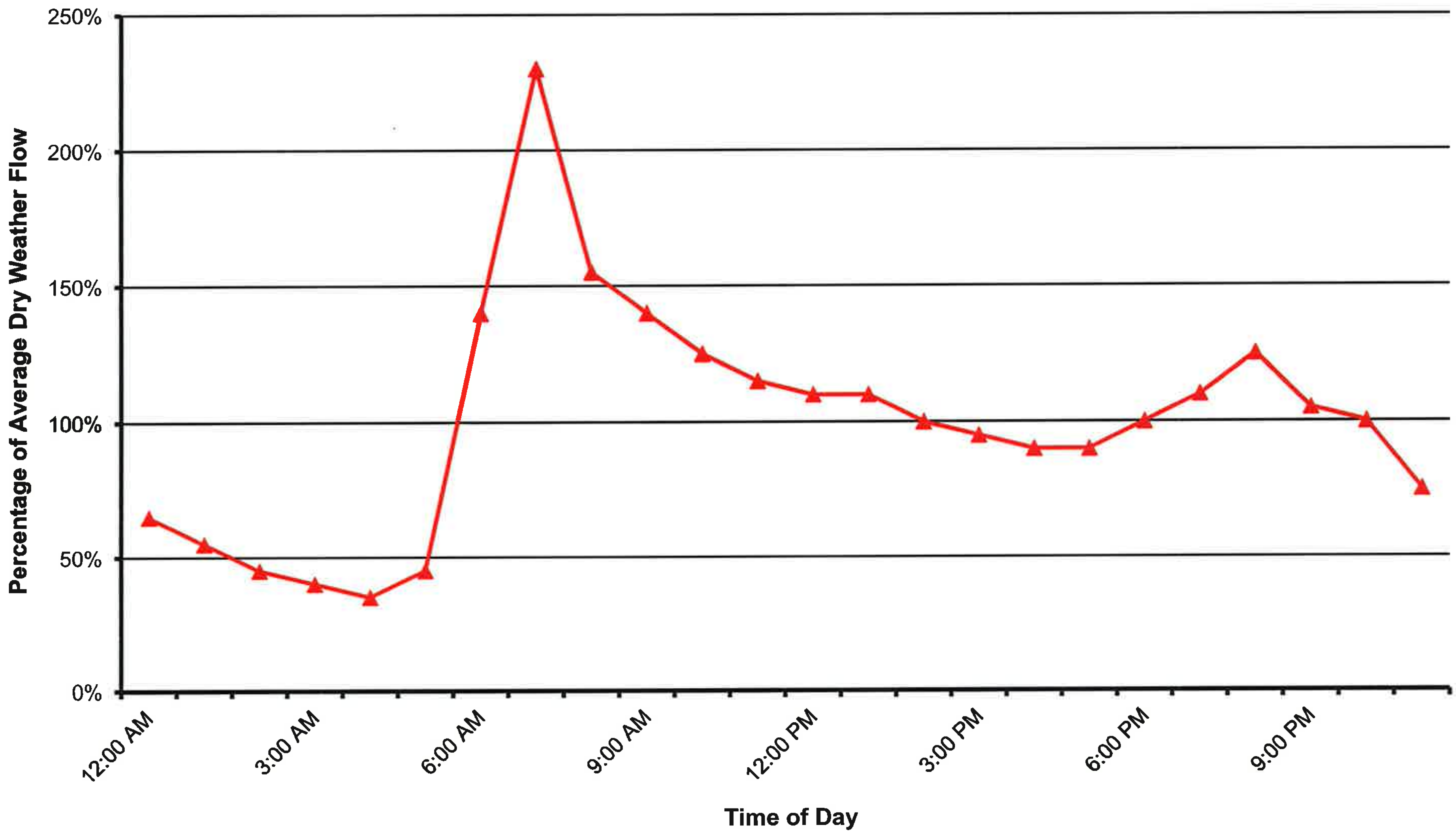


FIGURE 3
CSA 17
2013 Sewer Master Plan
COLLECTION SYSTEM DIURNAL CURVE



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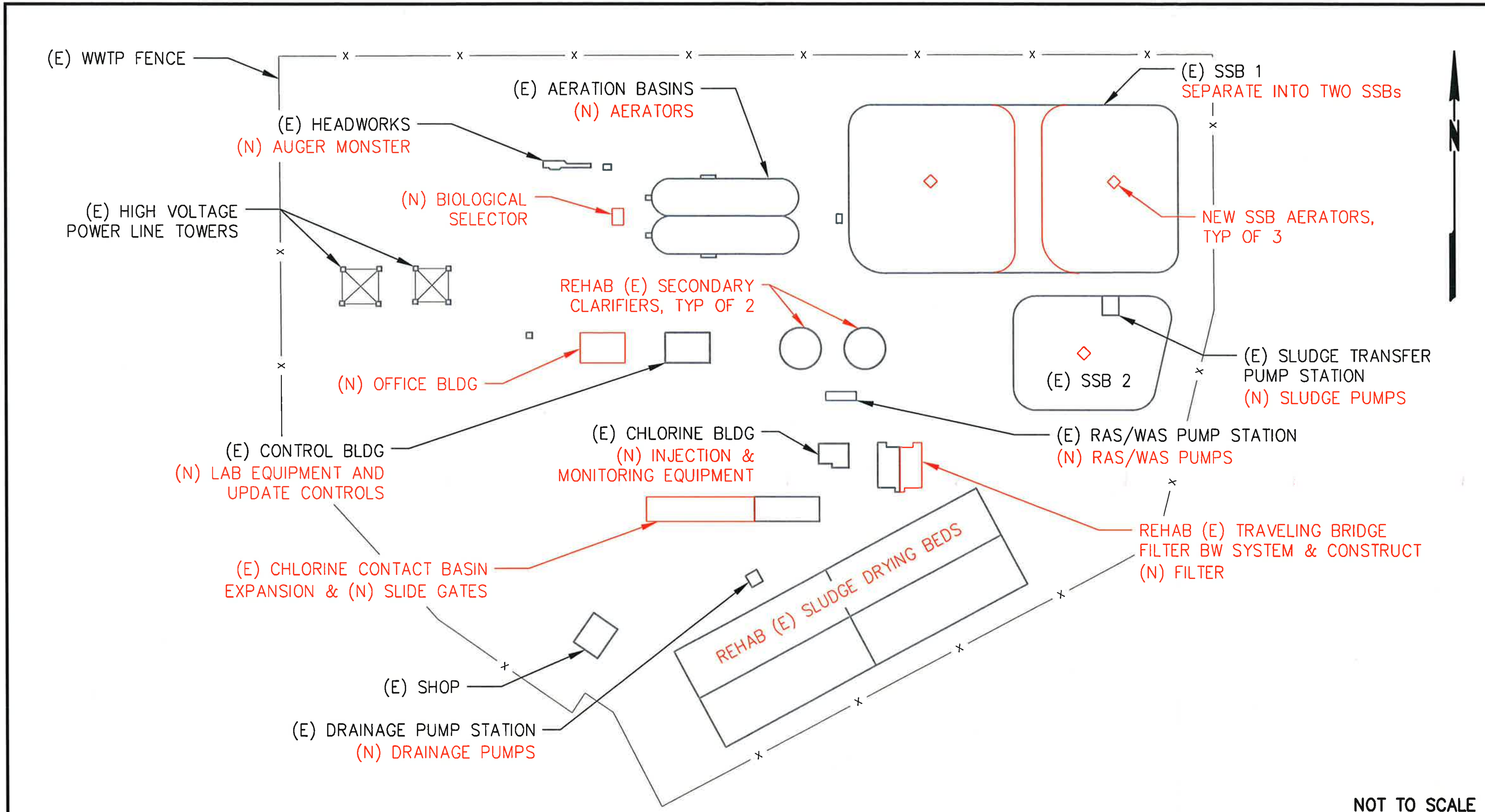


NOT TO SCALE

PACE ENGINEERING
REDDING, CALIFORNIA

CSA 17
2013 SEWER MASTER PLAN
WWTP SITE PLAN AND
PROPOSED IMPROVEMENTS

FIGURE 4

DATE: 10/13

JOB # 35.26

Plot Date: October 04, 2013 - 10:35 am Login Name: lmccollum
File Name: M:\Land Projects\003526 CSA 17 MSP\DWG\WWTP SITE PLAN.dwg, Layout: SITE

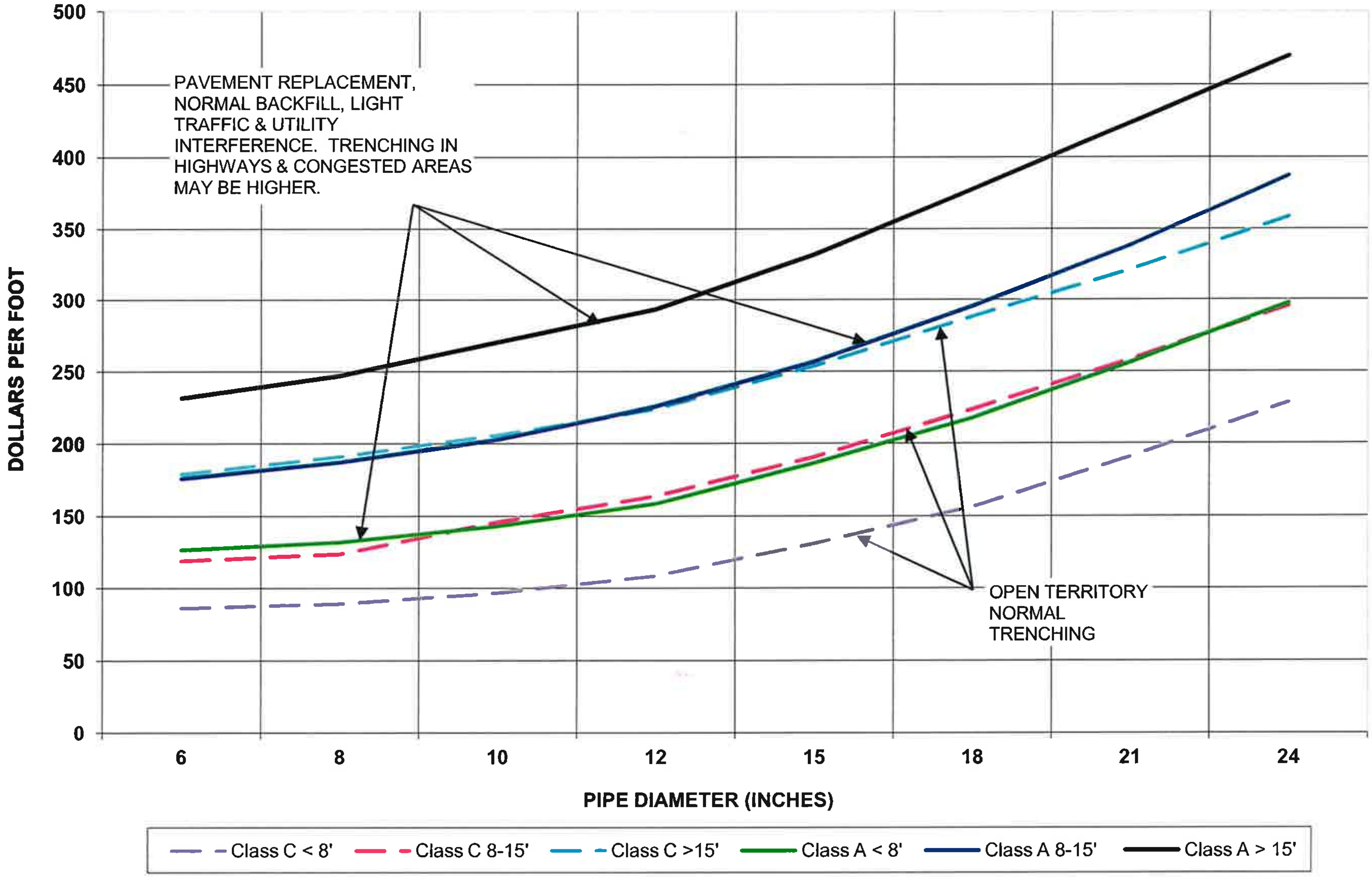
FIGURE 5

CSA 17

2013 Sewer Master Plan

GRAVITY SEWER CONSTRUCTION COST

November 2013



NOTE: COSTS ARE FOR OPEN TRENCHING & INCLUDE ALLOWANCES FOR MANHOLES & OTHER NORMAL APPURTENANCES. THIS COST FIGURE DOES NOT INCLUDE ENGINEERING OR CONTINGENCIES, BORING AND JACKING, ROCK EXCAVATION, SEVERE GROUND WATER, EASEMENTS, OR OTHER SITE SPECIFIC FACTORS.

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APPENDIX A

WASTEWATER UTILITY RATE STUDY

COUNTY SERVICE AREA NO. 17

FOR THE

COUNTY OF SHASTA
DEPARTMENT OF HOUSING
AND COMMUNITY ACTION PROGRAMS
CDBG GRANT NO. 10-DRI-6792

NOVEMBER 2013

JOB NO. 35.26

PACE ENGINEERING
REDDING, CALIFORNIA

COUNTY OF SHASTA
CALIFORNIA

PACE ENGINEERING

November 22, 2013

35.26

Richard Kuhns, Psy. D.
Department of Housing and Community Action Programs
Shasta County Administration Center
1450 Court Street, Suite 108
Redding, CA 96001-1661

PACE Engineering is pleased to present the report entitled:

WASTEWATER UTILITY RATE STUDY
FOR
SHASTA COUNTY SERVICE AREA NO. 17 (CSA 17)

The Wastewater Rate Study contains the results of our review and analysis of the CSA 17 current wastewater service charges. This review was conducted as part of the 2013 Sewer Master Plan to develop a rate increase program that would provide the revenues needed to allow the County to recover the total costs of operating and maintaining CSA 17 only from existing and future customers. Costs reviewed included operation and maintenance, debt service, small capital replacements, and administration. The proposed rate structure was developed under the premise that the service charges would be equitable such that, as nearly as practical, each customer would pay their fair share of the costs of providing the services received.

This project was funded through Community Block Development Grant No. 10-DRI-6792. PACE Engineering is very pleased to have participated in this project. We would like to thank County staff for their able assistance in providing data to estimate current and future revenues and expenditures. Please call with any comments on this report.

Sincerely,

Laurie McC

Laurie McCollum
Staff Engineer

REGISTERED PROFESSIONAL ENGINEER
LAURIE E. McCOLLUM
No. 77274
Exp. 6-30-15
CIVIL
STATE OF CALIFORNIA

LM
Enclosures
c: Al Cathey, Shasta County Department of Public Works
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TABLE OF CONTENTS

ABBREVIATIONS

County	Shasta County
CSA 17	County Service Area No. 17 Cottonwood
ENR CCI	Engineering News Record, Construction Cost Index
FY	Fiscal Year
GASB 34	Government Accounting Standards Board Statement 34
GPD	Gallons per Day
GPM	Gallons per Minute
HE	Household Equivalent (i.e., typical single-family home)
I&I	Infiltration and Inflow
MHI	Median Household Income
MSR	Municipal Services Review
O&M	Operation and Maintenance
SMP	Sewer Master Plan
SOP	Standard Operating Procedure
WWTP	Wastewater Treatment Plant

EXECUTIVE SUMMARY

INTRODUCTION

The reader is referred to the 2013 Sewer Master Plan (SMP) for a complete introduction to Shasta County Service Area No. 17 (CSA 17). This Wastewater Utility Rate Study deals strictly with funding CSA 17.

The County of Shasta (County) owns and operates CSA 17 in Cottonwood, which consists of a wastewater collection system, treatment plant, and effluent disposal facilities. CSA 17 is operated by the County as an independent enterprise through the Non-Major Enterprise Fund. Expansion and upgrading of the wastewater system is funded through the Enterprise Fund and Capital and Collection System Improvement Fees.

A Capital Improvement Fee is charged for new land uses that generate wastewater in excess of the household equivalents (HEs) that were previously purchased for the affected property based on the proposed zoning or use. A Collection System Improvement Fee is charged for new land uses that will generate wastewater in excess of the HEs that were previously purchased for the affected property based on the proposed zoning or use for future improvements in the western and central portions of CSA 17. Capital and Collection System Improvement Fees are deposited into the CSA 17 Capital Improvement Fund for growth related improvements.

PURPOSE AND SCOPE

As part of the 2013 SMP, PACE Engineering was retained by the County to review the current wastewater service charges and recommend feasible rate increases that cover the costs of operating and maintaining the wastewater system. This includes improvements recommended in the first 5-year increment of the 20-Year SMP.

This report presents results of the analysis of CSA 17's current wastewater service charges. This review was conducted to develop a rate increase program that would provide the revenues needed to allow the County to recover the total costs of operating and maintaining CSA 17 from existing and future customers. Costs reviewed included operation and maintenance (O&M), debt service, small capital replacements due to equipment age and capital additions due to growth, administration, and depreciation.

The proposed rate structure was developed under the premise that service charges would be equitable such that, as nearly as practical, each customer would pay their fair share of the costs of providing the services received.

The scope of this study includes a review and analysis of operation of the CSA 17 Wastewater Enterprise based upon historic expenditures and revenues, the proposed Capital Improvement Plan from the 2013 SMP, and projected future revenue requirements.

The work performed included:

- Meeting with County staff members to collect and review available information and review the methodology to be used in the development of the recommended rate structures for wastewater services.

- Reviewing historical account information and anticipated future costs for the 5-year study period (Fiscal Year (FY) 2013-14 through FY 2017-18).

- Prioritizing capital improvement funding needs from the 2013 SMP and supplemental improvements the County may deem warranted to comply with regulatory requirements.

- Developing a forecast of annual revenue requirements.

- Recommending a rate structure that generates the level of revenue needed, with a distribution of those costs on an equitable basis between current and new customers, as well as by class of customer.

STUDY ASSUMPTIONS

The following assumptions were used to analyze and project future costs, revenues, and wastewater rates for this study:

- Proposed wastewater service charges should be increased gradually such that they generate sufficient revenues to cover the costs of system operation and maintenance, and replacement of capital improvements allocated to system users by the end of FY 17-18. Although a significant capital improvement project will likely not begin until the end of FY 17-18, the proposed rate increases recommended herein are based on loan funding to be implemented immediately for the improvements. This allows costs to be spread more evenly over the life of the proposed improvements, thus minimizing monthly rates.

- Revenues generated from the Capital and Collection System Improvement Fees will fund future capital expansion improvements and debt service payments for growth related improvements. These revenues will not be used for operating expenses.

- Refer to the Financial Considerations section of the 2013 SMP for details of the recommended Capital Improvement Fee related to growth. All rates discussed herein are not growth related and therefore are only to fund O&M of the existing system and current needed capital improvements.

- The CSA 17 Wastewater Enterprise Fund will operate with a balanced budget.

- Long-term capital replacements are being funded; therefore, depreciation will not be funded at this time.

WASTEWATER RATE AND FINANCIAL RECOMMENDATIONS

SUMMARY OF WASTEWATER FINDINGS: Findings related to the CSA 17 wastewater system are summarized below:

- The current wastewater rate structure consists of a fixed bimonthly service charge with all single-family household equivalent (HE) accounts being charged one base rate per family unit. Single-family HEs are typically calculated for each non-residential account based on their winter water use. In special situations the calculated number of HEs may be adjusted to account for unusual water use conditions. All accounts (commercial, industrial, institutional) with flows greater than one HE are charged based on the calculated number of HEs times the base rate. All remaining accounts are charged the base amount.

- Current CSA 17 wastewater rates do not provide sufficient revenues to sustain O&M expenditures or the capital replacement program at levels desired for long-term system reliability. The CSA 17 Enterprise Fund was short $121,592 in FY 12-13, which was offset by a $100,000 transfer from the Capacity Improvement Fund.

- Wastewater connection fees are not sufficient to fund growth-related capital improvements costs on a pay-as-you-grow basis. A portion of these future fees should be allocated to debt service for growth related improvements.

WASTEWATER RATE RECOMMENDATIONS: The wastewater rates recommended for adoption in FY 13-14 through FY 17-18 are summarized in Table 1. These wastewater rates should be implemented as soon as possible, as FY 13-14 is already underway. In order to complete a rate increase, Proposition 218 procedures will likely take at least 6 months; therefore, proposed rates recommended herein will probably not be effective until July 1, 2014. The timing of future capital improvement projects will need to be adjusted accordingly based on when rate increases go into effect.

The typical residential sewer bill will increase by approximately 20% the first two years, then 10%, 10%, and 5% in each of the next three subsequent years.

TABLE 1
CSA 17
Recommended Bimonthly Wastewater Rates

	Existing FY 12-13	Proposed FY 13-14	Proposed FY 14-15	Proposed FY 15-16	Proposed FY 16-17	Proposed FY 17-18
Single-Family Flat Rate per Unit	$68.00	$81.60	$97.92	$107.71	$118.48	$124.41
Non-Residential Flat Rate per HE (see Notes)	$68.00	$81.60	$97.92	$107.71	$118.48	$124.41

1. One household equivalent (HE) equals 240 gallons per day of wastewater flow, which is the estimated flow from a typical single-family household.
2. Non-residential HEs based on 80% of winter water consumption or available flow factors for similar type of discharges.

It is recommended CSA 17 continue to use its current flow-based rate structure, but an HE be adjusted to reflect an average wastewater flow of 240 gallons per day (GPD), rather than 250 GPD as it currently stands.

WASTEWATER FINANCIAL PLAN RECOMMENDATIONS: The following recommendations are made with respect to the fund structure and reserve policies of the wastewater utility. These recommendations are intended to improve the financial condition of the utility and minimize the potential for future rate volatility.

- Rates must be raised significantly for current revenues to meet expenditures and to fund needed capital improvements; therefore, while allowing for a minimum operating reserve is prudent, it cannot be sustained by the rate payers at this time. However, in the future, a minimum operating reserve of $200,000, or 25% of the budgeted total expenses less on-going capital projects, whichever is greater is recommended. Operating reserves would provide funds available for emergencies, unanticipated fluctuations in revenues relative to costs, and other unforeseeable events.

- A Wastewater Improvements Capital Reserve Fund should also be maintained. The need for wastewater system improvements can vary from year to year, thus unspent funds budgeted for capital improvements would be transferred to this fund at the end of each fiscal year so that they can be used for future needs.

- Review and update other fee related services within the Wastewater Enterprise fund, such as call-outs, contractor hookups and usage, etc.

- Review inflationary trends annually using the Consumer Price Index, and confirm that inflation is still within the inflation factors used in the 5-year financial plan. Higher than projected inflation may require adjustments to the proposed rate schedule.

- Update this Rate Study within 5 years.

- To assure that future growth is paying its fair share of the capital improvements, the County should charge its Improvement Fees for the wastewater utility at 100% of the recommended value. In addition, the Improvement Fees should be adjusted for inflation on an annual basis in accordance with the change in the Engineering News Record, Construction Cost Index (ENR CCI).

WASTEWATER UTILITY

CURRENT WASTEWATER RATES

Due to the relatively small size of the system, and lack of large commercial and industrial users, the current wastewater rate structure is a flow-based system without any adjustments for the organic strength of the wastewater. Single-family units are charged one base rate per HE. Single-family HEs are calculated for each non-residential account based on the water use for the months of November through February. The average daily water use for each account during these four winter months is multiplied by 80% to determine their estimated average daily wastewater discharge. This average daily wastewater discharge is then divided by 250 GPD for a typical HE (recommended to be lowered to 240 GPD), to arrive at the number of HEs per account, with a minimum of one HE being assigned to each account. In special situations, the calculated number of HEs may be adjusted to account for unusual water use. The monthly sewer bill for the following year is then computed by multiplying the number of HEs times the monthly base rate. Historical wastewater rates are summarized in Table 2. The current wastewater rate structure has not been adjusted for inflation since January 1, 2010.

TABLE 2
CSA 17
Historical Wastewater Rates

Year	Bimonthly Rate
2008	\$60.00
2009	\$64.00
2010	\$68.00
2011	\$68.00
2012	\$68.00

HISTORICAL GROWTH AND EXPENDITURES

HISTORICAL WASTEWATER CUSTOMERS AND FLOWS: According to the 2003 Municipal Services Review (MSR), CSA 17 had 1,094 service connections, of which 981 (90%) were active, serving an estimated 2,460 people. In 2012, there were a reported 1,271 service connections, 1,146 (90%) of which were active, serving an estimated 2,475 people. This equates to an average annual growth rate in connections of 1.8%, while the population remained about the same.

According to the Shasta County General Plan, the California Department of Finance indicated the population of Shasta County as a whole increased by 4% over the last 5 years (annual average growth rate of 0.8%). Current data shows a predicted growth of 17% between the years 2010 and 2020 (annual average growth rate of 1.7%) in a report previously completed by the Department of Finance. Also noted in the General Plan, the Department of Finance now states that assumptions used to project future population may no longer be applicable, and these projections could change with their next estimate cycle which is every 5 years.

In the 2003 MSR, it was stated that growth and population in the CSAs will remain relatively static into the foreseeable future; therefore, CSA operations are more in a preventative maintenance mode than one of system expansion to accommodate new development. That having been said, there are a few proposed developments which have tentative maps and/or preliminary plans already completed and approved. The 2013 SMP utilized these developments, together with the highest predicted future development densities per the General Plan and Housing Element, at an annual growth rate of 1.7% to forecast growth in the next 20 years.

In 2012, there were 1,086 active single-family residential connections, 56 active commercial connections, and 4 active public connections. According to County GIS mapping, there are approximately 100 vacant lots within the CSA 17 service area boundary. The County anticipates these lots will eventually be built on and connected to the wastewater system, which will continue to add customers and increase revenue for wastewater operations.

Historical wastewater connection data is shown in Figure 1. The values shown are for all active use classifications. Overall, for the last nine years, the annual growth rate in active connections has been 1.7%.

FIGURE 1
HISTORICAL WASTEWATER CONNECTIONS

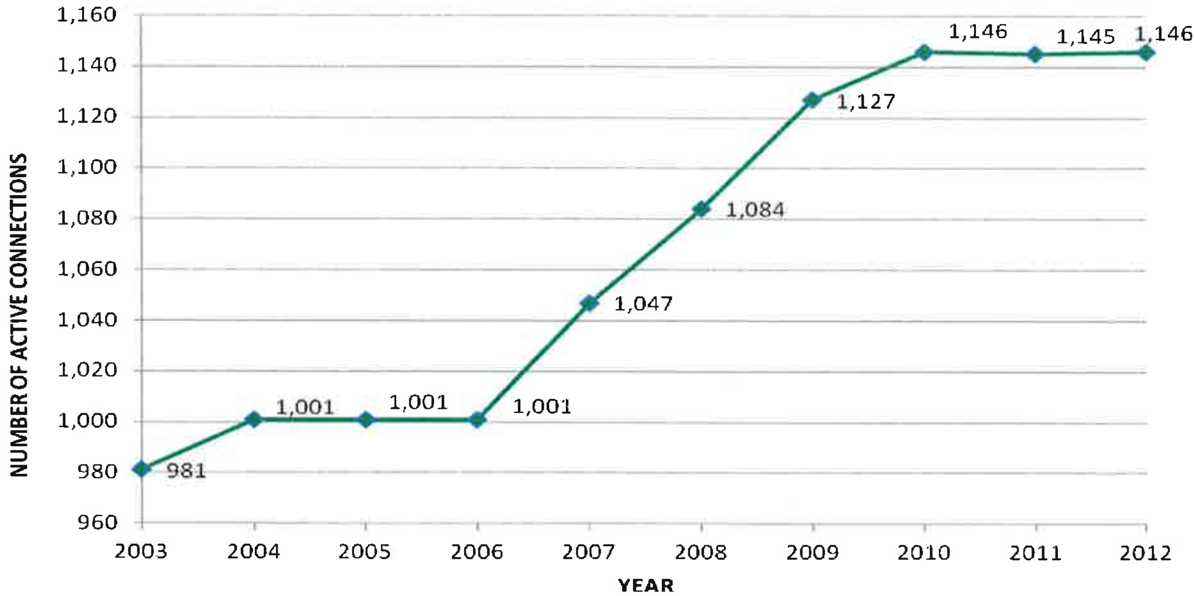
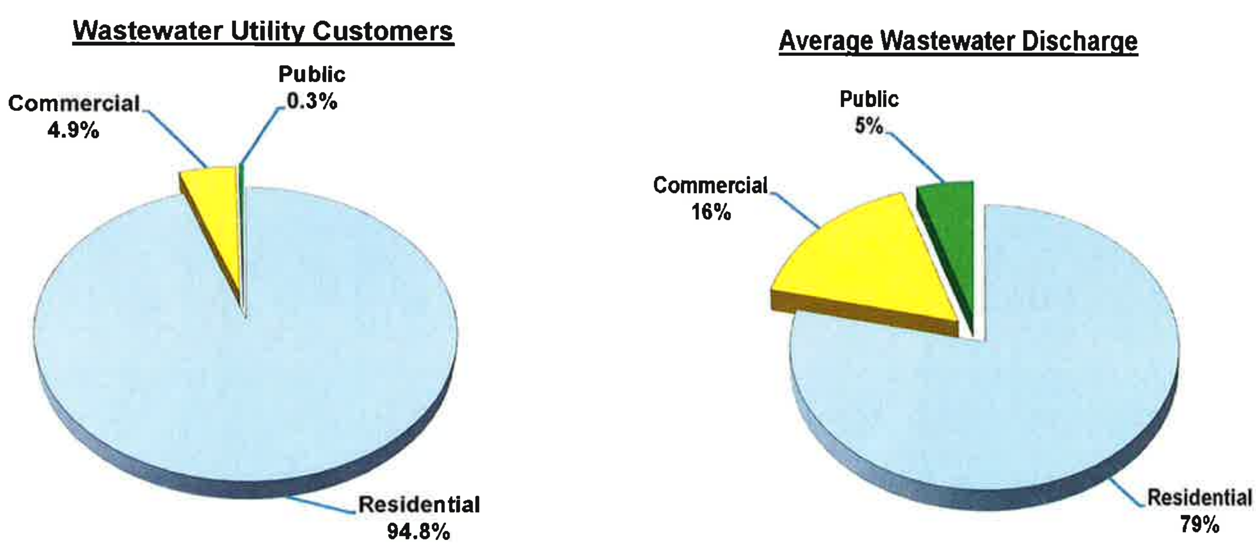


Figure 2 summarizes the current number of active customer accounts, as well as the current estimated amount of annual wastewater discharged by each class of customer. As expected, wastewater discharged by all user classes, except for the residential class, represents a much higher proportion of wastewater discharge than is reflected by the percentage of customer accounts in each class.

FIGURE 2
SUMMARY OF CUSTOMERS AND ANNUAL WASTEWATER DISCHARGES



WASTEWATER EXPENDITURES: CSA 17 wastewater expenditures for operation and maintenance and replacement of capital projects are normally made from the CSA 17 Wastewater Enterprise Fund. Table 3 is a summary of Wastewater Enterprise expenditures from FY 07-08 through FY 11-12.

Historically, CSA 17 has not funded depreciation per GASB 34 guidelines. An amount equal to the annual depreciation should be put back into rehabilitation and replacement of the existing collection and treatment systems. Currently, CSA 17 annual depreciation is about $240,600 per year, which equates to about $14 per month, per household equivalent.

TABLE 3
CSA 17
Historical Wastewater Enterprise Expenditures

Category	Actual (FY 07-08)	Actual (FY 08-09)	Actual (FY 09-10)	Actual (FY 10-11)	Actual (FY 11-12)
Clothing/personal supplies	$0.00	-	$84.20	$29.82	-
Communications expense	$1,580.49	$2,230.54	$1,824.87	$1,751.23	$2,109.96
IT communications	-	-	-	-	$92.04
Household expense	$3,047.37	$1,103.44	$1,181.98	$7,446.81	$514.86
Facility mgmt household expense	-	$1,072.90	$559.17	$848.63	$942.43
Maintenance of equipment	$115,826.83	$119,849.12	$105,314.27	$191,761.39	$113,948.87
Maintenance of structures	$1,324.09	$216.30	$17,034.06	-	$18.33
Charges facility mgmt maint structures	-	$4,526.02	$14,879.62	$1,972.18	$3,318.23
Medical/dental/lab supplies	$360.32	$1,823.75	$1,291.40	$2,799.38	$3,688.40
Memberships	$300.00	$150.00	$150.00	$150.00	$150.00
Miscellaneous expense	-	$18.00	-	-	-
Office expense	$243.34	$1,496.33	$129.25	$74.24	$80.38
OC postage services	$4,479.16	$3,885.01	$3,575.96	$4,631.99	$4,817.05
Professional and special services	$46,673.56	$45,631.09	$46,549.13	$28,896.13	$371.94
Professional lab services	$25,700.60	$24,617.00	$27,946.00	$35,524.36	$29,461.00
Professional maintenance services	$198,011.34	$208,356.84	$189,467.72	$241,415.54	$294,260.77
Publications and legal	$92.82	-	-	-	-
Rentals and leases of equipment	$497.43	$1,766.89	$680.70	$2,203.66	$714.79
Minor equipment	$734.83	$384.46	$116.77	$252.74	$2,423.19
Special departmental	$721.30	$1,262.32	$720.15	$1,874.81	$2,640.31
Sp dept expense permits/licenses	$3,508.00	$1,226.00	$3,356.00	$1,226.00	$0.00
Utilities	$60,071.88	$54,451.88	$73,650.89	$67,995.55	$65,357.40
Central service cost A-87	$6,170.16	$10,605.72	$15,491.59	$9,465.60	$10,553.40
Interest on long term debt	$20,133.00	$19,499.00	$18,839.00	$18,153.00	$17,440.00
Depreciation	$238,258.18	$242,456.99	$241,096.15	$240,599.42	$240,599.42
Bad debts	$320.33	$362.79	$186.79	-$1,202.00	
Cottonwood sewer upgrade	$31,239.72	-$2,000.00			
Sludge pond liner	$47,870.16	$127,808.17			
Transfer out financial stmt adjustment		-$159,991.32	-$56,231.31		
Total Expenditures:	**$807,165**	**$712,809**	**$707,894**	**$857,870**	**$793,503**
Total Expenditures (w/o capital improvements):	**$728,055**	**$585,001**	**$707,894**	**$857,870**	**$793,503**
% Change:		**-19.6%**	**21.0%**	**21.2%**	**-7.5%**

WASTEWATER RATE DEVELOPMENT

CURRENT WASTEWATER RATE REVENUE REQUIREMENT: Analysis of the FY 13-14 wastewater rate revenue requirement is based on CSA 17's FY 12-13 adopted budget. The annual CSA 17 Wastewater Enterprise rate revenue requirement is based on wastewater system operation and maintenance cost, plus replacement of small capital improvement needs, less other wastewater system revenues such as property taxes, interest earnings, and other income.

CSA 17's FY 12-13 Wastewater Enterprise budget indicates annual wastewater expenditures of $922,391, less $240,599 in depreciation (for total expenditures of $681,792), and revenues of $660,200, including $100,000 transferred in from the CSA 17 Capacity Improvement Fund (for actual revenues of $560,200). Thus, the current rate structure is not adequate to meet FY 12-13 revenue needs by $121,592, and the CSA 17 Wastewater Enterprise ran a deficit in FY 12-13. It is important to note, CSA 17 also faces additional sewer rehabilitation and replacement capital improvements in the near future as discussed in the 2013 SMP.

COST OF SERVICE ANALYSIS: There are a number of ways to allocate costs for rate setting purposes. Some are rather complex, requiring a significant effort to develop and administer. Others are somewhat simpler to develop, understand, and administer. As discussed previously herein, the CSA 17 current rate structure is flow based and does not take waste strength into account. This is generally an acceptable approach for relatively small systems with minimal commercial and industrial users. Thus, there is no need to change the current method of cost allocation.

MULTI-YEAR FINANCIAL PLAN GUIDELINES: In order to develop recommendations regarding future rates, this Rate Study developed a multi-year financial plan for the CSA 17 Wastewater Enterprise, which considers both nominal capital and replacement operating programs.

Capital Projects: A prioritized list of the specific improvements, including those recommended in Table 11 of the 2013 SMP, is shown here again in Table 4 for clarity, with estimated costs in November 2013 dollars. Table 4 also indicates the approximate allocation of project costs to the replacement and growth categories. Replacement category improvements include replacement and/or upgrade of existing infrastructure to improve its effectiveness. Refer to the Financial Considerations section of the 2013 SMP for details of the recommended Capital Improvement Fee related to growth. Due to the magnitude of the listed improvements, capital improvement funding will need to be included in CSA 17's financial plan for the foreseeable future.

Funding for creating and/or updating the CSA 17 standard operating procedures (SOPs) and O&M manuals for all major processes and equipment at the wastewater treatment plant was included in the 5-year plan. Additionally, costs to enter into a performance services agreement to calibrate necessary equipment each year were also included. Finally, costs to provide video inspection of the complete sewer system were included. It is estimated this total effort will cost about $375,000 over the next 5 years.

Costs for completion of a comprehensive infiltration and inflow (I&I) reduction program within CSA 17 are not included herein. I&I field measurement could not be completed as part of the 2013 SMP due to the lack of seasonal precipitation. In the future, when I&I monitoring is completed, an I&I reduction program can then be developed based on review of the field data. At that time, this Rate Study should be updated to include associated costs. Until such time, cost for performing I&I reduction work is accounted for by replacing approximately 325 feet of sewer each year as noted in Table 4. Costs to parallel sewers known to be at or over capacity based upon survey data and modeling have been included in Table 4 as well.

TABLE 4
CSA 17
CAPITAL NEEDS PRIORITIZATION ESTIMATED COSTS (1)

Item No.		Estimated Cost (2) Immediate Term (2013-2017)	Near Term (2017-2022)	Intermediate Term (2022-2027)	Long Term (2027-2032)	% Attributed to Growth	Cost Attributed to Growth
GENERAL COLLECTION SYSTEM IMPROVEMENTS							
1	Parallel 200' of 8" sewer along Gas Point Road with 10" and 630' of 8" sewer near West Cottonwood Junior High with 8" (Pts. 1 to 2)	$112,000				0%	$0
2	Replace 200' of 10" sewer east of Main Street with 15" and parallel 215' of 10" sewer with 8" and 130' of 12" sewer with 10" (Pts. 3 to 4)		$82,000			23%	$18,860
3	Parallel 520' of 8" sewer near Cinabar Road and Wincrich Lane with 10" and 550' of 8" sewer with 8" (Pts. 5 to 6)			$144,000		23%	$33,120
4	Parallel 150' of 8" sewer on Park Drive with 8" (Pt. 7)				$20,000	23%	$4,600
5	Hydro Jetter sewer cleaner & trailer	$30,000				0%	$0
6	Aging sewer main replacements(3)	$205,000	$205,000	$205,000	$205,000	23%	$188,600
COTTONWOOD LIFT STATION IMPROVEMENTS							
7	Grinder	$75,000				0%	$0
8	Float Backup System	$10,000				0%	$0
9	Generator		$70,000			0%	$0
10	2-700 GPM & 2-300 GPM centrifugal pumps, motors, and starters, complete with upsized piping and valving			$184,000		23%	$42,320
BLACK LANE LIFT STATION IMPROVEMENTS							
11	Replace railings	$10,000				0%	$0
12	New generator w/ auto transfer switch	$50,000				0%	$0
13	2-230 GPM pumps, motors, and starters, complete with upsized piping, valving, and alarms		$42,000			23%	$9,660
14	Portable trash pump and piping			$40,000		0%	$0
CROWLEY CREEK LIFT STATION IMPROVEMENTS							
15	Diesel gas tank secondary containment		$5,000			0%	$0
16	Cover over electrical controls		$10,000			0%	$0
17	Install bypass piping				$10,000	0%	$0
QUAIL LANE LIFT STATION IMPROVEMENTS							
18	2-60 GPM grinder pumps and motors	$10,000				0%	$0
19	Replace all mechanical	$15,000				0%	$0
20	New generator w/ auto transfer switch	$40,000				0%	$0
21	Cover over electrical controls		$10,000			0%	$0
22	Install fence around lift station		$5,000			0%	$0
23	Install bypass piping				$10,000	0%	$0
	GENERAL COLLECTION SYSTEM IMPROVEMENTS SUBTOTAL:	**$557,000**	**$429,000**	**$573,000**	**$245,000**		**$297,000**
WWTP IMPROVEMENTS							
24	New Auger Monster®		$200,000			0%	$0
25	New biological selector w/ mixers	$120,000				0%	$0
26	Replace aeration basin aerators	$40,000				0%	$0
27	Recoat mechanical equipment & new drives on existing clarifiers	$75,000		$75,000		0%	$0
28	Replace RAS, WAS, scum, sludge, water, and drainage pumps	$25,000	$25,000	$25,000	$25,000	0%	$0
29	Install additional RAS pump	$25,000					
30	Rehab existing filter	$100,000				0%	$0
31	New traveling bridge filter		$700,000			0%	$0
32	Replace chlorine contact basin slide gates	$20,000				0%	$0
33	Enlarge chlorine contact basin				$150,000	0%	$0
34	Replace 9 freeze-proof yard hydrants	$10,000				0%	$0
35	New chemical dosing and monitoring equipment				$100,000	0%	$0
36	Effluent disposal feasibility study			$75,000		23%	$17,250
37	SSB 1 modifications				$100,000	0%	$0
38	New SSB aerators	$20,000	$20,000	$20,000		0%	$0
39	Sludge drying beds modifications			$200,000	$200,000	0%	$0
40	New office building			$250,000		0%	$0
41	New chart recorders	$20,000				0%	$0
42	New lab equipment	$50,000				0%	$0
43	Update all controls and alarms, including WWTP and lift stations	$250,000				0%	$0
44	New generator	$80,000				0%	$0
	WWTP IMPROVEMENTS SUBTOTAL:	**$835,000**	**$945,000**	**$645,000**	**$575,000**		**$17,000**
	TOTAL ESTIMATED CONSTRUCTION COSTS:	$1,392,000	$1,374,000	$1,218,000	$820,000		$314,000
	Construction Contingency (25%):	$348,000	$344,000	$305,000	$205,000		$79,000
	Environmental, Engineering & Indirect Costs (35%):	$609,000	$601,000	$533,000	$359,000		$138,000
	TOTAL ESTIMATED PROJECT COSTS:	**$2,349,000**	**$2,319,000**	**$2,056,000**	**$1,384,000**		**$531,000**
	Cumulative Project Costs:	$2,349,000	$4,668,000	$6,724,000	$8,108,000		

(1) Based on a 1.7% annual growth rate.
(2) All costs in November 2013 dollars at an ENR index of 9666.
(3) Costs shown would result in ~325 feet of various sizes of pipe replaced every year.

Additional HEs Over Next 20 Years:	427
Additional Future Capacity Charge per HE:	$1,244
Existing Capacity Charge:	$3,600
Total Future Capacity Charge:	**$4,844**

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Operating Reserve: Operation reserves ranging from 10 to 40% of annual operating costs are common for public wastewater utilities. CSA 17 does not currently have an operating reserve, as wastewater rates are not yet adequate for revenues to meet expenditures. It is recommended the County attempt to maintain an operating reserve equal to approximately $200,000, or 25% of its total expenses less on-going capital projects, whichever is greater, at such a time when this is feasible and CSA 17 is not faced with significant pending capital improvements.

Financial Plan Assumptions: The following is a list of the primary assumptions used in developing the multi-year financial plan:

- O&M costs will generally increase at 3% per year starting in FY 13-14.
- The number of wastewater HEs will increase at 1.7%, or approximately 25 HEs per year.
- The 2011 median household income (MHI) for Cottonwood was $47,532, which is 83% of the State MHI of $57,287. Therefore Cottonwood does not qualify as a disadvantaged community. Current wastewater rates are at just 0.9% of the MHI. As such, no grant funding is anticipated for funding of the capital improvements outlined in Table 4.
- Future project costs will be inflated at 3% per year, which is equal to the average annual increase in the ENR CCI over the last three years.
- Replacement of major wastewater process components are being scheduled and funded within the 20-Year SMP; therefore, depreciation will remain unfunded at this time.
- Property tax and sewer administration revenues are projected to remain constant throughout the 5-year planning period, although they may vary somewhat.

Financial Plan Results: A 5-year projection of the CSA 17 Wastewater Enterprise budgeted and projected expenses is shown in Table 5.

TABLE 5
CSA 17
Budgeted and Projected Expenditures

Object	Account Description	Inflation Factor	Budgeted (FY 12-13)	Projected (FY 13-14)	Projected (FY 14-15)	Projected (FY 15-16)	Projected (FY 16-17)	Projected (FY 17-18)	Totals (FY 13-14 thru FY 17-18)
Services and Supplies									
32500	Communications expense	3%	$2,200	$2,266	$2,334	$2,404	$2,476	$2,550	$12,031
32591	IT communications	3%	$94	$97	$100	$103	$106	$109	$514
32900	Household expense	3%	$1,000	$1,030	$1,061	$1,093	$1,126	$1,159	$5,468
32992	Facility management houshold expense	3%	$566	$583	$600	$618	$637	$656	$3,095
33500	Maintenance of equipment	3%	$200,000	$206,000	$212,180	$218,545	$225,102	$231,855	$1,093,682
33791	Maintenance of structures	3%	$3,985	$4,105	$4,228	$4,355	$4,485	$4,620	$21,792
33900	Medical/dental/lab supplies	3%	$3,500	$3,605	$3,713	$3,825	$3,939	$4,057	$19,139
34100	Memberships	3%	$150	$155	$159	$164	$169	$174	$820
34500	Office expense	3%	$0	$0	$0	$0	$0	$0	$0
34591	OC postage services	3%	$4,941	$5,089	$5,242	$5,399	$5,561	$5,728	$27,019
34800	Professional and special services	3%	$25,000	$25,750	$26,523	$27,318	$28,138	$28,982	$136,710
34826	Professional lab services	3%	$40,000	$41,200	$42,436	$43,709	$45,020	$46,371	$218,736
34829	Professional maintenance services	3%	$260,000	$267,800	$275,834	$284,109	$292,632	$301,411	$1,421,787
35100	Rentals and leases of equipment	3%	$500	$515	$530	$546	$563	$580	$2,734
35500	Minor equipment	3%	$5,000	$5,150	$5,305	$5,464	$5,628	$5,796	$27,342
35700	Special departmental	3%	$5,000	$5,150	$5,305	$5,464	$5,628	$5,796	$27,342
36100	Utilities	3%	$73,000	$75,190	$77,446	$79,769	$82,162	$84,627	$399,194
		Subtotal:	**$624,936**	**$643,684**	**$662,995**	**$682,884**	**$703,371**	**$724,472**	**$3,417,406**
Wastewater Collection System Improvement Projects									
Parallel Gas Point Road sewer			**$0**	**$112,000**	**$0**	**$0**	**$0**	**$0**	**$112,000**
Hydro jetter sewer cleaner and trailer			**$0**	**$30,000**	**$0**	**$0**	**$0**	**$0**	**$30,000**
Aging sewer main replacements			**$0**	**$41,000**	**$41,000**	**$41,000**	**$41,000**	**$41,000**	**$205,000**
Cottonwood Lift Station grinder			**$0**	**$0**	**$75,000**	**$0**	**$0**	**$0**	**$75,000**
Cottonwood Lift Station float backup system			**$0**	**$0**	**$10,000**	**$0**	**$0**	**$0**	**$10,000**
Black Lane Lift Station railings			**$0**	**$0**	**$0**	**$10,000**	**$0**	**$0**	**$10,000**
Black Lane Lift Station generator w/ transfer switch			**$0**	**$0**	**$0**	**$50,000**	**$0**	**$0**	**$50,000**
Quail Lane Lift Station grinder pumps and motors			**$0**	**$0**	**$0**	**$0**	**$10,000**	**$0**	**$10,000**
Quail Lane Lift Station mechanical			**$0**	**$0**	**$0**	**$0**	**$15,000**	**$0**	**$15,000**
Quail Lane Lift Station generator w/ transfer switch			**$0**	**$0**	**$0**	**$0**	**$40,000**	**$0**	**$40,000**
		Subtotal:	$0	$183,000	$126,000	$101,000	$106,000	$41,000	$557,000
		Construction Contingency (25%):	$0	$45,800	$31,500	$25,300	$26,500	$10,300	$139,400
		Environmental, Engineering & Indirect Costs (35%):	$0	$80,100	$55,100	$44,200	$46,400	$18,000	$243,800
		Inflation Adder @ 3% Per Year:	$0	$9,000	$13,000	$16,000	$22,000	$11,000	$71,000
		Total Estimated Project Cost:	$0	$317,900	$225,600	$186,500	$200,900	$80,300	$1,011,200
		CWSRF Loan Funded Expeditures:	**$0**	**$0**	**$225,600**	**$186,500**	**$200,900**	**$80,300**	**$693,300**
		Subtotal Rate Payer Expenditures:	**$0**	**$317,900**	**$0**	**$0**	**$0**	**$0**	**$317,900**
Wastewater Treatment Plant Improvement Projects									
Biological selector w/ mixers			**$0**	**$0**	**$0**	**$0**	**$120,000**	**$0**	**$120,000**
Aeration basin aerators			**$0**	**$0**	**$0**	**$0**	**$40,000**	**$0**	**$40,000**
Existing clarifier rehabilitation			**$0**	**$0**	**$0**	**$0**	**$75,000**	**$0**	**$75,000**
Replace miscellaneous WWTP pumps			**$0**	**$0**	**$0**	**$0**	**$25,000**	**$0**	**$25,000**
RAS pump			**$0**	**$0**	**$0**	**$0**	**$25,000**	**$0**	**$25,000**
Existing filter rehabilitation			**$0**	**$0**	**$0**	**$0**	**$100,000**	**$0**	**$100,000**
Chlorine contact basin slide gates			**$0**	**$0**	**$0**	**$0**	**$0**	**$20,000**	**$20,000**
Yard hydrants			**$0**	**$0**	**$0**	**$0**	**$0**	**$10,000**	**$10,000**
SSB aerators			**$0**	**$0**	**$0**	**$0**	**$0**	**$20,000**	**$20,000**
Chart recorders			**$0**	**$0**	**$0**	**$0**	**$20,000**	**$0**	**$20,000**
Lab equipment			**$0**	**$0**	**$0**	**$0**	**$50,000**	**$0**	**$50,000**
Update all controls and alarms			**$0**	**$0**	**$0**	**$0**	**$0**	**$250,000**	**$250,000**
Generator			**$0**	**$0**	**$0**	**$0**	**$0**	**$80,000**	**$80,000**
SOPs, O&M Manuals, CCTV			**$0**	**$0**	**$0**	**$165,000**	**$125,000**	**$185,000**	**$475,000**
		Subtotal:	$0	$0	$0	$165,000	$580,000	$565,000	$1,310,000
		Construction Contingency (25%):	$0	$0	$0	$41,300	$145,000	$141,300	$327,600
		Environmental, Engineering & Indirect Costs (35%):	$0	$0	$0	$72,200	$253,800	$247,200	$573,200
		Inflation Adder @ 3% Per Year:	$0	$0	$0	$26,000	$123,000	$152,000	$301,000
		Total Estimated Project Cost:	$0	$0	$0	$304,500	$1,101,800	$1,105,500	$2,511,800
		CWSRF Loan Funded Expeditures:	**$0**	**$0**	**$0**	**$304,500**	**$1,101,800**	**$1,105,500**	**$2,511,800**
		Subtotal Rate Payer Expenditures:	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Debt Service									
50200	Retirement of long term debt		$19,293	$19,293	$19,293	$19,293	$19,293	$19,293	$96,465
50900	Interest on long term debt		$16,698	$16,698	$16,698	$16,698	$16,698	$16,698	$83,490
Additional debt service on CWSRF loan			**$0**	**$0**	**$201,734**	**$201,734**	**$201,734**	**$201,734**	**$806,936**
CWSRF loan debt reserve account			**$0**	**$0**	**$20,173**	**$20,173**	**$20,173**	**$20,173**	**$80,694**
		Subtotal:	**$35,991**	**$35,991**	**$257,898**	**$257,898**	**$257,898**	**$257,898**	**$1,067,585**
Internal Services									
50001	Central Service Cost A-87	3%	$20,865	$21,491	$22,136	$22,800	$23,484	$24,188	$114,098
50900	Depreciation	3%	$240,599	$247,817	$255,251	$262,909	$270,796	$278,920	$1,315,694
		Subtotal:	**$261,464**	**$269,308**	**$277,387**	**$285,709**	**$294,280**	**$303,108**	**$1,429,792**
		Total Expenditures Less Depreciation:	**$681,792**	**$1,019,066**	**$943,029**	**$963,583**	**$984,753**	**$1,006,559**	**$4,916,989**
		Total Expenditures:	**$922,391**	**$1,266,883**	**$1,198,280**	**$1,226,492**	**$1,255,549**	**$1,285,479**	**$6,232,683**

Table 6 presents a summary of the 5-year financial plan values based on the proposed rate increases for each year, and includes the year beginning fund balances, revenues, and expenditures for the CSA 17 Wastewater Enterprise Fund. As can be seen, the estimated fund balance at the end of FY 17-18 is about $14,160, with about $80,700 in debt reserve.

A summary of the wastewater utility revenue and expenditures associated with the proposed rate structure is also shown on Figure 3. As indicated by this bar graph the new rate structure will increase revenues such that projected expenditures can be met.

PROPOSED RATES: The proposed wastewater rates shown in Table 6 will increase the typical residential bill by about 20% per year the first two years, then 10%, 10%, and 5% in each of the next three subsequent years in order to fund needed improvements and have revenues meet expenditures. It is important to note, the proposed rate increases recommended herein include funding of loan costs for capital improvement projects to be implemented immediately. This allows costs to be spread more evenly over the life of the proposed improvements, thus minimizing monthly rates.

A comparison of wastewater rates for neighboring wastewater systems is shown in Figure 4. As one can see, the single-family monthly service charges range from a low of $32.76 at the City of Anderson, to a high of $74.27 at the City of Williams. The communities included typically have similar collection and advanced treatment systems; however, the age and condition of the sewer system varies. Additionally, most of these systems have future rate increases planned.

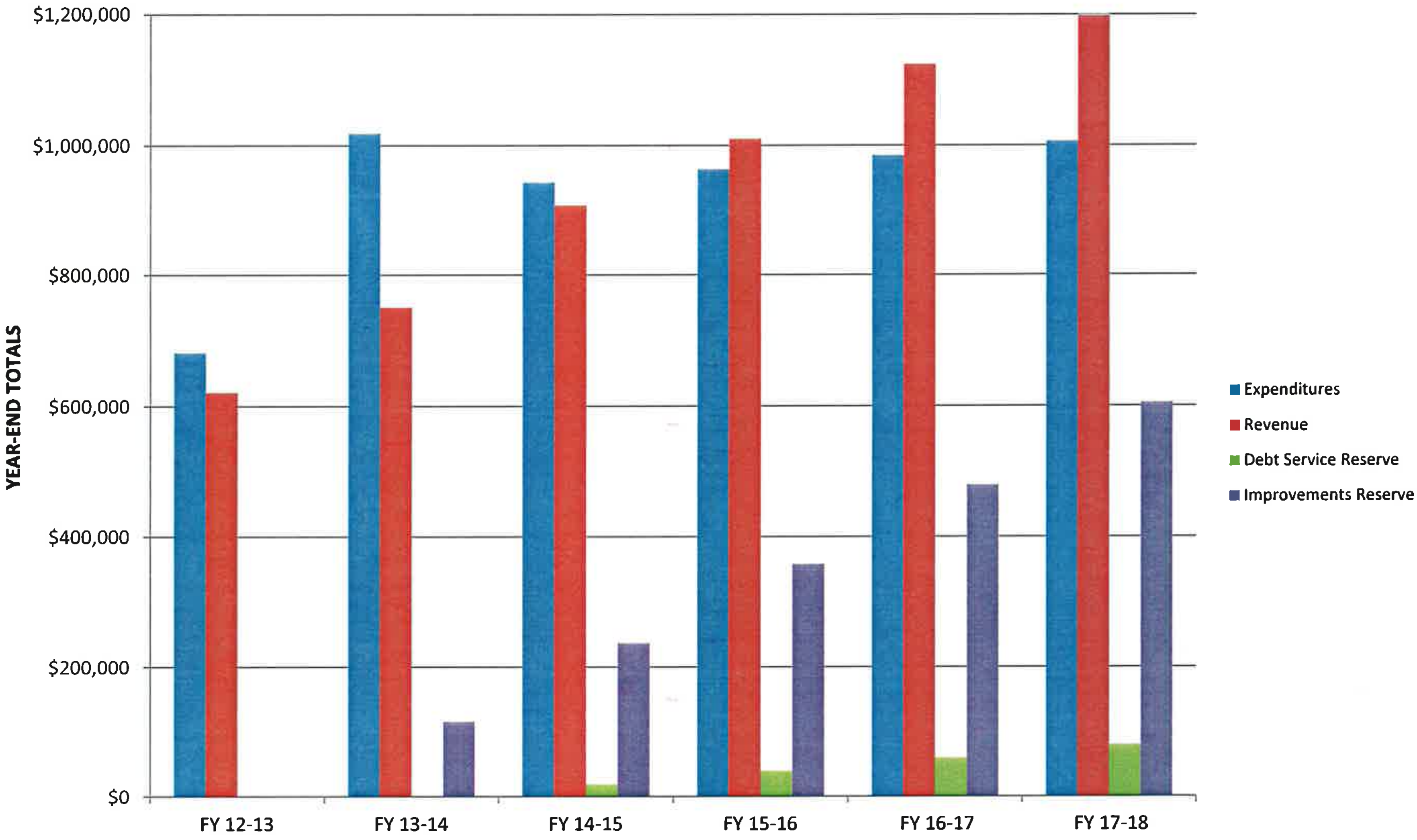
Before adopting any new rates, County counsel should be consulted and shown the 2013 SMP and this study to ensure the process is done correctly pursuant to Proposition 218 and government code.

TABLE 6
CSA 17
Summary of Wastewater Enterprise Fund Financial Plan

	Budgeted (FY 12-13)	Projected (FY 13-14)	Projected (FY 14-15)	Projected (FY 15-16)	Projected (FY 16-17)	Projected (FY 17-18)
WASTEWATER RATES USED						
Single-Family Bimonthly Service Charge	**$68.00**	**$81.60**	**$97.92**	**$107.71**	**$118.48**	**$124.41**
Single-Family Increase:		$13.60	$16.32	$9.79	$10.77	$5.92
ESTIMATED NUMBER OF SINGLE-FAMILY CONNECTION EQUIVALENTS						
Beginning of Year HEs		1,425	1,449	1,474	1,499	1,524
Estimated Additional HEs due to Growth		24	25	25	25	26
Estimated Year-End HEs	1,425	1,449	1,474	1,499	1,524	1,550
BEGINNING FUNDS AVAILABLE BALANCE	$0	-$60,192	-$328,478	-$364,157	-$317,629	-$177,622
REVENUES						
Fixed Service Charges	$581,400	$709,430	$866,000	$968,760	$1,083,410	$1,156,990
Standby Charges		$1,150	$1,150	$1,150	$1,150	$1,150
Interest	$200	$200	$200	$200	$200	$200
Sewer Asmt Curr (property tax assessments)	$40,000	$40,000	$40,000	$40,000	$40,000	$40,000
Total Revenue:	**$621,600**	**$750,780**	**$907,350**	**$1,010,110**	**$1,124,760**	**$1,198,340**
EXPENDITURES						
Services and Supplies	$624,936	$643,684	$662,995	$682,884	$703,371	$724,472
Wastewater Collection System Projects Paid by Rates	$0	$317,900	$0	$0	$0	$0
Wastewater Treatment Plant (WWTP) Projects Paid by Rates	$0	$0	$0	$0	$0	$0
Debt Service for WWTP & Collection System Projects Loan	$35,991	$35,991	$237,725	$237,725	$237,725	$237,725
Debt Service Reserve	$0	$0	$20,173	$20,173	$20,173	$20,173
Internal Services	$20,865	$21,491	$22,136	$22,800	$23,484	$24,188
Total Expenditures[(1)]:	**$681,792**	**$1,019,066**	**$943,029**	**$963,583**	**$984,753**	**$1,006,559**
YEAR-END BALANCE/OPERATING RESERVE:	**-$60,192**	**-$328,478**	**-$364,157**	**-$317,629**	**-$177,622**	**$14,159**
YEAR-END CAPITAL IMPROVEMENT FEES [(2)]:	**$0**	**$116,256**	**$121,100**	**$121,100**	**$121,100**	**$125,944**
YEAR-END OPERATING RESERVE [(3)]:	**-8.8%**	**-46.8%**	**-38.6%**	**-33.0%**	**-18.0%**	**1.4%**
ANNUAL INCREASE IN BIMONTHLY USER CHARGE:		**20.0%**	**20.0%**	**10.0%**	**10.0%**	**5.0%**

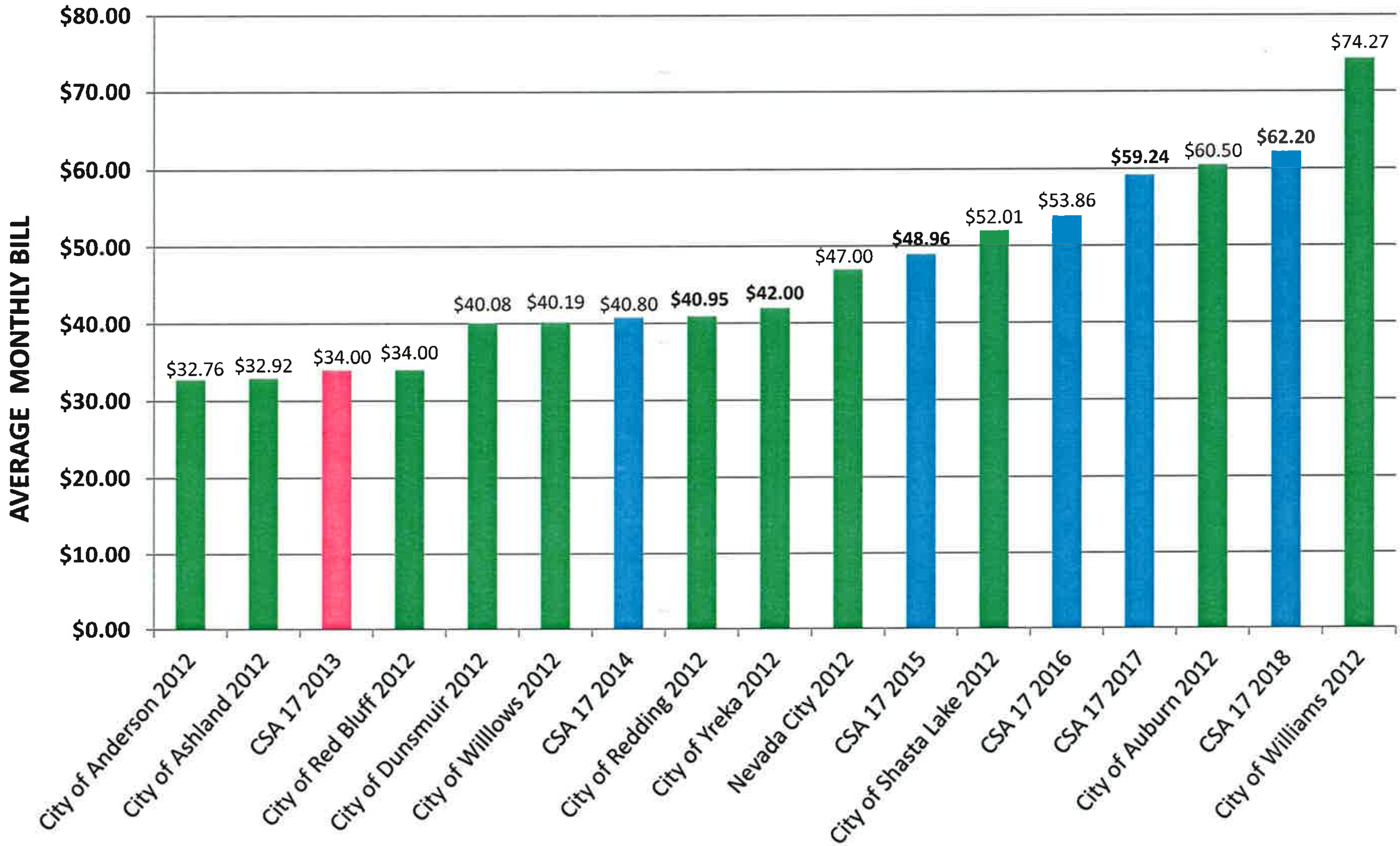
1. Excluding unfunded depreciation expense.
2. Capital Improvement Fees are for growth related improvements and are not used for operating expenses.
3. Percentage operating reserve is based on the year end Operating Reserve Fund Balance divided by Total Expenditures less On-going Capital Projects.

FIGURE 3
REVENUE & EXPENDITURES
BASED ON PROPOSED RATE SCHEDULE



Note: Reserve values are running totals.

FIGURE 4
SINGLE - FAMILY MONTHLY SEWER BILL COMPARISON



APPENDIX B

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

11020 Sun Center Drive #200, Rancho Cordova, California 95670-6114
Phone (916) 464-3291 • FAX (916) 464-4645
http://www.waterboards.ca.gov/centralvalley

ORDER NO. R5-2010-0044
NPDES NO. CA0081507

WASTE DISCHARGE REQUIREMENTS FOR SHASTA COUNTY SERVICE AREA NO. 17 COTTONWOOD WASTEWATER TREATMENT PLANT SHASTA COUNTY

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

Table 1. Discharger Information

Discharger	Shasta County Service Area No. 17
Name of Facility	Cottonwood Wastewater Treatment Plant, Cottonwood
Facility Address	3425 Live Oak Road
	Cottonwood, CA 96022
	Shasta 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 Shasta County Service Area No. 17 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	40° 22' 46.03"	122° 16' 08.65"	Cottonwood Creek

Table 3. Administrative Information

This Order was adopted by the Regional Water Quality Control Board on:	**27 May 2010**
This Order shall become effective on:	**16 July 2010**
This Order shall expire on:	**1 May 2015**
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 expiration date**

IT IS HEREBY ORDERED, that this Order supercedes Order No. R5-2005-0037 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 Clean Water Act (CWA) and regulations and guidelines adopted thereunder, the Discharger shall comply with the requirements in this Order.

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 27 May 2010.

Original signed by

PAMELA C. CREEDON, Executive Officer

Table of Contents

List of Tables

List of Attachments

I. FACILITY INFORMATION

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

Table 4. Facility Information

Discharger	Shasta County Service Area No. 17
Name of Facility	Cottonwood Wastewater Treatment Plant, Cottonwood
Facility Address	3425 Live Oak Road
	Cottonwood, CA 96022
	Shasta County
Facility Contact, Title, and Phone	Randy Gillichbauer, Utilities Superintendent, (530) 347-0431
Mailing Address	1855 Placer Street
	Redding, CA 96001
Type of Facility	Publicly Owned Treatment Works
Facility Design Flow	0.43 million gallons per day (MGD)

II. FINDINGS

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

A. Background. Shasta County Service Area No. 17 (hereinafter Discharger) is currently discharging pursuant to Waste Discharge Requirements (WDRs) Order No. R5-2005-0037 and National Pollutant Discharge Elimination System (NPDES) Permit No. CA0081507. The Shasta County Department of Public Works provides oversight and management of County Service Area No. 17. The Discharger submitted a complete Report of Waste Discharge on 9 September 2009, and applied for a NPDES permit renewal to discharge an average dry weather flow of up to 0.43 MGD of treated wastewater from the Cottonwood Wastewater Treatment Plant, hereinafter Facility. The application was deemed complete on 25 September 2009.

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 publicly owned treatment works (POTW). The treatment system at the Facility consists of a headworks with bar screen and Parshall flume with ultrasonic level sensor; two, parallel oxidation ditches with aerators; two, parallel secondary clarifiers with skimmers; traveling-bridge sand filter unit; chlorine disinfection with chlorine gas; serpentine chlorine contact chamber; dechlorination by addition of sulfur dioxide; an outfall line and diffuser to Cottonwood Creek; a northern 4.3 acre-feet aerated sludge settling basin, a southern 0.63 acre-feet aerated sludge settling basin; and four, sludge/sand drying beds.

Currently, wastewater is discharged from Discharge Point No. 001 (see table on cover page) to Cottonwood Creek, a water of the United States, tributary to the Sacramento River within the Lower Cottonwood Hydrologic Sub Area No. 508.20, as depicted on interagency hydrologic maps prepared by the Department of Water Resources. 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 federal Clean Water Act (CWA) and implementing regulations adopted by the U.S. Environmental Protection Agency (USEPA) and Chapter 5.5, Division 7 of the California 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 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 Title 40 of the Code of Federal Regulations (CFR), Part 122.44 (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 (Attachment F).

G. **Water Quality-based Effluent Limitations.** 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, that are necessary to achieve water quality standards. The Central Valley Water Board has considered the factors listed in CWC 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, water quality-based effluent limitations (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 September 2009), 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. 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.

As discussed in detail in the Fact Sheet, beneficial uses applicable to Cottonwood Creek are as follows:

Table 5. Basin Plan Beneficial Uses

Discharge Point	Receiving Water Name	Beneficial Use(s)
001	Cottonwood Creek	Existing: Municipal and domestic supply (MUN); agricultural supply, including irrigation and stock watering (AGR); water contact recreation, including canoeing and rafting (REC-1); non-contact recreation (REC-2); warm freshwater habitat (WARM); cold freshwater habitat (COLD); cold migration of aquatic organisms (MIGR); warm and cold spawning, reproduction, and/or early development (SPWN); and wildlife habitat (WILD). Potential: Industrial service supply (IND) and industrial process supply (PROC), and hydropower generation (POW).

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.*" Cottonwood Creek is tributary to the Sacramento River. The Sacramento River from the confluence of Cottonwood Creek to Red Bluff is listed as a WQLS for "unknown toxicity" in the 303(d) list of impaired water bodies. Effluent limitations applicable to this listing are included in this Order.

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 the 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 the 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 Clean Water Act section 301 and with 40 CFR 122.44(d). There are exceptions to this general rule. The State Water Board has concluded that where the Regional Water Board's Basin Plan allows for schedules of compliance and the Regional Water Board is newly interpreting a narrative standard, it may include schedules of compliance in the permit to meet effluent limits that implement a narrative standard. See In the Matter of Waste Discharge Requirements for Avon Refinery (State Water Board Order WQ 2001-06 at pp. 53-55). See also Communities for a Better Environment et al. v. State Water Resources Control Board, 34 Cal.Rptr.3d 396, 410 (2005). The Basin Plan for the Sacramento and San Joaquin Rivers includes a provision that authorizes the use of compliance schedules in NPDES permits for water quality objectives that are adopted after the date of adoption of the Basin Plan, which was 25 September, 1995 (see Basin Plan at page IV-16). Consistent with the State Water Board's Order in the CBE matter, the Regional Water Board has the discretion to include compliance schedules in NPDES permits when it is including an effluent limitation that is a "new interpretation" of a narrative water quality objective. This conclusion is also consistent with the United States Environmental Protection Agency policies and administrative decisions. See, e.g., Whole Effluent

Toxicity (WET) Control Policy. The Regional Water Board, however, is not required to include a schedule of compliance, 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 Regional 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 Basin Plan, should consider feasibility of achieving compliance, and must impose a schedule that is as short as practicable to achieve compliance with the objectives, criteria, or effluent limit based on the objective or criteria.

For CTR constituents, Section 2.1 of the SIP provides that, based on a Discharger's request and demonstration that it is infeasible for an existing Discharger to achieve immediate compliance with an effluent limitation derived from a CTR criterion, compliance schedules may be allowed in an NPDES permit. Unless an exception has been granted under section 5.3 of the SIP, a compliance schedule may not exceed 5 years from the date that the permit is issued or reissued, nor may it extend beyond 10 years from the effective date of the SIP (or 18 May 2010) to establish and comply with CTR criterion-based effluent limitations. Where a compliance schedule for a final effluent limitation exceeds 1 year, the Order must include interim numeric limitations for that constituent or parameter. Where allowed by the Basin Plan, compliance schedules and interim effluent limitations or discharge specifications may also be granted to allow time to implement a new or revised water quality objective. This Order does not include compliance schedules and/or interim effluent limitations. A detailed discussion of the basis for the compliance schedule(s) and interim effluent limitation(s) and/or discharge specifications is included in the Fact Sheet.

L. Alaska Rule. On 30 March 2000, USEPA revised its regulation that specifies when new and revised state and tribal water quality standards (WQS) become effective for CWA purposes. (40 CFR 131.21; 65 Fed. Reg. 24641 (April 27, 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 5-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH. The WQBELs consist of restrictions on copper, zinc, cyanide, nitrate, bis-2-ethylhexylphthalate, chlorodibromomethane, dichlorobromomethane, ammonia, pH, pathogens, and total residual chlorine. This Order's technology-based pollutant restrictions implement the minimum, applicable federal technology-based requirements. In addition, this Order includes new effluent limitations to meet numeric objectives or protect beneficial uses. The rationale for including these limitations is explained in the Fact Sheet. In addition, the Central Valley Water Board has considered the factors in CWC section 13241 in establishing these requirements.

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 are based on the CTR-SIP, which was approved by USEPA on 1 May 2001. 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 is consistent with 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 State Water Board Resolution No. 68-16.

This Order grants mixing zones and dilution credits for several pollutants. As a condition for allowing the mixing zones and dilution credits, the Central Valley Water Board requires that Best Practicable Treatment or Control (BPTC) of these pollutants is implemented by the Discharger. The Central Valley Water Board finds, based on information in the record, including the Discharger's Antidegradation Analysis report, that:

BPTC for the control and removal of copper, zinc, and bis-2-ethylhexylphthalate is secondary treatment plus the use of the Facility's tertiary filters, effluent diffuser, and source control and minimization;

BPTC for the control and removal of cyanide, chlorodibromomethane, and dichlorobromomethane is secondary treatment plus the use of the Facility's tertiary filters, effluent diffuser, and automated flow/concentration-based chlorination/dechlorination system; and,

BPTC for the control and removal of ammonia and nitrate is secondary treatment plus the use of the Facility's nitrification and denitrification processes and capabilities, and effluent diffuser.

O. Anti-Backsliding Requirements. Sections 402(o)(2) and 303(d)(4) 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 than those in the previous Order. The establishment of less stringent, or removal of, water quality based effluent limitations based on newly available information, is allowed under Section 303(d)(4), and 402(o)(2)(A) and (B)(i) of the CWA. The establishment of less stringent, or removal of, technology based effluent limitations based on a facility upgrade is allowed under 40 CFR 122.44(l)(2)(i)(A). 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 authorizes 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. This Monitoring and Reporting Program is provided in Attachment E.

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. A rationale for the special provisions contained in this Order is provided in the attached Fact Sheet.

S. Provisions and Requirements Implementing State Law. The provisions/requirements in subsections V.B, VI.A.2.v, VI.C.4.a, and VI.C.4.b 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 Waste Discharge Requirements 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 of this Order.

THEREFORE, IT IS HEREBY ORDERED, that this Order supercedes Order No. R5-2005-0037 except for enforcement purposes, and, in order to meet the provisions contained in division 7 of the CWC (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 of 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 California Water Code.

D. The Discharger shall not allow pollutant-free wastewater to be discharged into the collection, treatment, and disposal system in amounts that significantly diminish the system's capability to comply with this Order. Pollutant-free wastewater means rainfall, groundwater, cooling waters, and condensates that are essentially free of pollutants.

E. Discharge of wastewater from sewage holding tanks into the treatment plant or collection system, without prior approval from the Executive Officer of the Central Valley Water Board, or his/her designee, is prohibited.

IV. EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

A. Effluent Limitations – Discharge Point No. 001 (Cottonwood Creek)

1. Final Effluent Limitations – Discharge Point No. 001 (Cottonwood Creek)

a. The Discharger shall maintain compliance with the following effluent limitations at Discharge Point No. 001 for continuous and emergency discharges to Cottonwood Creek, with compliance measured at Monitoring Location EFF-001 as described in the attached MRP (Attachment E):

Table 6. Effluent Limitations – Discharge Point No. 001

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Conventional Pollutants						
Flow	MGD	0.43[1]	--	--	--	--
Biochemical Oxygen Demand, 5-day @ 20°C	mg/L	10	15	30	--	--
	lbs/day [2]	36	54	108	--	--
Total Suspended Solids	mg/L	10	15	30	--	--
	lbs/day [2]	36	54	108	--	--
pH	standard units	--	--	--	6.5	8.5
Priority Pollutants						
Copper, Total Recoverable	ug/L	20.9	--	41.5	--	--
Zinc, Total Recoverable	ug/L	77.6	--	131.3	--	--
Cyanide	ug/L	20.7	--	51.5	--	--
Chlorodibromomethane	ug/L	1.53	--	3.80	--	--
Dichlorobromomethane	ug/L	8.62	--	29.6	--	--
Bis-2-ethylhexylphthalate	ug/L	3.57	--	9.56	--	--
Non-Conventional Pollutants						
Nitrate as N	mg/L	90	--	--	--	--
Ammonia Nitrogen, Total (as N)	mg/L	13.7	--	36.5	--	--
Total Coliform Organisms	MPN/100 mL	--	23 [3]	500	--	240 [4]
Chlorine, Total Residual	mg/L	--	0.011[5]	0.019[6]		

1 Average dry weather flow.
2 Based on a design flow of 0.43 MGD.
3 Applied as a 7-day median effluent limitation.
4 Effluent total coliform organisms are not to exceed 240 MPN/100mL more than once in any 30-day period.
5 Applied as a 4-day average effluent limitation.
6 Applied as a 1-hour average effluent limitation.

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

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

   i. 23 most probable number (MPN) per 100mL, as a 7-day median;
   ii. 240 MPN/100mL, more than once in any 30-day period; and,
   iii. 500 MPN/100mL, as a daily maximum.

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

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

e. **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.

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. The discharge shall not cause the following in Cottonwood 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 ten 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**: Discharger shall not cause the following:

a. The monthly median of the mean daily dissolved oxygen concentration shall not fall below 85 percent of saturation in the main water mass, and the 95 percentile concentration shall not fall below 75 percent of saturation.

b. The dissolved oxygen concentration to be reduced below 7.0 mg/L at any time between 1 September and 31 May of each year.

c. The dissolved oxygen concentration to be reduced below 9.0 mg/L at any time between 1 June and 31 August of each year.

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, 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 set forth in California Code of Regulations, Title 22, Division 4, Chapter 15; and
g. Thiobencarb to be present in excess of 1.0 ug/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 maximum contaminant levels specified in Table 4 (MCL Radioactivity) 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.

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**. The turbidity to increase as follows:

    a. Where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), controllable factors shall not cause downstream turbidity to exceed 2 NTU.
    b. More than 1 NTU where natural turbidity is between 1 and 5 NTUs.
    c. More than 20 percent where natural turbidity is between 5 and 50 NTUs.
    d. More than 10 NTU where natural turbidity is between 50 and 100 NTUs.
    e. More than 10 percent where natural turbidity is greater than 100 NTUs.

B. Groundwater Limitations

1. Release of waste constituents from any storage, treatment, or disposal component associated with the Facility shall not cause or contribute to, in combination with other sources of the waste constituents, groundwater within influence of the Facility to contain:

    a. Taste or odor-producing constituents, toxic substances, or any other constituents, in concentrations that cause nuisance or adversely affect beneficial uses;

    b. Waste constituent concentrations in excess of water quality objectives or background water quality, whichever is greater; and

    c. Waste constituent concentrations in excess of the concentrations specified below or background water quality, whichever is greater:

d. Total coliform organisms shall not exceed 2.2 MPN/100 mL over any 7-day period.

VI. PROVISIONS

A. Standard Provisions

1. The Discharger shall comply with all Standard Provisions 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 Clean Water Act, 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. The discharge of any radiological, chemical or biological warfare agent or high-level, radiological waste is prohibited.

i. 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.

j. 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.

k. 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 Central Valley Water Board Standard Provision VI.A.2.m.

   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.

l. A publicly owned treatment works (POTW) 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.

m. 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.

n. Laboratories that perform sample analyses must be identified in all monitoring reports submitted to the Central Valley Water Board and USEPA.

o. 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.

p. 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.

q. All monitoring and analysis 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.

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

s. 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.

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

u. For POTWs, prior to making any change in the point of discharge, place of use, or purpose of use of treated wastewater that results in a 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. (CWC section 1211).

v. 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 (530) 224-4845 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 Attachment D, Section V.E.1 [40 CFR 122.41(l)(6)(i)].

B. Monitoring and Reporting Program (MRP) Requirements

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

C. Special Provisions

1. Reopener Provisions

a. 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.

b. Conditions that necessitate a major modification of a permit are described in 40 CFR 122.62, including:

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.

c. **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.

d. **Total Maximum Daily Loads (TMDLs).** This Order may be reopened, and appropriate effluent limitations, or other controls, prescribed, in order to implement any TMDLs.

e. **Salinity Evaluation and Minimization Plan.** This Order requires the Discharger to prepare a Salinity Evaluation and Minimization Plan (SEMP). This reopener provision allows the Central Valley Water Board to reopen this Order for addition and/or modification of effluent limitations and requirements for salinity based on review and implementation of the SEMP.

f. **Water Effects Ratios (WER) and Metal Translators.** A default WER of 1.0 has been used in this Order for calculating criteria for applicable 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 inorganic constituents. An acceptable WER can be used to adjust aquatic life-based water quality standards, including metals such as copper, and Basin Plan incorporated USEPA water quality standards for ammonia and aluminum. USEPA has also promulgated an objective for copper based on the Biotic Ligand Model (BLM) that can be used as the basis for a site-specific copper effluent limitations. If the Discharger performs studies to determine site-specific WERs and/or site-specific dissolved-to-total metal translators and submits an approved report, this Order may be reopened to modify the effluent limitations for the applicable constituents.

g. **Reasonable Potential for Constituents with Insufficient Information.** This Order may be reopened, and appropriate effluent limitations added, if results from the Monitoring and Reporting Program indicate that carbon tetrachloride, aldrin, beta-BHC, or gamma-BHC is present at concentrations that have the reasonable potential to cause or contribute to an exceedance of applicable water quality criteria or objectives.

2. Special Studies, Technical Reports and Additional Monitoring Requirements

a. **Annual Performance Evaluation.** As discussed in the Fact Sheet, dilution and corresponding mixing zones have been granted for copper, cyanide, zinc, nitrate, bis-2-ethylhexylphthalate, ammonia, chlorodibromomethane, and dichlorobromomethane. In order to assure, at a minimum, current facility performance is maintained for these constituents, the Discharger is required to conduct an Annual Performance Evaluation on the removal efficiency of these constituents. In conducting this evaluation, Discharger shall determine, using appropriate statistical methods and a 99% confidence level, whether pollutant concentrations are increasing, decreasing, or exhibits no change in concentration. Discharger shall submit a work plan outlining the proposed methodology and statistical analysis to the Central Valley Water Board for approval no later than **6 months after date of adoption of this Order**. The Annual Performance Evaluation Report shall be submitted to the Central Valley Water Board **by 1 January, each year.**

b. **Annual Best Practicable Treatment or Control (BPTC) Review.** As discussed in this Order, the Central Valley Water Board finds that:

BPTC for the control and removal of copper, zinc, and bis-2-ethylhexylphthalate is secondary treatment plus the use of the Facility's tertiary filters, effluent diffuser, and source control and minimization;

BPTC for the control and removal of cyanide, chlorodibromomethane, and dichlorobromomethane is secondary treatment plus the use of the Facility's tertiary filters, effluent diffuser, and automated flow/concentration-based chlorination/dechlorination system; and,

BPTC for the control and removal of ammonia and nitrate is secondary treatment plus the use of the Facility's nitrification and denitrification processes and capabilities, and effluent diffuser.

In order to ensure that BPTC is fully, and optimally implemented, the Discharger shall conduct an annual review of the treatment and control measures used to implement BPTC, to determine if any modifications, maintenance, or improvements are required to maintain BPTC performance. Such modifications, maintenance, or improvements may include maintenance of filters, effluent diffuser, or other treatment processes, calibration or fine-tuning of the chlorination/dechlorination system or nitrification and denitrification processes, or modification of the source control program. A report that includes the findings of the review, and any modifications, maintenance, or improvements that are required to fully implement BPTC shall be submitted to the Central Valley Water Board **by 1 January, each year**. The Discharger shall fully, and optimally implement BPTC at all times.

c. **Salinity Evaluation and Minimization Plan (SEMP).** The Discharger shall prepare a Salinity Evaluation and Minimization Plan (SEMP) to identify sources of salinity in effluent from the Facility, and measures available to minimize the concentration and mass loading of salinity. The plan, including a proposed schedule to implement the identified minimization measures, shall be completed and submitted to the Regional Water Board within **1 year of the effective date of this Order** for approval by the Executive Officer. Following SEMP approval, the Discharger shall implement the applicable minimization measures according to the approved schedule.

d. **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 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 exceeds the toxicity numeric monitoring trigger established in this Provision, the Discharger is required to initiate a Toxicity Reduction Evaluation (TRE), in accordance with an approved TRE Work Plan, and take actions to mitigate the impact of the discharge and prevent reoccurrence 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 whole 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 Work Plan and includes procedures for accelerated chronic toxicity monitoring and TRE initiation.

   i. **Toxicity Reduction Evaluation (TRE) Work Plan. Within 6 months of the effective date of this Order,** the Discharger shall submit to the Central Valley Water Board a TRE Work Plan for approval by the Executive Officer. The TRE Work Plan shall outline the procedures for identifying the source(s) of, and reducing or eliminating effluent toxicity. The TRE Work Plan must be developed in accordance with USEPA guidance[1] and be of adequate detail to allow the Discharger to immediately initiate a TRE as required in this Provision.

   ii. **Accelerated Monitoring and TRE Initiation.** When the numeric toxicity monitoring trigger is exceeded during regular chronic toxicity monitoring, and the testing meets all test acceptability criteria, the Discharger shall initiate accelerated monitoring as required in the Accelerated Monitoring Specifications. WET testing results exceeding the monitoring trigger during accelerated monitoring demonstrates a pattern of toxicity and requires the Discharger to initiate a TRE to address the effluent toxicity.

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

iii. **Numeric Monitoring Trigger.** The numeric toxicity monitoring trigger is > **1 TUc** (where TUc = 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.

iv. **Accelerated Monitoring Specifications.** If the monitoring trigger is exceeded during regular chronic toxicity testing, within 14 days of notification by the laboratory of the test results, the Discharger shall initiate accelerated monitoring. Accelerated monitoring shall consist of four (4) chronic toxicity tests in a 6-week period (i.e., one test 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 adequate evidence of a pattern 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 (i.e., 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 initiate 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 the test results 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 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.

3. Best Management Practices and Pollution Prevention – Not Applicable

4. Construction, Operation and Maintenance Specifications

a. The treatment facilities shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.

b. The Discharger shall operate the treatment system to insure 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 10 NTU, at any time.

5. Special Provisions for Municipal Facilities (POTWs Only)

a. **Pretreatment Requirements – <u>If Applicable</u>**

i. The Discharger shall implement its approved pretreatment program and the program shall be an enforceable condition of this Order. If the Discharger fails to perform the pretreatment functions, the Central Valley Water Board, the State Water Board or the U.S. Environmental Protection Agency (USEPA) may take enforcement actions against the Discharger as authorized by the CWA.

ii. The Discharger shall enforce the Pretreatment Standards promulgated under sections 307(b), 307(c), and 307(d) of the Clean Water Act. The Discharger shall perform the pretreatment functions required by 40 CFR Part 403 including, but not limited to:

a) Adopting the legal authority required by 40 CFR 403.8(f)(1);

b) Enforcing the Pretreatment Standards of 40 CFR 403.5 and 403.6;

c) Implementing procedures to ensure compliance as required by 40 CFR 403.8(f)(2); and

d) Providing funding and personnel for implementation and enforcement of the pretreatment program as required by 40 CFR 403.8(f)(3).

iii. The Discharger shall implement, as more completely set forth in 40 CFR 403.5, the necessary legal authorities, programs, and controls to ensure that the following incompatible wastes are not introduced to the treatment system, where incompatible wastes are:

a) Wastes which create a fire or explosion hazard in the treatment works;

b) Wastes which will cause corrosive structural damage to treatment works, but in no case wastes with a pH lower than 5.0, unless the works is specially designed to accommodate such wastes;

c) Solid or viscous wastes in amounts which cause obstruction to flow in sewers, or which cause other interference with proper operation or treatment works;

d) Any waste, including oxygen demanding pollutants (BOD, *etc.*), released in such volume or strength as to cause inhibition or disruption in the treatment works, and subsequent treatment process upset and loss of treatment efficiency;

e) Heat in amounts that inhibit or disrupt biological activity in the treatment works, or that raise influent temperatures above 40°C (104°F), unless the Central Valley Water Board approves alternate temperature limits;

f) Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;

g) Pollutants which result in the presence of toxic gases, vapors, or fumes within the treatment works in a quantity that may cause acute worker health and safety problems; and:

h) Any trucked or hauled pollutants, except at points predesignated by the Discharger.

iv. The Discharger shall implement, as more completely set forth in 40 CFR 403.5, the legal authorities, programs, and controls necessary to ensure that indirect discharges do not introduce pollutants into the sewerage system that, either alone or in conjunction with a discharge or discharges from other sources:

a) Flow through the system to the receiving water in quantities or concentrations that cause a violation of this Order, or:

b) Inhibit or disrupt treatment processes, treatment system operations, or sludge processes, use, or disposal and either cause a violation of this Order or prevent sludge use or disposal in accordance with this Order.

b. **Sludge/Biosolids Discharge Specifications**

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, disposal, or reuse at sites (i.e., 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.

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

iii. 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 any

Groundwater Limitations specified in section V.B. 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 any Groundwater Limitations specified in section V.B.

iv. The use and disposal 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.

c. **Biosolids Disposal Requirements**

i. The Discharger shall comply with the Monitoring and Reporting Program for biosolids disposal contained in Attachment E.

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

iii. The Discharger is encouraged to comply with the "Manual of Good Practice for Agricultural Land Application of Biosolids" developed by the California Water Environment Association.

d. **Biosolids Storage Requirements**

i. Facilities for the storage of Class B biosolids shall be located, designed and maintained to restrict public access to biosolids.

ii. Biosolids storage facilities shall be designed and maintained to prevent washout or inundation from a storm or flood with a return frequency of 100 years.

iii. Biosolids storage facilities, which contain biosolids, shall be designed and maintained to contain all storm water falling on the biosolids storage area during a rainfall year with a return frequency of 100 years.

iv. Biosolids storage facilities shall be designed, maintained and operated to minimize the generation of leachate.

e. **Collection System.** On 2 May 2006, the State Water Board adopted State Water Board Order 2006-0003, a Statewide General WDR for Sanitary Sewer Systems. The Discharger shall be subject to the requirements of Order 2006-0003 and any future revisions thereto. Order 2006-0003 requires that all public agencies that currently own or operate sanitary sewer systems apply for coverage under the General WDR.

Regardless of the coverage obtained under Order 2006-0003, the Discharger's collection system is part of the treatment system that is subject to this Order. As such, pursuant to federal regulations, the Discharger must properly operate and maintain its collection system [40 CFR 122.41(e)], report any non-compliance [40 CFR 122.41(l)(6) and (7)], and mitigate any discharge from the collection system in violation of this Order [40 CFR 122.41(d)].

6. Other Special Provisions

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

7. Compliance Schedules [NOT APPLICABLE]

VII. COMPLIANCE DETERMINATION

Compliance with the effluent limitations contained in section IV of this Order will be determined as specified below:

A. **BOD_5 and TSS Effluent Limitations**. Compliance with the final effluent limitations for BOD_5 and TSS required in sections IV.A.1.a shall be ascertained by 24-hour composite samples. Compliance with effluent limitations 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. **Average Dry Weather Flow Effluent Limitations**. The average dry weather flow is intended to represent 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 3 consecutive dry weather months (i.e., July, August, and September).

C. **Total Coliform Organisms Effluent Limitations.** 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 23 per 100 milliliters, the Discharger will be considered out of compliance.

D. **Total Residual Chlorine Effluent Limitations.** 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.

E. **Chronic Whole Effluent Toxicity Effluent Limitation.** Compliance with the accelerated monitoring and TRE/TIE provisions of Provision VI.C.2.a shall constitute compliance with effluent limitations contained in sections IV.A.1.d and IV.B.1.d of this Order for chronic whole effluent toxicity.

F. **Annual Average Effluent Limitations.** Annual average effluent constituent concentrations for determining compliance with the annual average effluent limitations for constituents such as iron, manganese, aluminum, and salinity shall be performed as the average value of each averaging period required in the Monitoring and Reporting Program. For example, if quarterly effluent monitoring is required, the annual average is the average of the four quarterly averages. Each quarterly average is the average of the verified results during that calendar quarter.

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.

Best Practicable Treatment or Control (BPTC): BPTC is a requirement of State Water Resources Control Board Resolution 68-16 – "Statement of Policy with Respect to Maintaining High Quality of Waters in California" (referred to as the "Antidegradation Policy"). BPTC is the treatment or control of a discharge necessary to assure that, *"(a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained."* Pollution is defined in CWC Section 13050(I). In general, an exceedance of a water quality objective in the Basin Plan constitutes "pollution".

Bioaccumulative pollutants are 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.

Biosolids is sewage sludge that has been treated and tested and shown to be capable of being beneficially and legally used as a soil amendment for agriculture, silviculture, horticulture, and land reclamation activities as specified under 40 CFR Part 503.

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

Coefficient of Variation (*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 one 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) are those sample results less than the RL, but greater than or equal to the laboratory's MDL.

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) 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 U.S. EPA guidance (Technical Support Document For Water Quality-based Toxics Control, March 1991, second printing, EPA/505/2-90-001).

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 is the estimated chemical concentration that results from the confirmed detection of the substance by the analytical method below the ML value.

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 are 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) means 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 is 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) 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 title 40 of the Code of Federal Regulations, Part 136, Attachment B, revised as of July 3, 1999.

Minimum Level (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 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) are those sample results less than the laboratory's MDL.

Ocean Waters are 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 are substances for which degradation or decomposition in the environment is nonexistent or very slow.

Pollutant Minimization Program (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 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 or Regional Water Board.

Reporting Level (RL) is the ML (and its associated analytical method) chosen by the Discharger for reporting and compliance determination from the MLs included in this Order. The MLs included in this Order correspond to approved analytical methods for reporting a sample result that are selected by the Central Valley Water Board either from Appendix 4 of the SIP in accordance with section 2.4.2 of the SIP or established in accordance with section 2.4.3 of the SIP. The ML is based on the proper application of method-based analytical procedures for sample preparation and the absence of any matrix interferences. Other factors may be applied to the ML depending on the specific sample preparation steps employed. For example, the treatment typically applied in cases where there are matrix-effects is to dilute the sample or sample aliquot by a factor of ten. In such cases, this additional factor must be applied to the ML in the computation of the RL.

Satellite Collection System is 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 is any water designated as municipal or domestic supply (MUN) in a Regional Water Board Basin Plan.

Sewage Sludge is the solid, semisolid, or liquid residue generated during the treatment of domestic sewage in a municipal wastewater treatment facility. Sewage sludge includes solids removed or used during primary, secondary, or advanced wastewater treatment processes. Sewage sludge does not include grit or screening material generated during preliminary treatment of domestic sewage at a municipal wastewater treatment facility.

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

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

where:

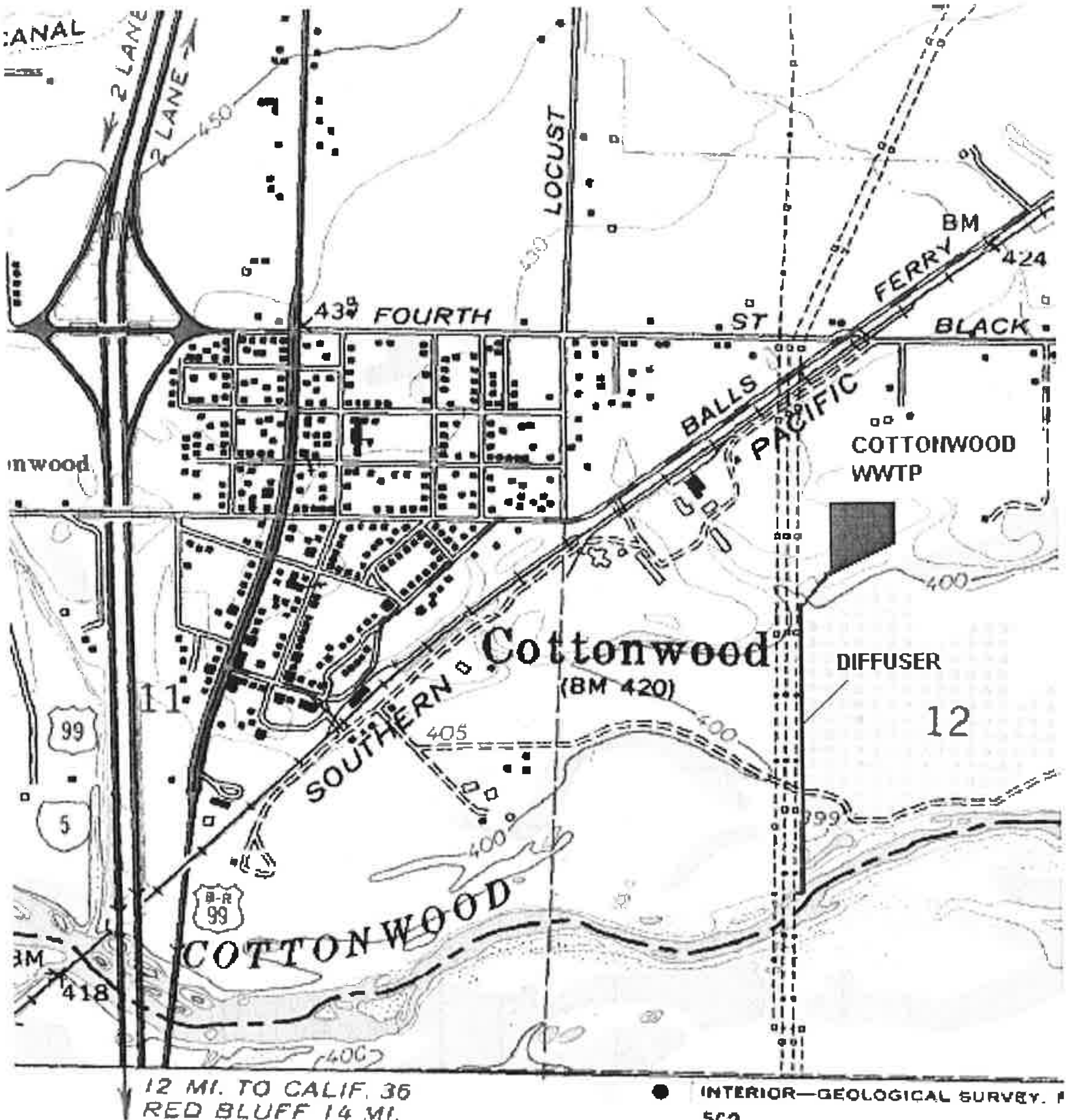
x is the observed value;

μ is the arithmetic mean of the observed values; and

n is the number of samples.

Toxicity Reduction Evaluation (TRE) 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.)

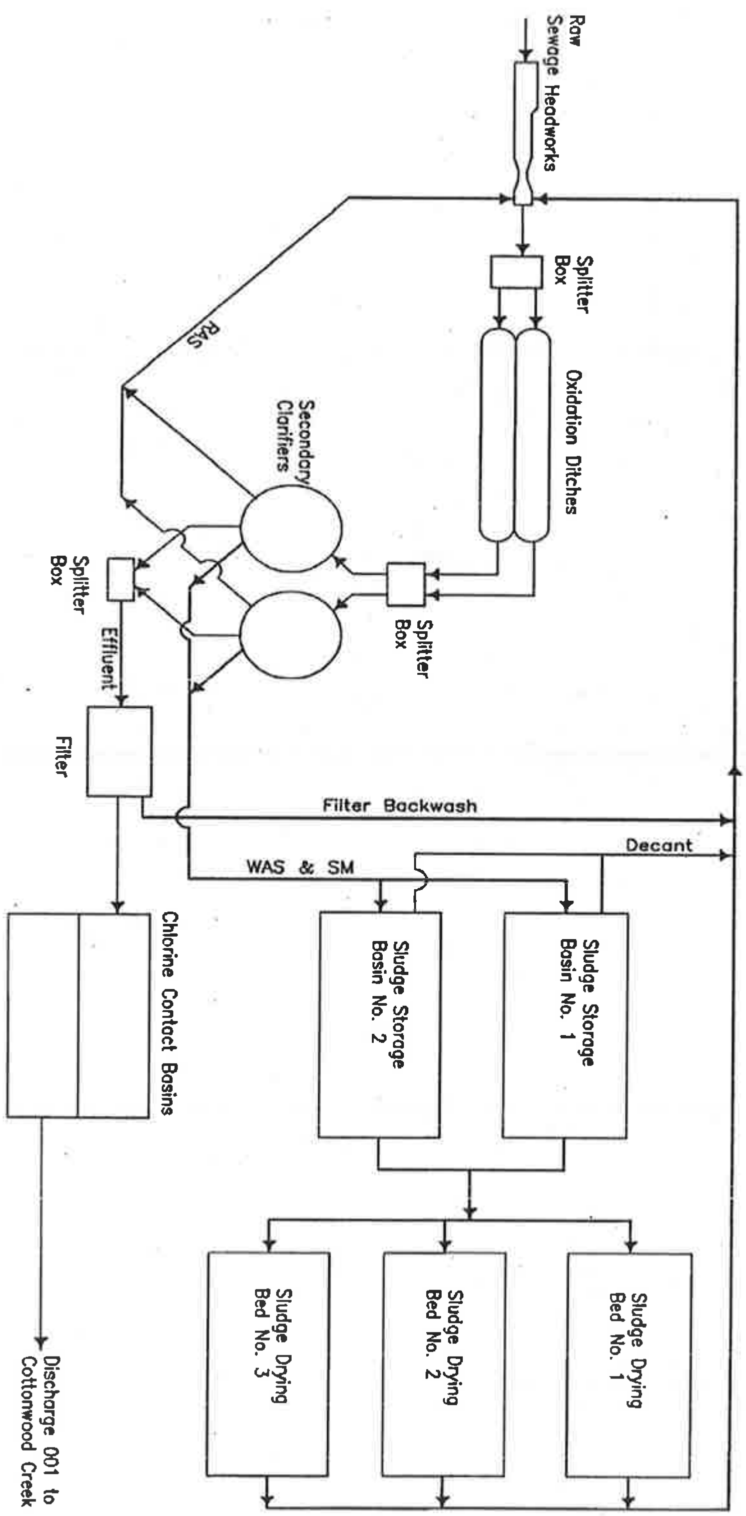
ATTACHMENT B – MAP



SITE LOCATION MAP

SHASTA COUNTY SERVICE AREA NO. 17
WASTEWATER TREATMENT PLANT
SHASTA COUNTY

ATTACHMENT C – SHASTA COUNTY SERVICE AREA NO. 17 FLOW SCHEMATIC



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 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 Central Valley 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); Wat. Code, § 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 Central Valley 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 Central Valley Water Board as required under Standard Provisions – Permit Compliance I.G.5 below. (40 CFR 122.41(m)(4)(i)(C).)

4. The Central Valley Water Board may approve an anticipated bypass, after considering its adverse effects, if the Central Valley 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 Central Valley Water Board. The Central Valley 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); 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); 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 Central Valley 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 Central Valley Water Board, State Water Board, or USEPA within a reasonable time, any information which the Central Valley 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 Central Valley 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 Central Valley 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 Central Valley 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 Central Valley 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 Central Valley 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 Central Valley 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 Central Valley 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 report any noncompliance that may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the Discharger becomes aware of the circumstances. A written submission shall also be provided 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 Central Valley 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 Central Valley 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 subject neither to effluent limitations in this Order nor to notification requirements under 40 CFR 122.42(a)(1) (see Additional Provisions—Notification Levels VII.A.1). (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 existing 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 Central Valley 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 Central Valley 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 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.

VII. ADDITIONAL PROVISIONS – NOTIFICATION LEVELS

A. Publicly-Owned Treatment Works (POTWs)

All POTWs shall provide adequate notice to the Central Valley 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

Table of Contents

List of Tables

ATTACHMENT E – MONITORING AND REPORTING PROGRAM (MRP)

Title 40 of the Code of Federal Regulations section 122.48 (40 CFR 122.48) requires that all NPDES permits specify monitoring and reporting requirements. Water Code Sections 13267 and 13383 also authorize the Central Valley Regional Water Quality Control Board (Central Valley Water Board) to require technical and monitoring reports. This MRP establishes monitoring and reporting requirements, which implement the federal and state 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. Chemical, bacteriological, and bioassay analyses of any material required by this Order shall be conducted by a laboratory certified for such analyses by the State Department of Public Health (DPH; formerly the Department of Health Services). 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, 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 must be kept in the laboratory and shall be available for inspection by Central Valley Water Board staff. The Quality Assurance-Quality Control Program must conform to USEPA guidelines or to procedures approved by the Central Valley Water Board.

C. All analyses shall be performed in a laboratory certified to perform such analyses by DPH. Laboratories that perform sample analyses shall be identified in all monitoring reports submitted to the Central Valley Water Board. The Discharger shall institute a Quality Assurance-Quality Control Program for any onsite field measurements such as pH, turbidity, temperature and residual chlorine. A manual containing the steps followed in this program must be kept onsite 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 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.

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	At the plant headworks prior to entering into treatment processes.
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 entering the diffuser at Cottonwood Creek.
--	RSW-001	Cottonwood Creek: 100 feet upstream of the diffuser
--	RSW-002	Cottonwood Creek: 100 feet downstream of the diffuser
--	RSW-003	Historic monitoring location used for a metals translator study.
--	RSW-004	Cottonwood Creek: 58 feet downstream of the diffuser (maximum concentration at edge of nitrate mixing zone)
--	RSW-005	Cottonwood Creek: 27 feet downstream of the diffuser (maximum concentration at edge of chlorodibromomethane mixing zone)
--	RSW-006	Cottonwood Creek: 158 feet downstream of the diffuser (maximum concentration at edge of ammonia, copper, cyanide, and zinc mixing zone)
--	RSW-007	Cottonwood Creek: 160 feet downstream of the diffuser (maximum concentration at edge of dichlorobromomethane mixing zone)
--	RSW-008	Cottonwood Creek: 4 feet downstream of the diffuser (maximum concentration at edge of bis-2-ethylhexylphthalate mixing zone)
--	BIO-001	A location where a representative sample of the biosolids can be collected.
--	UND-1	Underdrain system discharge
--	SPL-001	A location where a representative sample location for the municipal water supply can be collected. If the water supply is from more than one source, a weighted average should be calculated.

III. INFLUENT MONITORING REQUIREMENTS

A. Monitoring Location INF-001

1. Samples shall be collected at approximately the same time as effluent samples. The Discharger shall monitor domestic influent at the headworks (INF-001) prior to entry into treatment processes as follows:

Table E-2. Influent Monitoring

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow	MGD	Meter	Continuous	--
Conventional Pollutants				
Biochemical Oxygen Demand (BOD) (5-day @ 20 Deg. C)	mg/L	24-hr Composite[1]	Weekly	[2]
	lbs/day	Calculate	Weekly	[2]
pH	standard units	Grab	1/Day	[2]
Total Suspended Solids	mg/L	24-hr Composite[1]	Weekly	[2]
	lbs/day	Calculate	Weekly	[2]
Non-Conventional Pollutants				
Electrical Conductivity @ 25°C	umhos/cm	Grab	Monthly	[2]
Total Dissolved Solids	mg/L	Grab	Monthly	[2]

1 Composite samples shall be flow proportional.
2 Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136.

IV. EFFLUENT MONITORING REQUIREMENTS

A. Monitoring Location EFF-001

1. The Discharger shall monitor treated effluent at Monitoring Location EFF-001 (for continuous and emergency discharges from Discharge Point No. 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.

Table E-3. Effluent Monitoring

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow	MGD	Meter	Continuous	--
Conventional Pollutants				
Biochemical Oxygen Demand (BOD) (5-day @ 20 Deg. C)	mg/L	24-hr Composite[1]	1/Week	[2]
	lbs/day	Calculate	1/Week	[2]
pH	standard units	Meter	Continuous	[2]
Total Suspended Solids	mg/L	24-hr Composite[1]	1/Week	[2]
	lbs/day	Calculate	1/Week	[2]
Priority Pollutants				
Chlorodibromomethane	ug/L	Grab	1/Month	[2,4]
Dichlorobromomethane	ug/L	Grab	1/Month	[2,4]
Bis-2-ethylhexylphthalate	ug/L	Grab	1/Month	[2,3,4]
Chloroform	ug/L	Grab	1/Quarter	[2,4]
Bromoform	ug/L	Grab	1/Quarter	[2,4]
Carbon Tetrachloride	ug/L	Grab	1/Quarter	[2,4]
Aldrin	ug/L	Grab	1/Quarter	[2,4]
B-BHC	ug/L	Grab	1/Quarter	[2,4]

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
G-BHC	ug/L	Grab	1/Quarter	2,4
Copper, Total Recoverable	ug/L	Grab	1/Month	2,4
Zinc, Total Recoverable	ug/L	Grab	1/Month	2,4
Cyanide, Total Recoverable	ug/L	Grab	1/Month	2,4
Priority Pollutants	ug/L	24-hr Composite[1,8]	Twice during life of permit[9]	2,4,6
Non-Conventional Pollutants				
Hardness (as $CaCO_3$)	mg/L	24-hr Composite[1]	1/Month	2
Electrical Conductivity @ 25°C	umhos/cm	Grab	1/Month	2
Temperature	°F	Grab	1/Day	2
Dissolved Oxygen	mg/L	Grab	1/Week	2
Total Dissolved Solids	mg/L	Grab	1/Month	2
Turbidity	NTU	Meter	Continuous	2
Total Coliform Organisms	MPN/100 mL	Grab	1/Week	2
Chlorine, Total Residual	mg/L	Meter	Continuous	2,13
Ammonia Nitrogen, Total (as N)	mg/L	Grab	1/Month[11,12]	2
Nitrate Nitrogen, Total (as N)	mg/L	24-hr Composite[1]	1/Quarter	2
Aluminum	ug/L	Grab	1/Quarter	2
Standard Minerals[14]	ug/L	Grab	1/Quarter	2
Whole Effluent Toxicity (see Section V. below)	--	--	--	--

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method

1 Composite samples shall be flow proportional.

2 Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136.

3 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.

4 For priority pollutant constituents with effluent limitations, detection limits shall be below the effluent limitations. If the lowest minimum level (ML) published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Plan or SIP) is not below the effluent limitation, the detection limit shall be the lowest ML. For priority pollutant constituents without effluent limitations, the detection limits shall be equal to or less than the lowest ML published in Appendix 4 of the SIP.

5 Reserved.

6 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 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.

7 Reserved.

8 Volatile constituents shall be sampled in accordance with 40 CFR Part 136.

9 Monitoring is required one time each during the 3rd and 4th years of the permit. The Discharger is not required to conduct effluent monitoring for priority pollutants that have already been sampled in a given month, as required in Table E-3.

11 Concurrent with whole effluent toxicity monitoring.

12 pH and temperature shall be recorded at the time of ammonia sample collection.

13 Total chlorine residual must be monitored with a method sensitive to and accurate at the level of 0.01 mg/L.

14 Standard minerals shall include the following: boron, calcium, iron, magnesium, potassium, sodium, chloride, manganese, phosphorus, total alkalinity (including alkalinity series), and hardness, and include verification that the analysis is complete (i.e. cation/anion balance).

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 quarterly acute toxicity testing, concurrent with effluent ammonia sampling.

2. *Sample Types* – For static non-renewal and static renewal testing, the samples shall be grab samples and shall be representative of the volume and quality of the discharge. The effluent samples shall be taken at the effluent 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 annual three species chronic toxicity testing.

2. *Sample Types* – Effluent samples shall be flow proportional 24-hour composite samples and shall be representative of the volume and quality of the discharge. The effluent samples shall be taken at the effluent monitoring location EFF-001. The receiving water control shall be a grab sample obtained from the RSW-001.

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* – The chronic toxicity testing shall be performed using the dilution series identified in Table E-4, below. If no toxic effects occur at 100% effluent, then the full dilution series is not required. The receiving water control shall be used as the diluent (unless the receiving water is toxic).

   If the receiving water is toxic, laboratory control water may be used as the diluent, in which case, the receiving water should still be sampled and tested to provide evidence of its toxicity.

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 Special Provisions VI. 2.a.iii.)

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 within 30 days following completion of the test, and shall contain, at minimum:

   a. The results expressed in TUc, measured as 100/NOEC, and also measured as $100/LC_{50}$, $100/EC_{25}$, $100/IC_{25}$, and $100/IC_{50}$, as appropriate.

   b. The statistical methods used to calculate endpoints;

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

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

e. 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 Toxicity Reduction Evaluations shall be submitted in accordance with the schedule contained in the Discharger's approved TRE Work 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.

VIII. RECEIVING WATER MONITORING REQUIREMENTS – SURFACE WATER AND GROUNDWATER

A. Monitoring Locations RSW-001 through RSW-008

1. The Discharger shall monitor Cottonwood Creek at RSW-001, RSW-002, RSW-004, RSW-005, RSW-006, RSW-007, and RSW-008 when discharging to Cottonwood Creek at Discharge Point No. 001, as follows. Monitoring at RSW-003 is not required in this Order however previous data have been collected at RSW-003 in the past.

Table E-7. Receiving Water Monitoring Requirements – Monitoring Location RSW-001

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow	MGD	--	Daily[1]	--
Conventional Pollutants				
Fecal Coliform Organisms	MPN/100 mL	Grab	1/Week	[2]
pH	standard units	Grab	1/Week [4]	[2]
Priority Pollutants				
Copper, Total Recoverable	ug/L	Grab	1/Quarter	[2]

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Cyanide	ug/L	Grab	1/Quarter	2
Zinc, Total Recoverable	ug/L	Grab	1/Quarter	2
Chlorodibromomethane	ug/L	Grab	1/Quarter	2
Dichlorobromomethane	ug/L	Grab	1/Quarter	2
Bis-2-ethylhexylphthalate	ug/L	Grab	1/Quarter	2
Priority Pollutants	ug/L	Grab	Twice during life of permit[3]	2
Non-Conventional Pollutants				
Ammonia Nitrogen, Total (as N)	mg/L	Grab[5]	1/Quarter	2
Dissolved Oxygen	mg/L	Grab	1/Week	2
Electrical Conductivity@ 25°C	umhos/cm	Grab	1/Month	2
Aluminum	ug/L	Grab	1/Quarter	
Hardness (as $CaCO_3$)	mg/L	Grab	1/Month	2
Temperature	°F	Grab	1/Month [4]	2
Turbidity	NTU	Grab	1/Week	2
Standard Minerals	ug/L	Grab	1/Year	2

1 Flow to be obtained from USGS Gauging Station 11376000
2 Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136.
3 Priority pollutant monitoring is required once during the 3rd year and once during 4th year of the permit term.
4 Temperature and pH shall be collected at the same time as the ammonia sample.

2. The Discharger shall monitor Cottonwood Creek at RSW-002, when discharging to Cottonwood Creek at Discharge Point No. 001 as follows:

Table E-8. Receiving Water Monitoring Requirements – Monitoring Location RSW-002

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Conventional Pollutants				
Fecal Coliform Organisms	MPN/100 mL	Grab	1/Week	1
pH	standard units	Grab	1/Week	1
Non-Conventional Pollutants				
Total Residual Chlorine			1/Week	1
Dissolved Oxygen	mg/L	Grab	1/Week	1
Electrical Conductivity@ 25°C	umhos/cm	Grab	1/Month	1
Hardness (as $CaCO_3$)	mg/L	Grab	1/Month	1
Temperature	°F	Grab	1/Month	1
Turbidity	NTU	Grab	1/Week	1

1 Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136.

3. The Discharger shall monitor the maximum concentration at the downstream edge of the nitrate mixing zone in Cottonwood Creek at RSW-004, when discharging to Cottonwood Creek at Discharge Point No. 001, as follows:

Table E-9. Receiving Water Monitoring Requirements – Monitoring Location RSW-004

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Nitrate (as N)	mg/L	Grab	1/Year [1]	[2]

[1] Samples shall be collected during low flow conditions (September of each year)
[2] Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136.

4. The Discharger shall monitor the maximum concentration at the downstream edge of the chlorodibromomethane, and bis-2-ethylhexylphthalate mixing zone in Cottonwood Creek at RSW-005, when discharging to Cottonwood Creek at Discharge Point No. 001, as follows:

Table E-10. Receiving Water Monitoring Requirements – Monitoring Location RSW-005

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Priority Pollutants				
Bis-2-ethylhexylphthalate	ug/L	Grab	1/Year [1]	[2]
Chlorodibromomethane	ug/L	Grab	1/Year [1]	[2]

[1] Samples shall be collected during low flow conditions (September of each year).
[2] Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136.

5. The Discharger shall monitor the maximum concentration at the downstream edge of the ammonia, copper, cyanide, and zinc mixing zone in Cottonwood Creek at RSW-006, when discharging to Cottonwood Creek at Discharge Point No. 001, as follows:

Table E-11. Receiving Water Monitoring Requirements – Monitoring Location RSW-006

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Conventional Pollutants				
Hardness (as $CaCO_3$)	mg/L	Grab	1/Year [1]	[2]
pH	standard units	Grab	1/Year [1]	[2]
Priority Pollutants				
Copper, Dissolved	ug/L	Grab	1/Year [1]	[2]
Cyanide	ug/L	Grab	1/Year [1]	[2]
Zinc, Dissolved	ug/L	Grab	1/Year [1]	[2]
Non-Conventional Pollutants				
Temperature	°F	Grab	1/Year [1]	[2]
Ammonia Nitrogen, Total (as N)	mg/L	Grab [3]	1/Year [1]	[2]

[1] Samples shall be collected during low flow conditions (September of each year)
[2] Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136.
[3] Temperature and pH shall be collected at the same time as the ammonia sample.

6. The Discharger shall monitor the maximum concentration at the downstream edge of the dichlorobromomethane mixing zone in Cottonwood Creek at RSW-007, when discharging to Cottonwood Creek at Discharge Point No. 001, as follows:

Table E-12. Receiving Water Monitoring Requirements – Monitoring Location RSW-007

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Priority Pollutants				
Dichlorobromomethane	ug/L	Grab	1/Year [1]	[2]

[1] Samples shall be collected during low flow conditions (September of each year).
[2] Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136.

7. The Discharger shall monitor the maximum concentration at the downstream edge of the bis-2-ethylhexylphthalate mixing zone in Cottonwood Creek at RSW-008, when discharging to Cottonwood Creek at Discharge Point No. 001, as follows:

Table E-13. Receiving Water Monitoring Requirements – Monitoring Location RSW-008

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Priority Pollutants				
Bis-2-ethylhexylphthalate	ug/L	Grab	1/Year [1]	[2]

[1] Samples shall be collected during low flow conditions (September of each year).
[2] Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136.

In conducting the receiving water sampling when discharging to Cottonwood Creek at Discharge Point No. 001, a log shall be kept of the receiving water conditions throughout the reach bounded by Monitoring Locations RSW-001 and RSW-008. 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.

B. Underdrain Monitoring UND-001

1. Underdrain monitoring at UND-001 shall be conducted as follows:

Table E-13. Underdrain Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow	GPM	Calculated	1/Week	--
Total and Fecal Coliform Organisms	MPN/100 mL	Grab	1/Month	[2]

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method

1 When discharging. If the detected Fecal Coliform concentration exceeds 200 MPN/100mL, then the monitoring frequency shall be increased to weekly, until the Fecal Coliform concentration falls below 200 MPN/100mL for 4 consecutive weekly measurements, or the Executive Officer of the Central Valley Water Board authorizes an alternate sampling program.

2 Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136.

IX. OTHER MONITORING REQUIREMENTS

A. Biosolids

1. Monitoring Location BIO-001

a. A composite sample of biosolids shall be collected annually at Monitoring Location BIO-001 in accordance with EPA's *POTW Sludge Sampling and Analysis Guidance Document*, August 1989, and tested for priority pollutants listed in 40 CFR Part 122, Appendix D, Tables II and III (excluding total phenols).

b. Sampling records shall be retained for a minimum of **5 years**. A log shall be maintained of biosolids 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.

c. Upon removal of biosolids, the Discharger shall submit characterization of biosolids quality, including sludge percent solids and the most recent quantitative results of chemical analysis for the priority pollutants listed in 40 CFR Part 122, Appendix D, Tables II and III (excluding total phenols). In addition to USEPA's POTW *Sludge Sampling and Analysis Guidance Document*, August 1989, suggested methods for analysis of biosolids are provided in USEPA publications titled "*Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*" and "*Test Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater*". Recommended analytical holding times for biosolids samples should reflect those specified in 40 CFR 136.6.3(e). Other guidance is available.

B. Municipal Water Supply

1. Monitoring Location SPL-001

The Discharger shall monitor the Municipal Water Supply at SPL-001 as follows. A sampling station shall be established where a representative sample of the municipal water supply can be obtained. Municipal water supply samples shall be collected at approximately the same time as effluent samples.

Table E-14. Municipal Water Supply Monitoring Requirements

Parameter	Units	Sample Type	Minimum Sampling Frequency[1]	Required Analytical Test Method
Standard Minerals[2]	ug/L	--	1/Year	[3]

Parameter	Units	Sample Type	Minimum Sampling Frequency[1]	Required Analytical Test Method
Electrical Conductivity @ 25°C	umhos/cm	--	1/Year	3
Hardness (as $CaCO_3$)	mg/L		1/Year	3
Copper, Total Recoverable	ug/L		1/Year	3
Zinc, Total Recoverable	ug/L		1/Year	3
Total Dissolved Solids	mg/L	--	1/Year	3

1 If the water supply is from more than one source, the results shall be reported as a weighted average and include copies of supporting calculations. Alternatively, the Discharger may composite individual grab samples on a flow-weighted basis from multiple locations to represent the water supply within the service area. Composited samples must taken in accordance with the sample handling and preservation requirements specified in 40 CFR Part 136.

2 Standard minerals shall include the following: boron, calcium, iron, magnesium, potassium, sodium, chloride, manganese, phosphorus, total alkalinity (including alkalinity series), and hardness, and include verification that the analysis is complete (i.e., cation/anion balance).

3 Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136.

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.** – Not Applicable

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 Protocols.** The Discharger shall report with each sample result the applicable Reporting Level (RL) and the current 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 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.

6. **Multiple Sample Data.** When determining compliance with an AMEL , AWEL, or MDEL 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.

B. Self Monitoring Reports (SMRs)

1. At any time during the term of this permit, the State or Central Valley Water Board may notify the Discharger to electronically submit Self-Monitoring Reports (SMRs) using the State Water Board's California Integrated Water Quality System (CIWQS) Program Web site (http://www.waterboards.ca.gov/ciwqs/index.html). Until such notification is given, the Discharger shall submit hard copy SMRs. The CIWQS Web site will provide additional directions for SMR submittal in the event there will be service interruption for electronic submittal.

2. Monitoring results shall be submitted to the Central Valley Water Board by the **first day** of the second month following sample collection. Quarterly and annual monitoring results shall be submitted by the **first day of the second month following each calendar quarter, semi-annual period, and year**, respectively.

3. 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. The data shall be summarized in such a manner to illustrate clearly whether the discharge complies with waste discharge requirements. The highest daily maximum for the month, monthly and weekly averages, and medians, and removal efficiencies (%) for BOD and Total Suspended Solids, shall be determined and recorded as needed to demonstrate compliance.

4. With the exception of flow, all constituents monitored on a continuous basis (metered), shall be reported as daily maximums, daily minimums, and daily averages; flow shall be reported as the total volume discharged per day for each day of discharge.

5. If the Discharger monitors any pollutant at the locations designated herein more frequently than is required by this Order, the results of such monitoring shall be included in the calculation and reporting of the values required in the discharge monitoring report form. Such increased frequency shall be indicated on the discharge monitoring report form.

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

7. SMRs 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, Redding Office
   415 Knollcrest Drive, Suite 100
   Redding, CA 96002

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

Table E-15. Monitoring Periods and Reporting Schedule

Sampling Frequency	Monitoring Period Begins On…	Monitoring Period	SMR Due Date
Continuous	Permit effective date	All	First day of second calendar month following month of sampling

Sampling Frequency	Monitoring Period Begins On…	Monitoring Period	SMR Due Date
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.	First day of second calendar month following month of sampling
1/Week	Sunday following permit effective date or on permit effective date if on a Sunday	Sunday through Saturday	First day of second calendar month following month of sampling
1/Month	First day of calendar month following permit effective date or on permit effective date if that date is first day of the month	1st day of calendar month through last day of calendar month	First day of second calendar month following month of sampling
1/Quarter	Closest of 1January, 1 April, 1 July, or 1 October following (or on) 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
1/Year	1 January following (or on) permit effective date	January 1 through December 31	1 February

C. Discharge Monitoring Reports (DMRs)

1. As described in Section X.B.1 above, at any time during the term of this permit, the State or Central Valley Water Board may notify the Discharger to electronically submit SMRs that will satisfy federal requirements for submittal of Discharge Monitoring Reports (DMRs). Until such notification is given, the Discharger shall submit DMRs in accordance with the requirements described below.

2. DMRs must be signed and certified as required by the standard provisions (Attachment D). The Discharger shall submit the original DMR and one copy of the DMR to the address listed below:

Standard Mail	FedEx/UPS/ Other Private Carriers
State Water Resources Control Board Division of Water Quality c/o DMR Processing Center PO Box 100 Sacramento, CA 95812-1000	State Water Resources Control Board Division of Water Quality c/o DMR Processing Center 1001 I Street, 15th Floor Sacramento, CA 95814

3. All discharge monitoring results must be reported on the official USEPA pre-printed DMR forms (EPA Form 3320-1). Forms that are self-generated cannot be accepted unless they follow the exact same format as EPA form 3320-1.

D. Other Reports

1. Within **60 days** of permit adoption, the Discharger shall submit a report outlining minimum levels, method detection limits, and analytical methods for approval, with a goal to achieve detection levels below applicable water quality criteria. At a minimum, the Discharger shall comply with the monitoring requirements for CTR constituents as outlined in Section 2.3 and 2.4 of the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California*, adopted 2 March 2000 by the State Water Resources Control Board. All peaks identified by analytical methods shall be reported.

2. The Discharger's sanitary sewer system collects wastewater using sewers, pipes, pumps, and/or other conveyance systems and directs the raw sewage to the wastewater treatment plant. A "sanitary sewer overflow" is defined as a discharge to ground or surface water from the sanitary sewer system at any point upstream of the wastewater treatment plant. Sanitary sewer overflows are prohibited by this Order. All violations must be reported as required in Standard Provisions. Facilities (such as wet wells, regulated impoundments, tanks, highlines, *etc.*) may be part of a sanitary sewer system and discharges to these facilities are not considered sanitary sewer overflows, provided that the waste is fully contained within these temporary storage facilities.

3. **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.

4. **Annual Pretreatment Reporting Requirements.** If applicable, the Discharger shall submit annually a report to the Central Valley Water Board, with copies to USEPA Region 9 and the State Water Board, describing the Discharger's pretreatment activities over the previous 12 months. In the event that the Discharger is not in compliance with any conditions or requirements of this Order, including noncompliance with pretreatment audit/compliance inspection requirements, then the Discharger shall also include the reasons for noncompliance and state how and when the Discharger shall comply with such conditions and requirements.

   An annual report shall be submitted by **28 February** and include at least the following items:

   a. A summary of analytical results from representative, flow proportioned, 24-hour composite sampling of the POTW's influent and effluent for those pollutants USEPA has identified under Section 307(a) of the CWA which are known or suspected to be discharged by industrial users.

      Sludge shall be sampled during the same 24-hour period and analyzed for the same pollutants as the influent and effluent sampling and analysis. The sludge analyzed shall be a composite sample of a minimum of 12 discrete samples taken at equal time intervals over the 24-hour period. Wastewater and sludge sampling and analysis shall be performed at least annually. The discharger shall also provide any influent, effluent or sludge monitoring data for nonpriority pollutants which may be causing or contributing to Interference, Pass-Through or adversely impacting sludge quality. Sampling and analysis shall be performed in accordance with the techniques prescribed in 40 CFR 136 and amendments thereto.

   b. A discussion of Upset, Interference, or Pass-Through incidents, if any, at the treatment plant, which the Discharger knows or suspects were caused by industrial users of the POTW. The discussion shall include the reasons why the incidents occurred, the corrective actions taken and, if known, the name and address of, the industrial user(s) responsible. The discussion shall also include a review of the applicable pollutant limitations to determine whether any additional limitations, or changes to existing requirements, may be necessary to prevent Pass-Through, Interference, or noncompliance with sludge disposal requirements.

   c. The cumulative number of industrial users that the Discharger has notified regarding Baseline Monitoring Reports and the cumulative number of industrial user responses.

   d. An updated list of the Discharger's industrial users including their names and addresses, or a list of deletions and additions keyed to a previously submitted list. The Discharger shall provide a brief explanation for each deletion. The list shall identify the industrial users subject to federal categorical standards by specifying which set(s) of standards are applicable. The list shall indicate which categorical industries, or specific pollutants from each industry, are subject to local limitations that are more stringent than the federal categorical standards. The Discharger shall also list the noncategorical industrial users that are subject only to local discharge limitations. The Discharger shall characterize the compliance status through the year of record of each industrial user by employing the following descriptions:

i. complied with baseline monitoring report requirements (where applicable);
ii. consistently achieved compliance;
iii. inconsistently achieved compliance;
iv. significantly violated applicable pretreatment requirements as defined by 40 CFR 403.8(f)(2)(vii);
v. complied with schedule to achieve compliance (include the date final compliance is required);
vi. did not achieve compliance and not on a compliance schedule; and
vii. compliance status unknown.

A report describing the compliance status of each industrial user characterized by the descriptions in items iii. through vii. above shall be submitted for each calendar quarter **within 21 days of the end of the quarter**. The report shall identify the specific compliance status of each such industrial user and shall also identify the compliance status of the POTW with regards to audit/pretreatment compliance inspection requirements. If none of the aforementioned conditions exist, at a minimum, a letter indicating that all industries are in compliance and no violations or changes to the pretreatment program have occurred during the quarter must be submitted. The information required in the fourth quarter report shall be included as part of the annual report. This quarterly reporting requirement shall commence upon issuance of this Order.

e. A summary of the inspection and sampling activities conducted by the Discharger during the past year to gather information and data regarding the industrial users. The summary shall include:

   i. the names and addresses of the industrial users subjected to surveillance and an explanation of whether they were inspected, sampled, or both and the frequency of these activities at each user; and
   ii. the conclusions or results from the inspection or sampling of each industrial user.

f. A summary of the compliance and enforcement activities during the past year. The summary shall include the names and addresses of the industrial users affected by the following actions:

   i. Warning letters or notices of violation regarding the industrial users' apparent noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the apparent violation concerned the federal categorical standards or local discharge limitations.

ii. Administrative orders regarding the industrial users noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the violation concerned the federal categorical standards or local discharge limitations.
iii. Civil actions regarding the industrial users' noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the violation concerned the federal categorical standards or local discharge limitations.
iv. Criminal actions regarding the industrial users noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the violation concerned the federal categorical standards or local discharge limitations.
v. Assessment of monetary penalties. For each industrial user identify the amount of the penalties.
vi. Restriction of flow to the POTW.
vii. Disconnection from discharge to the POTW.

g. A description of any significant changes in operating the pretreatment program which differ from the information in the Discharger's approved Pretreatment Program including, but not limited to, changes concerning: the program's administrative structure, local industrial discharge limitations, monitoring program or monitoring frequencies, legal authority or enforcement policy, funding mechanisms, resource requirements, or staffing levels.

h. A summary of the annual pretreatment budget, including the cost of pretreatment program functions and equipment purchases.

Duplicate signed copies of these Pretreatment Program reports shall be submitted to the Central Valley Water Board and the:

State Water Resources Control Board
Division of Water Quality
1001 I Street or P.O. Box 100
Sacramento, CA 95812

and the

Regional Administrator
U.S. Environmental Protection Agency W-5
75 Hawthorne Street
San Francisco, CA 94105

ATTACHMENT F – FACT SHEET

Table of Contents

List of Tables

ATTACHMENT F – FACT SHEET

As described 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	5A450001005
Discharger	Shasta County Service Area No. 17
Name of Facility	Cottonwood Wastewater Treatment Plant
Facility Address	3425 Live Oak Road
	Cottonwood, CA 96022
	Shasta County
Facility Contact, Title and Phone	Randy Gillichbauer, Utilities Superintendent, (530) 347-0431
Authorized Person to Sign and Submit Reports	Randy Gillichbauer, Utilities Superintendent, (530) 347-0431
Mailing Address	1855 Placer Street, Redding, CA 96001
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	B
Pretreatment Program	N
Reclamation Requirements	None
Facility Permitted Flow	0.43 million gallons per day (MGD)
Facility Design Flow	0.43 MGD
Watershed	Lower Cottonwood Hydrologic Sub Area No. 508.20
Receiving Water	Cottonwood Creek tributary to the Sacramento River
Receiving Water Type	Inland surface water

A. The Shasta County Service Area (CSA) No. 17 (hereinafter Discharger) is the owner and operator of the Cottonwood Wastewater Treatment Plant (hereinafter Facility), a POTW. The Shasta County Department of Public Works provides oversight and management of the CSA.

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 Cottonwood Creek, a water of the United States, and is currently regulated by Order No. R5-2005-0037 which was adopted on 17 March 2005 and expired on 1 March 2010. The terms and conditions of the Order No. R5-2005-0037 have been automatically continued and remain in effect until new Waste Discharge Requirements (WDRs) and National Pollutant Discharge Elimination System (NPDES) permit are adopted pursuant to this Order.

C. The Discharger filed a complete report of waste discharge (ROWD) and application for renewal of its WDRs and NPDES permit on 9 September 2009. The Central Valley Water Board deemed the ROWD complete on 25 September 2009.

II. FACILITY DESCRIPTION

The Discharger provides sewerage service for the community of Cottonwood, located approximately 15 miles south of the city of Redding, along Interstate 5. The Facility serves approximately 1,100 residences and small commercial customers. The design average dry weather flow capacity of the Facility is 0.43 MGD.

A. Description of Wastewater and Biosolids Treatment or Controls

The treatment system at the Facility consists of a headworks with bar screen and Parshall flume with ultrasonic level sensor; two, parallel oxidation ditches with aerators; two, parallel secondary clarifiers with skimmers; traveling-bridge sand filter unit; chlorine disinfection with chlorine gas; serpentine chlorine contact chamber; dechlorination by addition of sulfur dioxide; an outfall line and diffuser to Cottonwood Creek; a northern 4.3 acre-feet aerated sludge setting basin, a southern 0.63 acre-feet aerated sludge settling basin; and four, sludge/sand drying beds. After being processed at the Facility, biosolids are characterized and disposed at appropriate landfill facilities.

B. Discharge Points and Receiving Waters

1. The Facility is located in Section 22, T29N, R4W, MDB&M, as shown in Attachment B, a part of this Order.

2. Currently, treated municipal and industrial wastewater is discharged from Discharge Point No. 001 to Cottonwood Creek, a water of the United States, at a point Latitude 40° 22' 40" and Longitude 122° 16' 15". Cottonwood Creek is tributary to the Sacramento River approximately 4.5 miles downstream of the discharge point.

C. Summary of Existing Requirements and Self-Monitoring Report (SMR) Data

Effluent limitations contained in Order No. R5-2005-0037 for discharges from Discharge Point No. 001 (Monitoring Location EFF-001) and representative monitoring data from the term of Order No. R5-2005-0037 are as follows:

Table F-2. Historic Effluent Limitations and Monitoring Data

Parameter	Units	Effluent Limitation			Monitoring Data	
		Avg. Monthly	Avg. Weekly	Max. Daily	Highest Avg. Monthly Discharge	Highest Daily Discharge
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	10	15	30	7.5	9
	lbs/day[1]	36	54	108	28.8	62
	% Removal	85	--	--	99 avg	99 avg
Total Suspended Solids	mg/L	10	15	30	9.2	35
	lbs/day	36	54	108	33	97
	% Removal	85	--	--	97 avg	99 avg
Settleable Solids	mL/L	0.1	--	0.2	<0.1[2]	<0.1[2]
Total Coliform Organisms	MPN/100 mL	240[3]	23[3]	500[3]	68	488
Copper (Total Recoverable)	ug/L	[4,5]	--	[4,5]	--	--
	ug/L	--	--	37[8]	39.9	39.9
Zinc (Total Recoverable)	ug/L	[4,6]	--	[4,6]	--	--
	ug/L	--	--	162[8]	128	128
pH	standard units	--	--	6.0 – 9.0	--	5.7 – 8.0
Average Dry Weather Flow	MGD	0.43	--	--	0.36	0.63
Acute Toxicity	% Survival	[9]	--	70%-90%	--	90% (lowest)
Chlorine, Total Residual	mg/L	0.02[10]	0.01[10]	--	<0.1	<0.1

1 Based on a design flow of 0.43 MGD.
2 One time exceedance of 5.7 mL/L max. Avg <0.1 mL/L.
3 Shall not exceed 23 MPN/100mL as a 7-day median, 240 MPN/100mL more than once in a 30-day period, and 500 MPN/100mL as a daily maximum.
4 Final effluent limitation effective 1 March 2010.
5 Floating effluent limitations calculated in accordance with Attachment C of Order No. R5-2005-0037.
6 Floating effluent limitations calculated in accordance with Attachment D of Order No. R5-2005-0037.
7 Using the value, in mg/L, determined from Attachment C or D of Order No. R5-2005-0037 as appropriate, calculate lbs/day using the formula: z mg/L x 8.345 x 0.43 MGD = y lbs/day.
8 Interim effluent limitation effective until 1 March 2010.
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 or more consecutive bioassays, 90%.
10 0.02 is hourly average limitation, 0.01 is 4-Day average limitation.

D. Compliance Summary

On 9 September 2009 the Discharger was issued a draft Record of Violations (ROV) for comment. The draft ROV included a detailed summary of reported violations and resulting mandatory minimum penalties. A total of 17 violations were reported by the

Discharger in monthly DMRs received from September 2005 through February 2009. Nearly all of the violations were for effluent total coliform concentrations exceeding effluent limits. Central Valley Water Board staff is considering written comments provided by the Discharger regarding the violations. The Discharger is currently completing installation of automated chlorination/dechlorination controls and real-time chlorine residual analyzers. These improvements are expected to provide better control and monitoring of the disinfection process and result in marked improvement in the Facility's ability to comply with the total coliform effluent limits. A summary of effluent limitation exceedances is provided in Table F-3 below.

Table F-3. Summary of Effluent Limitation Exceedances

Date Range	Parameter	No. of Exceedances	Effluent Limit	Maximum Exceedance Value
20 December 2005 through 17 February 2009	Total Coliform Organisms 7-Day Median	12	23 MPN/100mL	248 MPN/100mL
15 February 2007	Total Coliform Monthly Maximum	1	420 MPN/100mL	488 MPN/100mL
14 August 2007	pH	1	Not <6 or >9	5.7
27 September 2005	Interim Zinc MDEL	1	162 ug/L	170 ug/L
30 January 2009	Interim Copper MDEL	1	37 ug/L	39.9 ug/L

E. Planned Changes

1. The Discharger is currently completing the installation of the required dosing control systems for the chlorination/dechlorination process at the treatment plant. Controls will be automatically operated based on flow and/or concentration.

2. The Discharger is currently completing the installation of electronic, real-time residual chlorine analyzers for the chlorination/dechlorination processes. The devices will continuously measure and record the chlorine residual and automatically notify the treatment plant operator of problems and potential effluent violations. The devices will have the sensitivity and accuracy to demonstrate compliance with effluent limits for chlorine residual contained in this Order.

3. The Discharger has completed a mixing zone/dilution study, associated biological assessment, and complete antidegradation analysis. The California Department of Fish and Game (DFG) was consulted during the mixing zone/dilution study and biological evaluation. This Order allows a mixing zone/ dilution credit for certain pollutants present in the discharge.

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in this Order are based on the applicable plans, policies, and regulations identified in section II of the Limitations and Discharge Requirements (Findings). This section provides supplemental information, where appropriate, for the plans, policies, and regulations relevant to the discharge.

A. Legal Authority

See Limitations and Discharge Requirements - Findings, Section II.C.

B. California Environmental Quality Act (CEQA)

See Limitations and Discharge Requirements - Findings, Section II.E.

C. State and Federal Regulations, Policies, and Plans

1. **Water Quality Control Plans**. The Central Valley Water Board adopted a *Water Quality Control Plan, Fourth Edition (Revised September 2009), for the Sacramento and San Joaquin River Basins* 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. In addition, State Water Board Resolution No. 88-63 requires that, with certain exceptions, the Central Valley Water Board assign the municipal and domestic supply use to water bodies that do not have beneficial uses listed in the Basin Plan. The beneficial uses of Cottonwood Creek, downstream of the discharge, are municipal and domestic supply (MUN); agricultural supply, including irrigation and stock watering (AGR); water contact recreation, including canoeing and rafting (REC-1); other non-contact water recreation (REC-2); warm freshwater habitat (WARM); cold freshwater habitat (COLD); cold migration of aquatic organisms (MIGR); spawning, reproduction, and/or early development, warm and cold (SPWN); and wildlife habitat (WILD). Potential beneficial uses have been identified as industrial process supply (PROC); industrial service supply (IND), and hydropower generation (POW).

   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. 40 CFR 131.3(e) 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 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.*

This Order contains effluent limitations requiring tertiary level of treatment, or equivalent, which is necessary to protect the beneficial uses of the receiving water. The Central Valley Water Board has considered the factors listed in CWC section 13241 in establishing these requirements, as discussed in more detail in the Fact Sheet, Attachment F, IV.C.3.v.

2. **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 water quality 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 (Attachment F, Section IV.D.4.) the discharge is consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Board Resolution 68-16.

3. **Anti-Backsliding Requirements.** Sections 402(o)(2) and 303(d)(4) of the CWA and federal regulations at 40 CFR 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require that effluent limitations in a reissued permit must be as stringent as those in the previous permit, with some exceptions in which limitations may be relaxed. Some effluent limitations in this Order are less stringent than those in the previous Order. As discussed in the Fact Sheet, this relaxation of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations.

4. **Emergency Planning and Community Right to Know Act**. Section 13263.6(a), California 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 CWC 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.

5. **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 certain storm water discharges from wastewater treatment facilities. However, wastewater treatment plants with design flows of less than one million gallons per day (< 1MGD) are not required to obtain an NPDES permit for storm water discharges. The design flow for Cottonwood Wastewater Treatment Plant is 0.43 MGD. Therefore, the Discharger is not required to obtain coverage under the State Water Board's Industrial Stormwater General Permit (Order No. 97-03-DWQ).

6. **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.

7. **Water Reuse Policy.** The Basin Plan's Water Reuse Policy states, "*The Regional Water board encourages the reclamation and reuse of wastewater…and requires as part of a Report of Waste Discharge an evaluation of reuse and land disposal options as alternative disposal methods. Reuse options should include consideration of the following, where appropriate, based on the quality of the wastewater and the required quality for the specific reuses: industrial and municipal supply, crop irrigation, landscape irrigation, ground water recharge, and wetland restoration*." The purpose of the Water Reuse Policy is to evaluate alternative methods of disposal to prevent unnecessary discharges to surface water.

   In December 2009 the Discharger submitted a complete antidegradation analysis to show that the proposed mixing zones/dilution credits satisfy requirements of State Water Board Resolution 68-16. As part of the antidegradation analysis, the Discharger evaluated a number of alternatives to directly discharging effluent to Cottonwood Creek. Some of the alternatives evaluated include: zero discharge, seasonal discharge, and flow restricted discharge. The antidegradation analysis alternatives assessment concludes that, at this time, it is not cost effective for the Discharger to expand its effluent storage capacity, and recommends continuance of the surface water discharge.

D. Impaired Water Bodies on CWA 303(d) List

1. Under Section 303(d) of the 1972 Clean Water Act, 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 30 November 2006 USEPA gave final approval to California's 2006 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 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.*" Cottonwood Creek is tributary to the Sacramento River. The 2006 CWA section 303(d) listing includes the Sacramento River from Keswick Dam to Cottonwood Creek (upstream of the confluence) and the Sacramento River from Cottonwood Creek to Red Bluff (downstream of the confluence). Both segments of the Sacramento River are listed for "unknown toxicity" due to an "unknown source". Proposed TMDL completion date for both segments is 2019.

2. **Total Maximum Daily Loads (TMDL).** USEPA requires the Central Valley Water Board to develop total maximum daily loads (TMDLs) for each 303(d) listed pollutant and water body combination. The listing for unknown toxicity has a proposed TMDL completion date of 2019. This Order contains a reopener provision to modify permit requirements, as necessary, to implement any changes to the TMDL.

E. Other Plans, Polices 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.

Sludge Settling Basins.
The Facility includes two, aerated sludge settling basins (SSBs). The SSBs are aerated ponds that provide biological and physical treatment to sludge produced during the primary and secondary treatment processes. The SSBs are underlain by engineered liner systems consisting of a combination of compacted clay, asphalt, and concrete. Furthermore, an underdrain system collects shallow groundwater from under the Facility to ensure groundwater is adequately separated from the bottoms of the treatment units. Therefore, it is reasonable to conclude that operation of the SSBs does not have the potential to cause an exceedance of applicable water quality objectives in groundwater. Thus, the discharges to the SSBs are in compliance with the applicable water quality control plan. Monitoring of the sludge and liquid contained in the SSBs indicates that the waste does not need to be managed as a hazardous waste. Based on these findings the SSBs are exempt from the requirements of Title 27 CCR, pursuant to either Title 27 CCR section 20090(a) or section (b).

Sludge Drying Beds.
The Facility includes sludge drying beds. The sludge drying beds are a sludge treatment process that dewaters the sludge prior to final disposal. The sludge drying beds are underlain by engineered liner systems consisting of concrete with a drain system and sump to collect and return percolating liquid to the headworks. The drain system and sump ensure that there is no hydraulic pressure on the concrete liner. Furthermore, an underdrain system collects shallow groundwater from under the Facility to ensure groundwater is adequately separated from the bottoms of the treatment units. Therefore, it is reasonable to conclude that operation of the sludge drying beds does not have the potential to cause an exceedance of applicable water quality objectives in groundwater. Thus, the discharges to the sludge drying beds are in compliance with the applicable water quality control plan. Monitoring of the sludge and liquid contained in the sludge drying beds indicates that the waste does not need to be managed as a hazardous waste. Based on these findings the sludge drying beds are exempt from the requirements of Title 27 CCR, pursuant to either Title 27 CCR section 20090(a) or section (b).

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 Clean Water Act (CWA) and amendments thereto are applicable to the discharge.

The Federal 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 discharges 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: 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 water quality-based effluent limitations (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 Central Valley Water Board's 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 contains a narrative objective requiring that: "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life*" (narrative toxicity objective). The Basin Plan requires the application of the most stringent objective necessary to ensure that surface water and groundwater do not contain chemical constituents, discoloration, toxic substances, radionuclides, or taste and odor producing substances that adversely affect beneficial uses. 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 Basin Plan also limits chemical constituents in concentrations that adversely affect surface water beneficial uses. For waters designated as municipal, the Basin Plan specifies that, at a minimum, waters shall not contain concentrations of constituents that exceed Maximum Contaminant Levels (MCL) of CCR Title 22. The Basin Plan further states that, to protect all beneficial uses, the Central Valley Water Board may apply limits more stringent than MCLs.

A. Discharge Prohibitions

1. 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.

2. The discharge of effluent at a location or in a manner different from that described in the Findings, is prohibited.

3. Discharge of materials, other than storm water, that are not otherwise permitted by this Order to surface waters or surface water drainage courses, is prohibited.

4. Discharge of wastewater from sewage holding tanks into the treatment plant or collection system, without prior approval from the Executive Officer of the Central Valley Water Board, or his/her designee, is prohibited.

B. Technology-Based Effluent Limitations

1. Scope and Authority

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 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. The Central Valley Water Board has determined that tertiary treatment (treatment beyond secondary) 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 currently prescribed; therefore, consistent with Order No. 5-01-122, this Order includes 30-day average BOD_5 and TSS limitations of 10 mg/L, which are 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. See Table F-4 for final technology-based effluent limitations required by this Order. 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.

b. **pH.** Federal Regulations, 40 CFR Part 133, also establish technology-based effluent limitations for pH. The secondary treatment standards require the pH of the effluent to be no lower than 6.0 and no greater than 9.0 standard units.

c. **Flow.** The Facility is designed to provide a tertiary level of treatment for up to a design average dry weather flow of 0.43 MGD. Therefore, this Order contains an average dry weather flow effluent limit of 0.43 MGD.

Summary of Technology-based Effluent Limitations
Discharge Point No. 001

Table F-4. Summary of Technology-based Effluent Limitations

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	10	15	30	--	--
	lbs/day[1]	36	54	108	--	--
	% Removal	85	--	--	--	--

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Total Suspended Solids	mg/L	10	15	30	--	--
	lbs/day[1]	36	54	108	--	--
	% Removal	85	--	--	--	--
pH	standard units	--	--	--	6.0	9.0
Flow	MGD	0.43[2]	--	--	--	--

1 Based on a design flow of 0.43 MGD.
2 Average dry weather flow.

C. Water Quality-Based Effluent Limitations (WQBELs)

1. Scope and Authority

As specified in 40 CFR 122.44(d)(1)(i), permits are required to include WQBELs for pollutants (including toxicity) that are or may be discharged at levels that cause, have reasonable potential to cause, or contribute to an in-stream excursion above any state water quality standard. 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

a. **Receiving Water.** Currently, treated municipal and industrial wastewater is discharged from Discharge Point No. 001 to Cottonwood Creek, which is tributary to the Sacramento River approximately 4.5 miles downstream of the discharge point. The beneficial uses of Cottonwood Creek and the Sacramento River are described above in Section III.C.1 of this Fact Sheet.

b. **Hardness-Dependent Metals Criteria and Objectives.** The *California Toxics Rule* and the *National Toxics Rule* contain water quality criteria for seven metals that vary as a function of hardness. The Basin Plan also contains numeric objectives for several metals that vary as a function of hardness. The lower the hardness the lower the water quality criteria. The metals with hardness-dependent criteria or objectives include cadmium, copper, chromium III, lead, nickel, silver, and zinc.

This Order has established the criteria or objectives 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, § 1.2; 40 CFR § 131.38(c)(4), Table 4, note 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. In some cases, the hardness of effluent discharges changes the hardness of the ambient receiving water. 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 Regional Water Board thus has considerable discretion in determining ambient hardness (*Id.*, p.10.).

The hardness values must also be protective under all flow conditions (*Id.*, pp. 10-11). As discussed below, in this Order, the lowest observed hardness in the effluent or upstream receiving water (whichever was lowest) was used to calculate the hardness-dependent criteria or objectives.

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 or objective that has been properly adjusted for hardness.

- For comparing the MEC to the applicable criterion or objective, in accordance with the SIP, CTR, and Order WQO 2008-0008, the reasonable worst-case hardness was used to adjust the criterion or objective. In this Order, the lowest observed effluent or receiving water hardness (whichever was lower) was used as a conservative approach.

- For comparing the Maximum Ambient Background Concentration to the applicable criterion or objective, in accordance with the SIP, CTR, and Order WQO 2008-0008, the reasonable worst-case upstream hardness was used to adjust the criterion. In this evaluation the area outside the influence of the discharge is analyzed. For this situation, the discharge does not impact the upstream hardness. Therefore, the effect of the effluent hardness was not included in this evaluation.

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[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.

Upstream receiving water hardness for Cottonwood Creek ranged from 55 mg/L to 135 mg/L (as $CaCO_3$), based on 40 samples collected between January 2006 to December 2009. The effluent hardness ranged from 64 mg/L to 113 mg/L (as $CaCO_3$), based on 41 samples from January 2006 to June 2009. Because Cottonwood Creek is not an effluent dominated stream, the lowest hardness of the receiving water (55 mg/L as $CaCO_3$) was used to represent a reasonable worst case receiving water hardness. Thus, for evaluating whether the MEC or Maximum Background Ambient Concentration exceeds the applicable criterion or objective, the criterion or objective was adjusted using a reasonable worst-case receiving water hardness of 55 mg/L (as $CaCO_3$).

Assimilative Capacity Determination for Hardness-Dependent Metals Criteria or Objectives. Hardness dependent metals determined to have reasonable potential include both copper and zinc. Analysis of ambient receiving water concentrations in Cottonwood Creek indicates large variation in total recoverable concentrations of copper and zinc. This variation is due to naturally occurring conditions, which include large flow variations and high sediment load. Ambient dissolved metals concentrations for the same metals exhibit far less variability and provide a more appropriate basis for determining how much assimilative capacity the receiving water has available for the dissolved metals present in the discharge. Assimilative capacity is typically determined using total recoverable concentrations, however the SIP, in section 1.4, step 2, allows for the determination of assimilative capacity using dissolved concentrations where appropriate (e.g., highly variable total recoverable concentrations with respect to corresponding dissolved concentrations). Furthermore, as stated in the CTR (Federal Register, Vol. 65, No. 97, Section F(2)(b) for 40 CFR, Part 131), "*It is now the Agency's [EPA's] policy that the use of dissolved metal to set and measure compliance with aquatic life water quality standards is the recommended approach, because dissolved metal more closely approximates the bioavailable fraction of the metal in the water column than does total recoverable metal*". Given the natural variation of total recoverable metals concentrations in the receiving water, SIP guidance, and EPA's policy, assimilative capacity for copper and zinc was determined using dissolved criteria and dissolved ambient background concentrations.

Effluent Concentration Allowance (ECA) Calculations. This Order followed SIP procedures to calculate an Effluent Concentration Allowance (ECA) for each of the hardness-dependent metals determined to have Reasonable Potential (copper and zinc, in this case). The SIP's ECA equation is presented below.

ECA = C + D (C – B), when C>B, and
ECA = C, when C<=B,

where, C = the applicable priority pollutant criterion or objective,
D = the dilution credit, if granted, and
B = the ambient background pollutant concentration.

The factor, (C – B), is referred to as the assimilative capacity.

c. **Mixing Zones and Dilution Credits.** The CWA directs states to adopt water quality standards to protect the quality of its waters. USEPA's current water quality standards regulation authorizes states to adopt general policies, such as mixing zones, to implement state water quality standards (40 CFR 122.44 and 122.45). The USEPA allows states to have broad flexibility in designing its mixing zone policies. Primary policy and guidance on determining mixing zone and dilution credits is provided by the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California* (State Implementation Policy or SIP) and the Basin Plan. If no procedure applies in the SIP or the Basin Plan, then the Regional Water Board may use the USEPA Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001)(TSD).

The allowance of mixing zones by the Central Valley Water Board is discussed in the Basin Plan, Policy for Application of Water Quality Objectives (Implementation page IV-16), which states in part, *"In conjunction with the issuance of NPDES and storm water permits, the Regional Board may designate mixing zones within which water quality objectives will not apply provided the discharger has demonstrated to the satisfaction of the Regional Board that the mixing zone will not adversely impact beneficial uses. If allowed, different mixing zones may be designated for different types of objectives, including, but not limited to, acute aquatic life objectives, chronic aquatic life objectives, human health objectives, and acute and chronic whole effluent toxicity objectives, depending in part on the averaging period over which the objectives apply. In determining the size of such mixing zones, the Regional Board will consider the applicable procedures and guidelines in the EPA's Water Quality Standards Handbook and the [TSD]. Pursuant to EPA guidelines, mixing zones designated for acute aquatic life objectives will generally be limited to a small zone of initial dilution in the immediate vicinity of the discharge."*

Section 1.4.2 of the SIP states, in part, *"...with the exception of effluent limitations derived from TMDLs, in establishing and determining compliance with effluent limitations for applicable human health, acute aquatic life, or chronic aquatic life priority pollutant criteria/objectives or the toxicity objective for aquatic life protection in a basin plan, the Regional Board may grant mixing zones and dilution credits to dischargers...The applicable priority pollutant criteria and objectives are to be met throughout a water body except within any mixing zone granted by a Regional Board. The allowance of mixing zones is discretionary and shall be determined on a discharge-by-discharge basis. The Regional Board* *may consider allowing mixing zones and dilution credits only for discharges with a physically identifiable point of discharge that is regulated through an NPDES permit issued by the Regional Board."*

This Order only allows a mixing zone for aquatic life and human health criteria. For completely-mixed discharges, the Central Valley Water Board may grant a mixing zone and apply a dilution credit in accordance with Section 1.4.2.1 of the SIP. For incompletely-mixed discharges, the Discharger must perform a mixing zone study to demonstrate to the Central Valley Water Board that a dilution credit is appropriate. In granting a mixing zone, the SIP states that a mixing zone shall be as small as practicable, and as provided in Section 1.4.2.2, shall not:

(1) Compromise the integrity of the entire water body;
The downstream edge of the longest mixing zone being granted in this permit is 160 feet downstream of the diffuser. From the diffuser downstream to the confluence of the Sacramento River, is a distance of approximately 4.5 river miles. Mixing zones granted in this Order do not compromise the integrity of the entire water body. Based on the results of the biological assessment, the integrity of the water body is not impacted within the mixing zone, let alone outside of the mixing zone.

(2) Cause acutely toxic conditions to aquatic life passing through the mixing zone;
The Discharger is required to conduct quarterly whole effluent toxicity testing for acute toxicity. Based on these results and results of the biological assessment conducted to support the mixing zone application, acutely toxic conditions are not present within the mixing zone.

(3) Restrict the passage of aquatic life;
Based on results of the mixing zone study and biological assessment, mixing zones granted in this Order do not restrict the passage of aquatic life. A zone of passage is present in all cases.

(4) Adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws;
Results of the biological assessment suggest effects on the benthic macro invertebrate (BMI) community are insignificant just below and within the mixing zone. No biologically sensitive or critical habitats were observed during field surveys and BMI sampling. Results from acute and chronic whole effluent toxicity testing do not indicate that the discharge has adverse affects at 100% effluent, let alone diluted effluent. Discharger must continue to meet acute and chronic toxicity requirements as part of this Order.

(5) Produce undesirable or nuisance aquatic life;

Based on the observations of researchers who conducted the biological assessment for the mixing zone study, no significant differences in the density or species composition of algae were noted during surveys between the mixing and reference zones. No significant changes were observed in the benthic macro invertebrate (BMI) community, indicating that undesirable or nuisance conditions are not being created.

(6) Result in floating debris, oil, or scum;
The mixing zone request was for aquatic life and human health criteria and objectives. This Order implements stringent, pollutant-specific effluent limitations, and discharge prohibitions to prevent these conditions from occurring. Receiving water monitoring to detect any of these problems is also required. Historical monitoring of the effluent and receiving water has never indicated problems.

(7) Produce objectionable color, odor, taste, or turbidity;
The mixing zone request was for aquatic life and human health criteria and objectives. This Order implements stringent, pollutant-specific effluent limitations, and discharge prohibitions to prevent these conditions from occurring. Receiving water monitoring to detect any of these problems is also required. Historical monitoring of the effluent and receiving water has never indicated problems.

(8) Cause objectionable bottom deposits;
The mixing zone request was for aquatic life and human health criteria and objectives. This Order implements stringent, pollutant-specific effluent limitations, and discharge prohibitions to prevent these conditions from occurring. Receiving water monitoring to detect any of these problems is also required. Historical monitoring of the effluent and receiving water has never indicated problems.

(9) Cause nuisance;
The mixing zone request was for aquatic life and human health criteria and objectives. This Order implements stringent, pollutant-specific effluent limitations, and discharge prohibitions to prevent these conditions from occurring. Receiving water monitoring to detect any of these problems is also required. Historical monitoring of the effluent and receiving water has never indicated problems.

(10) Dominate the receiving water body or overlap a mixing zone from different outfalls; and
The subject diffuser is approximately 50 feet long and is positioned such that its reach (perpendicular to the width of Cottonwood Creek) is approximately 35 feet. Cottonwood Creek is approximately 110 feet wide in the vicinity of the diffuser. Mixing zones granted by this permit do not dominate the water body. There are no other permitted NPDES discharges to Cottonwood Creek.

(11) Be allowed at or near any drinking water intake.
The downstream edge of the longest mixing zone being granted in this permit is 160 feet downstream of the diffuser. There are no known drinking water intakes within the reach of this mixing zone. There are no known drinking water intakes from the diffuser downstream to the confluence of the Sacramento River, a distance of approximately 4.5 river miles.

The Discharger has completed an instream mixing zone study, subsequent biological evaluation with DFG consultation, and a complete anti-degradation analysis per State Board Resolution 68-16. The mixing zone study was conducted in August 2008 using Rhodamine WT dye and transects positioned downstream of the diffuser. Maximum dye concentrations were measured along each transect. Instream dye concentration-based dilution ratios were calculated as the ratio of the maximum measured dye concentration at each transect to the effluent dye concentration. The dye concentration-based dilution ratios calculated from the field study conditions were proportionally adjusted to the critical receiving water and effluent flow conditions per the SIP section 1.4.2.1. The critical receiving water flows were determined using USGS Gauging Station 11376000 data and EPA's DFLOW model. The critical effluent flows were determined using the Discharger's effluent monitoring records. The resulting Concentration-based Critical Dilution Ratios are summarized below.

	Concentration-based Critical Dilution Ratios		
Distance Downstream from Diffuser (ft)	**Acute Aquatic Life**	**Chronic Aquatic Life**	**Human Health**
50	2.35	2.61	9.60
100	2.62	2.91	10.65
150	5.14	5.71	20.78
Flow-based Critical Dilution Ratios per SIP Section 1.4.2.1, Table 3.	36	42	298

Based on the results of the mixing zone study and per guidelines presented in the SIP, an incompletely mixed discharge occurs in the vicinity of the diffuser. An evaluation of the 11 mixing zone conditions outlined above was conducted. Information submitted by the Discharger in a report, *Biological Assessment of the Cottonwood Wastewater Treatment Plant Mixing Zone: Cottonwood Creek* was considered.

As suggested by the SIP, in determining the extent of, or whether to, allow a mixing zone and dilution credit, the Central Valley Water Board has considered the presence of any pollutants in the discharge that are carcinogenic, mutagenic, teratogenic, persistent, bioaccumulative, or attractive to aquatic organisms, and concluded that the allowance of the mixing zone and dilution credit does not adversely affect the beneficial uses of the receiving water.

The mixing zone therefore complies with the SIP, the Basin Plan, a d applicable guidance. In determining the size of the mixing zone, the Central Valley Water Board has considered the procedures, guidelines, and references in the SIP, EPA's Water Quality Standards Handbook, 2nd Edition (updated July 2007), and Section 5.1, and Section 2.2.2 of the TSD. A summary of granted dilution credits is presented in Table F-6. In no case was the Discharger granted a dilution credit or mixing zone that is larger than necessary for the Discharger to comply after implementing Best Practicable Treatment or Control for each pollutant.

In order to ensure that the granting of dilution credits does not allow the Discharger to relax treatment or control performance, this Order requires: an annual evaluation of removal efficiency trends; an annual review of BPTC implementation; and annual instream verification of pollutant concentrations at the edge of the respective mixing zones. Full, and optimal implementation of BPTC is required at all times.

Table F-6. Summary of Granted Dilution Credit

Constituent	Dilution Credit	Corresponding Length of Mixing Zone	Criterion
Ammonia	5.5	158 ft	EPA NAWQC, Aquatic Life
Copper, Total Recoverable	5.5	158 ft	CTR CCC, Aquatic Life
Chlorodibromomethane	5	27 ft	CTR W&O, Human Health
Cyanide	5.5	158 ft	CTR CCC, Aquatic Life
Dichlorobromomethane	20	160 ft	CTR W&O, Human Health
Bis-2-ethylhexylphthalate	1	4ft	CTR W&O, Human Health
Nitrate as N	9	58 ft	USEPA Primary MCL & NAWQC
Zinc, Total Recoverable	5.5	158 ft	BP Instantaneous Max, Aquatic Life

d. **Metal Translators.** Effluent limits applicable to this discharge were calculated using USEPA default metals translators.

3. Determining the Need for WQBELs

a. CWA section 301 (b)(1) requires NPDES permits to include effluent limitations that achieve technology-based standards and any more stringent limitations necessary to meet water quality standards. Water quality standards include Central Valley Water Board Basin Plan beneficial uses and narrative and numeric water quality objectives, State Water Board-adopted standards, and federal standards, including the CTR and NTR. The Basin Plan includes numeric site-specific water quality objectives and narrative objectives for toxicity, chemical constituents, 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.) With regards to the narrative chemical constituents objective, the Basin Plan states that waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. At a 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 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.*"

b. Federal regulations require effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numerical water quality standard. Based on information submitted as part of the application, in studies, and as directed by monitoring and reporting programs, 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 from Discharge Point No. 001 to Cottonwood Creek for ammonia, chlorodibromomethane, copper, cyanide, dichlorobromomethane, bis-2-ethylhexylphthalate, zinc, and nitrate. WQBELs for these constituents are included in this Order. A summary of the reasonable potential analysis (RPA) is provided in Attachment G, and a detailed discussion of the RPA for each constituent is provided below.

c. 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 Board may use the SIP as guidance for water quality-based toxics control.[1] The SIP states 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.

d. WQBELs were calculated in accordance with section 1.4 of the SIP, as described in Attachment F, Section IV.C.4.

e. **Ammonia.** 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 at toxic concentrations would violate the Basin Plan narrative toxicity objective. Applying 40 CFR 122.44(d)(1)(vi)(B), it is appropriate to use the NAWQC for the protection of freshwater aquatic life for ammonia.

[1] See, Order WQO 2001-16 (Napa) and Order WQO 2004-0013 (Yuba City).

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. As discussed in section III.C.1 of this Fact Sheet, warm and cold SPWN beneficial uses have been applied to Cottonwood Creek. Fall-run Chinook, Late-fall-run Chinook, Spring-run Chinook, and Steelhead trout are present in Cottonwood Creek. Therefore, the recommended criteria for waters where salmonids and early life stages are present were used.

The maximum permitted effluent pH is 8.5, as the Basin Plan objective for pH in the receiving stream is the range of 6.5 to 8.5. In order to protect against the worst-case short-term exposure of an organism, a pH value of 8.5 was used to derive the acute criterion. The resulting acute criterion is 2.14 mg/L.

The Discharger collects downstream receiving water temperature and pH data monthly. This data obtained from the Discharger's monthly monitoring reports from January 2006 through June 2009 were used to develop the chronic criteria. Using downstream receiving water data, the 30-day CCC was calculated for each day when temperature and pH were measured. Based on the highest running average downstream receiving water pH of 7.6, and the highest running average downstream receiving water temperature of 27.5°C, the 30-day CCC is 1.72 mg/L (as N) for the discharge to Cottonwood Creek. 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 1.72 mg/L (as N), the 4-day average concentration that should not be exceeded is 4.30 mg/L (as N).

The Central Valley Water Board calculates WQBELs in accordance with SIP procedures for non-CTR constituents, and ammonia is a non-CTR constituent. The SIP procedure assumes a 4-day averaging period for calculating the long-term average discharge condition (LTA). However, USEPA recommends modifying the procedure for calculating permit limits for ammonia using a 30-day averaging period for the calculation of the LTA corresponding to the 30-day CCC. Therefore, while the LTAs corresponding to the acute and 4-day chronic criteria were calculated according to SIP procedures, the LTA corresponding to the 30-day CCC was calculated assuming a 30-day averaging period. The lowest LTA representing the acute, 4-day average, and 30-day CCC is then selected for deriving the average monthly effluent limitation (AMEL) and the maximum daily effluent limitation (MDEL). The remainder of the WQBEL calculation for ammonia was performed according to the SIP procedures.

The Discharger has collected receiving water data to demonstrate assimilative capacity in Cottonwood Creek for ammonia. As described in Fact Sheet section IV.C.2.c, a dilution credit for ammonia of 5.5 can be granted, based on the available aquatic life dilution. Therefore, this Order includes an AMEL and MDEL for ammonia of 13.7 and 36.5 mg/L, respectively, based on the NAWQC for the protection of freshwater aquatic life, and a dilution credit of 5.5 for discharges to Cottonwood Creek (see Attachment F, Table F-8 for WQBEL calculations).

Based on the sample results for the effluent and the Facility's historical performance record, it appears the Discharger can immediately comply with these limitations.

f. **Bis-2-ethylhexylphthalate.** Bis-2-ethylhexylphthalate, in addition to several other phthalates, is used primarily as one of several plasticizers in polyvinyl chloride (PVC) resins for fabricating flexible vinyl products. According to the Consumer Product Safety Commission, USEPA, and the Food and Drug Administration, these PVC resins are used to manufacture many products, including soft squeeze toys, balls, raincoats, adhesives, polymeric coatings, components of paper and paperboard, defoaming agents, animal glue, surface lubricants, and other products that must stay flexible and non-injurious for the lifetime of their use. The State MCL for bis-2-ethylhexylphthalate is 4 µg/L and the USEPA MCL is 6 µg/L. The NTR criterion for human health protection for consumption of water and aquatic organisms is 1.8 µg/L and for consumption of aquatic organisms only is 5.9 µg/L.

Bis-2-ethylhexylphthalate was detected in 13 of 42 effluent samples collected between January 2006 and June 2009. The reported MEC is 3 µg/L. Six samples were reported at 2 µg/L, six samples were reported at 1 µg/L, and the remaining samples were reported non-detect. Per SIP section 1.4.3.2, ECA calculations for a priority pollutant criterion/objective that are intended to protect human health from carcinogenic effects are based on the ambient background concentration as an arithmetic mean. In this case, one sample has been collected upstream of the discharge in December 2005, with a resulting concentration of <0.7 µg/L. The arithmetic mean background concentration was calculated as one-half the detection limit of <0.7 µg/L or 0.35 µg/L. Cottonwood Creek has assimilative capacity for bis-2-ethylhexylphthalate. As described in section IV.C.2.c, a dilution credit of 1 can be granted, based on available human health dilution.

Using this value, the resulting AMEL and MDEL are 3.57 and 9.56, respectively (see Attachment F, Table F-13 for WQBEL calculations). It appears, based on the historic data set, that the Discharger can immediately comply with these new limits. Effluent limits for bis-2-ethylhexylphthalate are a new regulatory requirement within this permit.

g. **Carbon Tetrachloride.** Carbon tetrachloride is a clear heavy organic liquid with a sweet aromatic odor similar to chloroform. It is primarily used to make chlorofluorocarbon propellants and refrigerants, though its use has been declining steadily. It has also been used as dry cleaning agent and in fire extinguishers, in making nylon, as a solvent for rubber cement, soaps, insecticides, etc. The CTR criterion for human health protection for consumption of water and aquatic organisms for carbon tetrachloride is 0.25 ug/L.

   The MEC for carbon tetrachloride was estimated at 3 ug/L (J flag), based on 2 samples collected in 2006. Carbon tetrachloride was not detected in two upstream receiving water in Cottonwood Creek. Because only limited carbon tetrachloride data exists, only one of the two samples contained detectable concentrations (estimated concentration only), and no known sources of carbon tetrachloride contribute to the wastewater stream, insufficient information exists to determine reasonable potential. This Order requires quarterly monitoring 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 criterion, this Order may be reopened and modified by adding an appropriate effluent limitation.

h. **Chlorodibromomethane.** The CTR includes a chlorodibromomethane criterion of 0.41 ug/L for the protection of human health and is based on a one-in-a-million cancer risk for waters from which both water and organisms are consumed. The MEC for chlorodibromomethane was 30.1 ug/L, based on 39 samples collected between February 2006 and June 2009. The next highest detectable concentration during this period was 1.8 ug/L with an average concentration (using one-half the MDL for non-detect values) of 1.09 ug/L. No sample data for chlorodibromomethane is available for the upstream receiving water during this period, however for the purposes of developing a protective effluent limit, two data points, one obtained in January 2002 (<0.5 ug/L) and one in December 2005 (0.1 ug/L "J Flagged") were utilized. Based on the effluent data, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for chlorodibromomethane.

   Per SIP section 1.4.3.2, ECA calculations for a priority pollutant criterion/ objective that are intended to protect human health from carcinogenic effects are based on the ambient background concentration as an arithmetic mean. In this case ambient background concentration as an arithmetic mean was calculated using one-half the January 2002 concentration plus the full December 2005 "J-Flag" value divided by 2 to obtain an ambient background concentration of 0.175. Ambient monitoring demonstrates Cottonwood Creek has assimilative capacity for chlorodibromomethane. As described in section IV.C.2.c, a dilution credit for chlorodibromomethane of 5 can be granted, based on the available human health dilution. As shown in Table F-9, this results in an AMEL and MDEL of 1.53 ug/L and 3.80 ug/L, respectively.

As previously discussed the MEC for chlorodibromomethane was 30.1 ug/L. Using this value and the remaining 40 samples in the data set, the 99.9% upper confidence level was estimated at 2.93 ug/L. The average effluent concentration was 1.09 ug/L, therefore it appears, based on the facility's historic performance record, the Discharger can immediately comply with these limitations. As mentioned the Discharger is completing the installation of automated disinfection controls at the facility. This improvement is expected to reduce the concentration of chlorodibromomethane in the effluent. Effluent limitations for chlorodibromomethane are a new regulatory requirement within this permit, which becomes applicable to the waste discharge with the adoption of this Order.

i. **Copper.** The CTR and the Basin Plan include hardness-dependent criteria and objectives for the protection of freshwater aquatic life for copper. The criteria and objectives are presented in dissolved concentrations. USEPA recommends conversion factors to calculate total recoverable criteria. The USEPA default conversion factors for copper in freshwater are 0.96 for both the acute and the chronic criteria. Using the reasonable worst-case representative ambient hardness of 55 mg/L as $CaCO_3$, as described in section IV.C.2.b of this Fact Sheet, and the default conversion factors, the applicable chronic criterion (maximum 4-day average concentration) is 5.60 ug/L and the applicable acute criterion (maximum 1-hour average concentration) is 7.81 ug/L, as total recoverable concentrations.

The MEC for total copper was 39.9 ug/L, based on 42 samples collected between January 2006 and June 2009. The maximum observed upstream receiving water concentration was 168 ug/L based on 34 samples collected between January 2006 and June 2009. Because total copper in the effluent or upstream receiving water exceeds the criteria or objectives, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the criteria or objectives.

As described in section IV.C.2.b of the Fact Sheet, the ECA_{acute} and $ECA_{chronic}$ for discharges to Cottonwood Creek were determined using a hardness of 55 mg/L (as $CaCO_3$), which is protective under all discharge and mixing conditions. Using the procedures for calculating WQBELs in section 1.4 of the SIP, and as described in section IV.C.2.b of the Fact Sheet (including a dilution credit of 5.5), this results in an ECA_{acute} and an $ECA_{chronic}$ for copper of 41.5 ug/L and 26.1 ug/L, respectively. These ECAs are adjusted to long term averages, and then calculated as an AMEL and MDEL for total copper of 20.9 ug/L and 41.5 ug/L, respectively. These limits are included in this Order (see Attachment F, Table F-10 for WQBEL calculations).

As previously discussed, the MEC for total copper was 39.9 ug/L. Using this value and the remaining 41 samples in the data set, the 99.9% upper confidence level was estimated at 30.0 ug/L. With the exception of 39.9 ug/L all effluent concentrations in the data set fall below 30.0 ug/L. Also, after the 39.9 ug/L concentration, the next highest value was 19.8 ug/L. Therefore it appears, based on the facility's historical performance record, the Discharger can immediately comply with the AMEL and MDEL.

j. **Cyanide.** The CTR includes maximum 1-hour average and 4-day average cyanide criteria concentrations of 22 ug/L and 5.2 ug/L, respectively for the protection of freshwater aquatic life. The Basin Plan also includes criteria for the protection of freshwater aquatic life for cyanide. The Basin Plan instantaneous maximum objective is 10 ug/L. The MEC for cyanide was 20 ug/L, based on 41 samples collected between January 2006 and June 2009, while the maximum observed upstream receiving water cyanide concentration was <2 ug/L, based on 2 samples collected in January 2002 and December 2005. Therefore, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR and Basin Plan criteria for cyanide. The ambient monitoring demonstrates the receiving water has assimilative capacity for cyanide. As described in section IV.C.2.c, a dilution credit for cyanide of 5.5 can be granted, based on the available dilution.

   Therefore, using the allowed aquatic life dilution credit of 5.5, an AMEL and MDEL for cyanide of 20.69 ug/L and 51.52 ug/L, respectively, are included in this Order based on the CTR criterion for the protection of aquatic life for discharges to Cottonwood Creek (see Attachment F, Table F-11 for WQBEL calculations).

k. **Dichlorobromomethane.** The CTR includes a dichlorobromomethane criterion of 0.56 ug/L for the protection of human health and is based on a one-in-a-million cancer risk for waters from which both water and organisms are consumed. The MEC for dichlorobromomethane was 22.5 ug/L, based on 41 samples collected between January 2006 and June 2009. No sample data for dichlorobromomethane is available for the upstream receiving water during this period, however for the purposes of developing a protective effluent limit, two data points, one obtained in January 2002 (<0.5 ug/L) and December 2005 (estimated concentration of 0.06 ug/L) were utilized. Based on the effluent data, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for dichlorobromomethane.

   Per SIP section 1.4.3.2, ECA calculations for a priority pollutant criterion/ objective that are intended to protect human health from carcinogenic effects are based on the ambient background concentration as an arithmetic mean. In this case ambient background concentration as an arithmetic mean was calculated using one-half the January 2002 concentration plus the full December 2005 "J-Flag" value divided by 2 to obtain an ambient background concentration of 0.155. The ambient monitoring demonstrates Cottonwood Creek has assimilative capacity for dichlorobromomethane. As described in section IV.C.2.c, a dilution credit for dichlorobromomethane of 20 can be granted, based on the available human health dilution.

   Therefore, using the allowed human health dilution credit of 20, an AMEL and MDEL for dichlorobromomethane of 8.62 ug/L and 29.61 ug/L, respectively, are included in this Order based on the CTR criterion for the protection of human health for discharges to Cottonwood Creek (see Attachment F, Table F-12 for WQBEL calculations).

As previously discussed the MEC for dichlorobromomethane was 22.5 ug/L. Using this value and the remaining 40 samples in the data set, the 99.9% upper confidence level was estimated at 5.14. With the exception of 22.5 ug/L, the next highest detectable effluent concentrations are 8.2 ug/L, therefore it appears, based on the facility's historical performance record, the Discharger can immediately comply with these limitations. As mentioned the Discharger is completing the installation of automated disinfection controls at the facility. This improvement is expected to reduce the concentration of dichlorobromomethane in the effluent. Effluent limitations for dichlorobromomethane are a new regulatory requirement within this permit, which becomes applicable to the waste discharge with the adoption of this Order.

l. **Dissolved Oxygen.** The Basin Plan contains a water quality objective for dissolved oxygen requiring that the dissolved oxygen concentrations of waters designated as COLD and SPWN shall not be reduced below 7.0 mg/L at any time. This Order contains receiving water limitations and monitoring to ensure that the Basin Plan objectives for Dissolved Oxygen are met. Historical monitoring results indicate that the discharge does not have reasonable potential to cause or contribute to an in-stream excursion below (non-compliant) the Basin Plan water quality objective for Dissolved Oxygen.

m. **Nitrate.** 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 nitrogen gas, which is then released to the atmosphere. Nitrate and nitrite are known to cause adverse health effects in humans. DPH has adopted a Primary MCL at Title 22 CCR, Table 64431-A, for the protection of human health for nitrate equal to 10 mg/L (measured as nitrogen). Title 22 CCR, Table 64431 A, also includes a primary MCL of 10,000 ug/L (10 mg/L) for the sum of nitrate and nitrite, measured as nitrogen.

For nitrate, USEPA has developed Drinking Water Standards (10,000 ug/L as Primary MCL) and NAWQC for protection of human health (10,000 ug/L for non-cancer health effects). Recent toxicity studies have indicated a possibility that nitrate is toxic to aquatic organisms.

Inadequate or incomplete denitrification may result in the discharge of nitrate and/or nitrite to the receiving stream. The conversion of ammonia to nitrites and the conversion of nitrites to nitrates present a reasonable potential for the discharge to cause or contribute to an in-stream excursion above the Primary MCLs for nitrate. The MEC for nitrate, based on 42 samples collected between January 2006 and June 2009, was reported as 88 mg/L with an average concentration of 44.69 mg/L. Discharger has not collected nitrate data upstream of the discharge, however the California Department of Water Resources collects ambient data from Station A0352050 upstream of the discharge; of 16 samples collected between February 2003 and August 2009, a maximum concentration of 0.24 mg/L was detected. This value demonstrates Cottonwood Creek has assimilative capacity for nitrate. As described in section IV.C.2.c, a dilution credit for nitrate of 9 can be granted, based on the available human health dilution. Therefore, using the allowed human health dilution credit of 9, an AMEL for nitrate of 90 mg/L is included in this Order based on the Primary MCL and NAWQC criterion for the protection of human health for discharges to Cottonwood Creek (see Attachment F, Table F-13 for WQBEL calculations). Effluent monitoring data indicates that the Discharger can immediately comply with the new limit.

Effluent limitations for nitrate are a new regulatory requirement within this permit, which becomes applicable to the waste discharge with the adoption of this Order.

n. **Pathogens**. The beneficial uses of Cottonwood Creek include municipal and domestic supply, water contact recreation, and agricultural irrigation supply. To protect these beneficial uses, the Central Valley Water Board finds that the wastewater must be disinfected and adequately treated to prevent disease. Coliform limits are imposed to protect the beneficial uses of the receiving water, including public health through contact recreation and drinking water pathways. In a letter to the Central Valley Water Board data 8 April 1999, the California Department of Health Services (DHS, now California Department of Public Health) indicated that DHS would consider wastewater discharged to water bodies with identified beneficial uses of irrigation or contact recreation and where the wastewater receives dilution of more than 20:1 to be adequately disinfected if the effluent coliform concentration does not exceed 23 MPN/100 mL as a 7-day median and if the effluent coliform concentration does not exceed 240 MPN/100 mL more than once in any 30 day period. This Order contains a 500 MPN/100mL daily maximum effluent coliform limit, 23 MPN/100mL as a 7-day median effluent limitation, and 240 MPN/100mL as a shall not exceed more than once per month maximum effluent limitation.

n. **Pesticides.** Aldrin, Alpha Benzene Hexachloride (Alpha-BHC), and Gamma Hexachloro-cyclohexane (Gamma-BHC), constituents commonly found in pesticides have been detected in effluent during the most recent permit cycle. The Basin Plan contains water quality objectives applicable to pesticides for waters with the designated beneficial use of Municipal Supply (MUN). Cottonwood Creek is designated MUN, however specific MCLs for Aldrin, Alpha-BHC, and Gamma-BHC are not available. Applicable water quality objectives for each constituent are discussed below.

o. **Aldrin.** The CTR includes an Aldrin criterion of 0.00013 µg/L for the protection of human health and is based on a one-in-a-million cancer risk for water from which both water and organisms are consumed. The MEC for Aldrin was 0.043 µg/L based on two samples collected in November 2006. Aldrin was not detected in two samples (January 2002 at <0.002, and December 2005 at <0.002) in upstream receiving water samples in Cottonwood Creek. The existing information is insufficient to determine if the discharge has reasonable potential to exceed water quality objectives. Therefore, this Order requires quarterly monitoring of Aldrin. In the event, monitoring results confirm reasonable potential exists, this Order may be reopened for the purposes of establishing an effluent limit for Aldrin.

p. **Alpha Benzene Hexachloride (Alpha-BHC, or a-BHC).** The CTR includes an Alpha-BHC criterion of 0.014 µg/L for the protection of human health and is based on a one-in-a-million cancer risk for water from which both water and organisms are consumed. The MEC for Alpha-BHC was 0.031 µg/L based on two samples collected in November 2006. Alpha-BHC was not detected in two samples (January 2002 at <0.005, and December 2005 at <0.005) in upstream receiving water samples in Cottonwood Creek. The existing information is insufficient to determine if the discharge has reasonable potential to exceed water quality objectives. Therefore, this Order requires quarterly monitoring of Alpha-BHC. In the event, monitoring results confirm reasonable potential exists, this Order may be reopened for the purposes of establishing an effluent limit for Alpha-BHC.

q. **Gamma Hexachloro-cyclohexane (Gamma-BHC, or g-BHC).** The CTR includes a Gamma-BHC criterion of 0.019 µg/L for the protection of human health and is based on a one-in-a-million cancer risk for water from which both water and organisms are consumed. The MEC for Gamma-BHC was 0.024 µg/L based on two samples collected in November 2006. Aldrin was not detected in two samples (January 2002 at <0.005 and December 2005 at <0.005) in upstream receiving water samples in Cottonwood Creek. The existing information is insufficient to determine if the discharge has reasonable potential to exceed water quality objectives. Therefore, this Order requires quarterly monitoring of Gamma-BHC. In the event, monitoring results confirm reasonable potential exists, this Order may be reopened for the purposes of establishing an effluent limit for Gamma-BHC.

r. **pH.** 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*. Effluent Limitations for pH are included in this Order based on the Basin Plan objectives for pH.

s. **pH.** 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*. Effluent Limitations for pH are included in this Order based on the Basin Plan objectives for pH.

t. **Salinity.** The discharge contains total dissolved solids (TDS) and electrical conductivity (EC). These are water quality parameters that are indicative of the salinity of the water. Their presence in water can be growth limiting to certain agricultural crops and can affect the taste of water for human consumption. There are no USEPA water quality criteria for the protection of aquatic organisms for these constituents. The Basin Plan contains a chemical constituent objective that incorporates State MCLs, contains a narrative objective, and contains numeric water quality objectives for EC, TDS, sulfate, and chloride.

Table F-7. Salinity Water Quality Criteria/Objectives

Parameter	Agricultural WQ Goal[1]	Secondary MCL[3]	Effluent	
			Average	Maximum
EC (umhos/cm)	700[2]	900; 1,600; 2,200	495	702
TDS (mg/L)	Varies	500; 1,000; 1,500	361	467
Sulfate (mg/L)	Varies	250; 500; 600	Data Not Available	
Chloride (mg/L)	Varies	250; 500; 600	Data Not Available	

1 Agricultural water quality goals based on *Water Quality for Agriculture*, Food and Agriculture Organization of the United Nations—Irrigation and Drainage Paper No. 29, Rev. 1 (R.S. Ayers and D.W. Westcot, Rome, 1985)

2 The EC level in irrigation water that harms crop production depends on the crop type, soil type, irrigation methods, rainfall, and other factors. An EC level of 700 umhos/cm is generally considered to present no risk of salinity impacts to crops. However, many crops are grown successfully with higher salinities.

3 The secondary MCLs are stated as a recommended level, upper level, and a short-term maximum level.

i. **Chloride**. The previous order did not require Discharger to collect samples for chloride analysis. Therefore, insufficient information exists to conduct a reasonable potential analysis for chloride. This Order requires increased monitoring for chloride.

ii. **Electrical Conductivity**. The secondary MCL for electrical conductivity is 900 umhos/cm as a recommended level; 1,600 umhos/cm as an upper level; and 2,200 umhos/cm as a short-term maximum. The agricultural water quality goal for salt-sensitive crops is 700 umhos/cm as an annual average. It is unverified whether or not salt sensitive crops are or could be grown in the vicinity downstream of the discharge, therefore the conservative approach is to apply the agricultural goal of 700 umhos/cm.

A review of the Discharger's monitoring reports from January 2006 through June 2009 shows an average effluent electrical conductivity of 495 umhos/cm, with a range from 222 umhos/cm to 702 umhos/cm for 40 samples. These levels do not exceed the applicable objective of 700 umhos/cm as an annual average. The background receiving water electrical conductivity concentration in Cottonwood Creek averaged 243 umhos/cm in 40 sampling events collected by the Discharger from January 2006 through June 2009. Therefore, there is no reasonable potential to exceed the applicable water quality objective. This Order requires effluent and receiving water monitoring for EC.

iii. **Sulfate**. The previous order did not require the Discharger to collect samples for sulfate analysis. Therefore, insufficient information exists to conduct a reasonable potential analysis for sulfate. This Order requires increased monitoring for sulfate.

iv. **Total Dissolved Solids.** The secondary MCL for total dissolved solids is 500 mg/L as a recommended level; 1,000 mg/L as an upper level; and 1,500 mg/L as a short-term maximum. The recommended agricultural water quality goal for total dissolved solids, that would apply the narrative chemical constituent objective, is 450 mg/L as a long-term average based on *Water Quality for Agriculture, Food and Agriculture Organization of the United Nations—Irrigation and Drainage Paper No. 29, Rev. 1 (R.S. Ayers and D.W. Westcot, Rome, 1985)*. Water Quality for Agriculture evaluates the impacts of salinity levels on crop tolerance and yield reduction, and establishes water quality goals that are protective of the agricultural uses. The 450 mg/L water quality goal is intended to prevent reduction in crop yield, i.e., a restriction on use of water, for salt-sensitive crops. Only the most salt sensitive crops require irrigation water of 450 mg/L or less to prevent loss of yield. Most other crops can tolerate higher total dissolved solids concentrations without harm, however, as the salinity of the irrigation water increases, more crops are potentially harmed by the total dissolved solids, or extra measures must be taken by the farmer to minimize or eliminate any harmful impacts.

The average total dissolved solids effluent concentration was 361 mg/L; concentrations ranged from 268 mg/L to 467 mg/L for 42 samples collected by the Discharger from January 2006 through June 2009. The average concentration of 361 mg/L does not exceed the applicable water quality objectives. Background receiving water monitoring for total dissolved solids is not available for Cottonwood Creek. Therefore, there is no reasonable potential to exceed the applicable water quality objective. This Order requires effluent and receiving water monitoring for total dissolved solids.

v. **Salinity Effluent Limitations and Evaluation and Minimization Plan.** The average electrical conductivity in the discharge is 495 umhos/cm, which is less than the lowest applicable objective of 700 umhos/cm (agricultural water quality goal). The average total dissolved solids effluent concentration of 361 mg/L is less than the agricultural water quality objective of 450 mg/L. Insufficient information was available for sulfate and chloride. Based on the available information, no reasonable potential exists, therefore no effluent limitations are necessary. Nonetheless, in an effort to minimize salt loading to Cottonwood Creek and the Sacramento River, this Order requires the Discharger to prepare and submit a Salinity Evaluation and Minimization Plan to address sources of salinity from the Facility.

u. **Toxicity.** See Section IV.C.5 of the Fact Sheet regarding whole effluent toxicity.

v. **Zinc.** The CTR and Basin Plan include hardness-dependent criteria and objectives for the protection of freshwater aquatic life for zinc. The criteria and objectives are presented in dissolved concentrations. USEPA recommends conversion factors to calculate total recoverable criteria. The USEPA default conversion factors for zinc in freshwater are 0.978 and 0.986 for acute and chronic criteria, respectively. Using the reasonable worst-case representative ambient hardness of 55 mg/L as $CaCO_3$, as described in section IV.C.2.b of this Fact Sheet, and the default conversion factors, the applicable chronic criterion (maximum 4-day average concentration) is 21.3 ug/L and the applicable acute criterion (maximum 1-hour average concentration) is 72.2 ug/L, as total recoverable concentrations.

The MEC for total zinc was 128 ug/L, based on 42 samples collected between January 2006 and June 2009. The maximum observed upstream receiving water concentration was 422 ug/L based on 34 samples collected between January 2006 and June 2009. Because total zinc in the effluent or upstream receiving water exceeds the criteria or objectives, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the criteria or objectives.

As described in section IV.C.2.b of the Fact Sheet, the ECA_{acute} and $ECA_{chronic}$ for discharges to Cottonwood Creek were determined using a hardness of 55 mg/L (as $CaCO_3$), which is protective under all discharge and mixing conditions. Using the procedures for calculating WQBELs in section 1.4 of the SIP, and as described in section IV.C.2.b of the Fact Sheet (including a dilution credit of 5.5), this results in an ECA_{acute} and an $ECA_{chronic}$ for zinc of 131.3 ug/L and 462.1 ug/L, respectively. These ECAs are adjusted to long term averages, and then calculated as an AMEL and MDEL for total zinc of 77.6 ug/L and 131.3 ug/L, respectively. These limits are included in this Order (see Attachment F, Table F-13 for WQBEL calculations).

As previously discussed the MEC for total zinc was 128 ug/L. Using this value and the remaining 41 samples in the data set, the 99.9% upper confidence level was estimated at 108. With the exception of the 128 ug/L and 113 ug/L sample data all effluent concentrations in the data set fall below 108 ug/L, therefore it appears, based on the facility's historical performance record, the Discharger can immediately comply with the AMEL and MDEL.

4. WQBEL Calculations

a. As discussed in section IV.C.3. above, WQBELs for chlorine residual and pH were based on Basin Plan objectives and applied directly as effluent limitations. WQBELs for pathogens were based on California DPH recommendations. The WQBEL for nitrate was based on the Primary MCL and established directly as an AMEL.

b. Effluent limitations for ammonia, chlorodibromomethane, copper, cyanide, dichlorobromomethane, bis-2-ethylhexylphthalate, and zinc were calculated in accordance with section 1.4 of the SIP. The following paragraphs describe the methodology used for calculating effluent limitations.

Effluent Limitation Calculations. In calculating maximum effluent limitations, the effluent concentration allowances were calculated as follows:

$ECA_{HH} = HH + D(HH - B)$, (as a human health example)

where:

ECA_{acute} = effluent concentration allowance for acute (1-hour average) toxicity criterion

$ECA_{chronic}$ = effluent concentration allowance for chronic (4-day average) toxicity criterion

ECA_{HH} = effluent concentration allowance for human health, agriculture, or other long-term criterion/objective

CMC = criteria maximum concentration (1-hour average)

CCC = criteria continuous concentration (4-day average, unless otherwise noted)

HH = human health, agriculture, or other long-term criterion/objective

D = dilution credit

B = maximum receiving water concentration

Acute and chronic toxicity ECAs were then converted to equivalent long-term averages (LTA) using statistical multipliers and the lowest is used. Additional statistical multipliers were then used to calculate the maximum daily effluent limitation (MDEL) and the average monthly effluent limitation (AMEL).

Human health ECAs are set equal to the AMEL and a statistical multiplier is 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 CMC to LTA
M_C = statistical multiplier converting CCC to LTA

WQBELs were calculated for ammonia, chlorodibromomethane, copper, cyanide, dichlorobromomethane, bis-2-ethylhexylphthalate, and zinc as follows in Tables F-8 through F-14, below.

Table F-8. WQBEL Calculations for Ammonia

	Acute	Chronic (4-day)	Chronic (30-day)
Criteria (mg/L)[1]	5.62	4.3	1.72
Dilution Credit	5.5	5.5	5.5
ECA	36.48	27.90	11.13
ECA Multiplier	0.18	0.33	0.63
LTA[2]	6.52	9.22	6.99
AMEL Multiplier (95^{th}%)	2.10	[3]	[3]
AMEL (mg/L)	**13.7**	[3]	[3]
MDEL Multiplier (99^{th}%)	5.59	[3]	[3]
MDEL (mg/L)	**36.5**	[3]	[3]

1 USEPA Ambient Water Quality Criteria.
2 LTA developed based on Acute and Chronic ECA Multipliers calculated at 99th percentile level per sections 5.4.1 and 5.5.4 of TSD.
3 Limitations based on acute LTA ($LTA_{acute} < LTA_{chronic(4\text{-}day)}$ and $LTA_{acute} < LTA_{chronic(30\text{-}day)}$).

Table F-9. WQBEL Calculations for Chlorodibromomethane

	Human Health
Criteria (ug/L)	0.41
Dilution Credit	5
ECA	1.53
AMEL (ug/L)[1]	**1.53**
MDEL/AMEL Multiplier[2]	1.91
MDEL (ug/L)	**3.80**

1 AMEL = ECA per section 1.4.B, Step 6 of SIP
2 Assumes sampling frequency n=4. Uses MDEL/AMEL multiplier from Table 2 of SIP.

Table F-10. WQBEL Calculations for Copper

	Acute	Chronic
Criteria, total recoverable (ug/L) (1)	7.81	5.6
Dilution Credit	5.5	5.5
ECA, total recoverable (2)	41.5	26.1
ECA Multiplier (3)	0.33	0.53
LTA	13.53	13.90
AMEL Multiplier (95^{th}%) (4)(5)	1.54	(7)
AMEL (ug/L)	**20.9**	(7)
MDEL Multiplier (99^{th}%) (6)	3.07	(7)
MDEL (ug/L)	**41.5**	(7)

1 CTR aquatic life criteria, based on a hardness of 55 mg/L as $CaCO_3$. The criteria are based on USEPA default metals translator.
2 ECA calculated per section 1.4.B, Step 2 of SIP.
3 Acute and Chronic ECA Multiplier calculated at 99th percentile per section 1.4.B, Step 3 of SIP or per sections 5.4.1 and 5.5.4 of the TSD.
4 Assumes sampling frequency n<=4.
5 The probability basis for AMEL is 95th percentile per section 1.4.B, Step 5 of SIP or section 5.5.4 of the TSD.
6 The probability basis for MDEL is 99th percentile per section 1.4.B, Step 5 of SIP or section 5.5.4 of the TSD.
7 Limitations based on acute LTA (Acute LTA < Chronic LTA).

Table F-11. WQBEL Calculations for Cyanide

	Acute	Chronic
Criteria (ug/L) (1)	10	5.2
Dilution Credit	5.5	5.5
ECA (2)	59.50	28.30
ECA Multiplier (3)	0.21	0.38
LTA	12.47	10.80
AMEL Multiplier (95^{th}%) (4)(5)	(7)	1.92
AMEL (ug/L)	(7)	**20.7**
MDEL Multiplier (99^{th}%) (6)	(7)	4.77
MDEL (ug/L)	(7)	**51.5**

1 CTR aquatic life criteria, independent of hardness, no metals translator.
2 ECA calculated per section 1.4.B, Step 2 of SIP.
3 Acute and Chronic ECA Multiplier calculated at 99th percentile per section 1.4.B, Step 3 of SIP or per sections 5.4.1 and 5.5.4 of the TSD.
4 Assumes sampling frequency n<=4.
5 The probability basis for AMEL is 95th percentile per section 1.4.B, Step 5 of SIP or section 5.5.4 of the TSD.
6 The probability basis for MDEL is 99th percentile per section 1.4.B, Step 5 of SIP or section 5.5.4 of the TSD.
7 Limitations based on chronic LTA (Chronic LTA < Acute LTA).

Table F-12. WQBEL Calculations for Dichlorobromomethane

	Human Health
Criteria (ug/L)	0.56
Dilution Credit	20
ECA	8.66
AMEL (ug/L)[1]	**8.62**
MDEL/AMEL Multiplier[2]	3.69
MDEL (ug/L)	**29.6**

1 AMEL = ECA per section 1.4.B, Step 6 of SIP
2 Assumes sampling frequency n<=4. Uses MDEL/AMEL multiplier, Table 2 of SIP.

Table F-13. WQBEL Calculations for Bis-2-ethylhexylphthalate

	Human Health
Criteria (mg/L)	1.8
Dilution Credit	1
ECA	3.57
AMEL (ug/L)[1]	**3.57**
MDEL/AMEL Multiplier[2]	2.68
MDEL (ug/L)	**9.56**

1 AMEL = ECA per section 1.4.B, Step 6 of SIP
2 Assumes sampling frequency n<=4. Uses MDEL/AMEL multiplier, Table 2 of SIP.

Table F-14. WQBEL Calculations for Zinc

	Acute	Chronic
Criteria, total recoverable (ug/L) (1)	21.31	72.2
Dilution Credit	5.5	5.5
ECA, total recoverable (2)	131.25	462.11
ECA Multiplier (3)	0.43	0.64
LTA	56.71	294.26
AMEL Multiplier (95^{th}%) (4)(5)	1.37	(7)
AMEL (ug/L)	**77.6**	(7)
MDEL Multiplier (99^{th}%) (6)	2.31	(7)
MDEL (ug/L)	**131.3**	(7)

1 CTR aquatic life criteria and Basin Plan numeric objectives, based on a hardness of 55 mg/L as $CaCO_3$. The criteria are based on USEPA default metals translator.
2 ECA calculated per section 1.4.B, Step 2 of SIP.
3 Acute and Chronic ECA Multiplier calculated at 99th percentile per section 1.4.B, Step 3 of SIP or per sections 5.4.1 and 5.5.4 of the TSD.
4 Assumes sampling frequency n<=4.
5 The probability basis for AMEL is 95th percentile per section 1.4.B, Step 5 of SIP or section 5.5.4 of the TSD.
6 The probability basis for MDEL is 99th percentile per section 1.4.B, Step 5 of SIP or section 5.5.4 of the TSD.
7 Limitations based on acute LTA (Acute LTA < Chronic LTA).

Summary of Water Quality-based Effluent Limitations Discharge Point No. 001

Table F-15. Summary of Water Quality-based Effluent Limitations for Discharge Point No. 001 (Cottonwood Creek)

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Conventional Pollutants						
pH	standard units	--	--	--	6.5	8.5
Priority Pollutants						
Copper, Total Recoverable	ug/L	20.9	--	41.5	--	--
Chlorodibromomethane	ug/L	1.53	--	3.80	--	--
Cyanide	ug/L	20.7	--	51.5	--	--
Dichlorobromomethane	ug/L	8.62	--	29.6	--	--
Bis-2-ethylhexylphthalate	ug/L	3.57	--	9.56	--	--
Zinc, Total Recoverable	ug/L	77.6	--	131.3	--	--
Non-Conventional Pollutants						
Ammonia Nitrogen, Total (as N)	mg/L	13.7	--	36.5	--	--
Chlorine, Total Residual	mg/L	--	0.011[1]	0.019[2]	--	--
Nitrate Nitrogen, Total (as N)	mg/L	90	--	--	--	--
Total Coliform Organisms	MPN/100 mL	--	23[3]	500	--	240[4]

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum

1 Applied as a 4-day average effluent limitation.
2 Applied as a 1-hour average effluent limitation.
3 Applied as a 7-day median effluent limitation.
4 Effluent total coliform organisms are not to exceed 240 MPN/100 mL more than once in any 30-day period.

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 any 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 III-8.00) The Basin Plan also states that, "*...effluent limits based upon acute biotoxicity tests of effluents will be prescribed where appropriate...*". 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.*"

Acute toxicity is tested quarterly on Salmonids as percent survival after 96-hour exposure in 100% effluent. Order No. R5-2005-0037 establishes a limit of 70% survival for any single bioassay, and a median result of 90% survival for any three or more consecutive bioassays. Since August 2003, 24 acute toxicity tests have been performed. The acute toxicity results indicated 90%, or better, survival in 100% effluent for all tests. These data are summarized in Table F-30.

Table F-16. Acute Toxicity, 96 hr % Survival, Salmonids in 100% Effluent

Sample Date	Percent Survival
1/10/2006	100%
4/11/2006	100%
7/27/2006	100%
11/17/2006	100%
2/27/2007	100%
4/19/2007	100%
7/2/2007	95%
12/4/2007	100%
3/31/2008	95%
5/20/2008	100%
10/8/2008	100%
12/5/2008	100%
3/18/2009	100%
4/23/2009	100%
7/21/2009	100%
10/8/2009	100%
Number of Tests	**16**
Average Test Result	**99.37%**

In order to assure acute toxicity is not present within the mixing zone, 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 or more consecutive bioassays --------- 90%

b. **Chronic 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). Per Order No. R5-2005-0037, the Discharger was required to conduct annual chronic toxicity testing as follows: 7-day *Ceriodaphnia dubia (water flea)* survival and reproduction, 7-day fathead minnow (Pimephales promelas) survival and growth, and green algal (*Selenastrum capricornutum)* growth. Since the beginning of the permit cycle in 2005, only the *Ceriodaphnia dubia* reproduction test results in 2007, were significantly reduced from the control. In this case, the lab control water result indicates problems with the test results. Residual chlorine after the laboratory dechlorination process is believed to be the cause of this effect. All other test results for *Ceriodaphnia dubia, Pimephales promelas, and Selenastrum capricornutum* have been normal, demonstrating the discharge has no reasonable potential to cause or contribute to an in-stream excursion above the Basin Plan's narrative toxicity objective. The following table summarizes whole effluent chronic toxicity testing performed by the Discharger from December 2006 through December 2008.

Table F-17. Chronic Toxicity, Whole Effluent Data Summary

Date	Parameter	Fathead Minnow Larval Survival and Growth Test		C. Dubia (Survival and Reproduction Test)		Selenastrum Capricornutum
		7 day % Survival	Avg. Dry Wt (mg)	6 day % Survival	Avg No. Young/Female	Growth
12/08	Effluent	100.0	0.41	100.0	25.9	2.91
	DMW Lab Control, dechlor	97.5	0.43	100.0	22.9	1.66
	DMW Lab Control	97.5	0.41	100.0	22.4	1.68
12/07	Effluent	96.6	0.41	100.0	0.5 [1]	0.97
	DMW Lab Control, dechlor	100.0	0.53	100.0	11.2 [1]	[2]
	DMW Lab Control	97.5	0.45	100.0	20.4	1.39
12/06	Effluent	96.8	0.57	100.0	30.0	3.81
	DMW Lab Control	97.5	0.57	100.0	30.5	1.99

1 Significantly reduced from control, but apparent lab control problem.
2 Data not available.

The discharge does not have reasonable potential to cause or contribute to an exceedance of the Basin Plan's narrative toxicity objective. Therefore, a narrative effluent limit for chronic whole effluent toxicity has not been established in this Order.

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 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

[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).

revision it is infeasible to develop numeric effluent limitations for chronic toxicity. However, the State Water Board found in WQO 2003-012 that, while it is not appropriate to include final numeric effluent limitations for chronic toxicity in NPDES permits for POTWs, permits must contain a narrative effluent limitation, numeric benchmarks for triggering accelerated monitoring, rigorous Toxicity Reduction Evaluation (TRE)/Toxicity Identification Evaluation (TIE) conditions, and a reopener to establish numeric effluent limitations for either chronic toxicity or the chemical(s) causing toxicity. This Order includes a reopener that allows the Central Valley Water Board to reopen the permit and include a numeric chronic toxicity limitation, a new acute toxicity limitation, and/or a limitation for a specific toxicant identified in the TRE.

To ensure compliance with the narrative effluent limitation and 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 a pattern of toxicity exceeding the numeric toxicity monitoring trigger, the Discharger is required to initiate a Toxicity Reduction Evaluation (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 a pattern of effluent toxicity has been demonstrated.

D. Final Effluent Limitations

1. Mass-based Effluent Limitations.

Title 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 were calculated based upon the permitted average dry weather flow allowed in Sections IV.A.1.g and IV.B.1.g of the Limitations and Discharge Requirements.

Except for the pollutants listed above, for those pollutant parameters for which effluent limitations are based on water quality objectives and criteria that are concentration-based, mass-based effluent limitations are not included in this Order.

2. Averaging Periods for Effluent Limitations.

Title 40 CFR 122.45 (d) requires average weekly and average monthly discharge limitations for publicly owned treatment works (POTWs) unless impracticable. However, for toxic pollutants and pollutant parameters in water quality permitting, the USEPA recommends the use of a maximum daily effluent limitation 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 utilizes maximum daily effluent limitations in lieu of average weekly effluent limitations for ammonia, chlorodibromomethane, copper, cyanide, dichlorobromomethane, bis-2-ethylhexylphthalate, 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. Based on a conversation between the Central Valley Water Board and the California DPH, annual average limitations are more appropriate for some pollutants whose effluent limitations are based on primary and secondary MCLs. DPH also recommends that an AMEL is more appropriate for pollutants such as nitrate for which the MCL is designed to be protective of acute health effects. Therefore, an AMEL has been applied for nitrate. Furthermore, for chlorine residual, BOD_5, TSS, pH, and total coliform organisms, 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 Attachment F, Section IV.C.3, above.

3. Satisfaction of Anti-Backsliding Requirements.

The Clean Water Act 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 Clean Water Act sections 402(o) or 303(d)(4), or, where applicable, 40 CFR 122.44(l).

Some effluent limitations in this revised Order are less stringent than those in the originally adopted Order. As discussed below this relaxation of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations.

In the previous permit, the water quality-based effluent limitations (WQBELs) for copper and zinc were established without a dilution credit. In this new Order, the effluent limitations for these constituents have been recalculated using allowable dilution credits as explained in Section IV.C.2.c of the Fact Sheet. In some cases this has resulted in less stringent effluent limitations. Anti-backsliding requirements are satisfied, however, pursuant to CWA section 402(o)(2)(B), where the documentation and consideration of available dilution credits since adoption of the previous permit, qualifies as new information which was not available at the issuance of the previous permit.

The changes in effluent limits or copper and zinc in the revised permit are based on new information generated since adoption of the original permit, and are consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Resources Control Board Resolution 68-16, as described in Section IV.D.4, below.

4. Satisfaction of Antidegradation Policy

The Discharger submitted a report titled, *Antidegradation Analysis for the County Service Area No. 17, Cottonwood Wastewater Treatment Plant* (Report), dated December 2009 (PACE Engineering), that provides a complete antidegradation analysis following the guidance provided by State Water Board's APU 90-004, Resolution 68-16, and the 1987 Policy Memorandum, which take into account federal antidegradation policy and guidance. Pursuant to these guidelines, the Report evaluates whether adoption of a mixing zone and its potential impact on water quality are consistent with the maximum benefit to the people of the state, will not unreasonably affect beneficial uses, will not cause water quality to be less than water quality objectives, and that the discharge provides protection for existing in-stream uses and water quality necessary to protect those uses.

Alternative control measured evaluated as part of the study include:

1. Higher level of treatment to eliminate the need for a mixing zone,
2. Zero discharge (100% recycling),
3. Seasonal discharge,
4. Flow restricted discharge,
5. Pollutant source minimization,
6. Connecting to a nearby water system,
7. Discharge to the Sacramento River, and
8. Change in drinking water source.

Results of the alternative controls analysis are summarized in Table F-18 below.

Table F-18. Antidegradation Analysis, Alternative Controls Summary

Summary	Plan Elements	Total Construction Cost	Annual Rate Increase	%MHI
Obtaining Dilution Credits	Perform mixing zone and dilution study, bioassessment, and antidegradation analysis to obtain dilution credits.	$150,000	$0	1.2

Summary	Plan Elements	Total Construction Cost	Annual Rate Increase	%MHI
Higher Level of Treatment	PAC addition.	$500,000	$60	1.4
Zero Discharge	Inadequate existing pond size and the cost to develop another pond preclude zero discharge from being a feasible alternative.			
Seasonal Discharge	Pond storage with irrigation during summer months and creek discharge during winter months.	$1.65 million	$130	1.6
Flow-restricted Discharge	In order to mitigate the lowering of water quality, this alternative defaults to the zero discharge alternative.			
Pollutant Source Minimization	Quicklime or hydrated lime addition.	$100,000	$32	1.3
Regionalization	No wastewater systems exist in the reasonable immediate vicinity.			
Discharge to the Sacramento River	The costs associated with piping and environmental mitigation are not financially feasible given the negligible, positive environmental impact that might result.			
Change in Water Supply	Not economically feasible to find better quality water source than the existing source.			

Based on the results of the alternative controls analysis, and a detailed assessment of potential impacts to Cottonwood Creek based on various dilution scenarios the study concludes, the tertiary treated wastewater is determined to comprise best practicable treatment or control and is consistent with federal and State antidegradation policies for the following reasons:

- The Discharger's tertiary treated effluent will be discharged through a diffuser to Cottonwood Creek. Discharge through the diffuser has occurred since the facility was constructed in 1986.
- Concentrations of constituents being discharged and identified as having reasonable potential will not change by granting dilution credits and associated mixing zones.
- Measurable effects in Cottonwood Creek water quality downstream of the discharge location will not be produced, as evaluated in the Discharger's biological assessment which incorporates DFG consultation and final concurrence.
- Existing or potential beneficial uses of the receiving water will not be adversely affected, nor will water quality fall below applicable water quality objectives outside the designated mixing zones.
- Any changes in water quality immediately surrounding the diffuser will be confined to the mixing zone.
- The mixing zones are as small as practicable.

The Central Valley Water Board concurs with the antidegradation analysis provided by the Discharger. No increased flows or pollutant concentrations/loadings will occur as a result of allowing a mixing zone or dilution credit. The discharge is tertiary-level treated wastewater, which is a high level of treatment of sewage waste that is considered BPTC for most constituents in the wastewater and will result in attaining water quality standards applicable to the discharge. As part of this Order, the Discharger is required to evaluate BPTC performance on an annual basis to identify and improvements needed to maintain BPTC performance.

This Order grants mixing zones and dilution credits for several pollutants. As a condition for allowing the mixing zones and dilution credits, the Central Valley Water Board requires that Best Practicable Treatment or Control (BPTC) of these pollutants is implemented by the Discharger. The Central Valley Water Board finds, based on information in the record, including the Discharger's antidegradation analysis report, that:

BPTC for the control and removal of copper, zinc, and bis-2-ethylhexylphthalate is secondary treatment plus the use of the Facility's tertiary filters, effluent diffuser, and source control and minimization;

BPTC for the control and removal of cyanide, chlorodibromomethane, and dichlorobromomethane is secondary treatment plus the use of the Facility's tertiary filters, effluent diffuser, and automated flow/concentration-based chlorination/dechlorination system; and,

BPTC for the control and removal of ammonia and nitrate is secondary treatment plus the use of the Facility's nitrification and denitrification processes and capabilities, and effluent diffuser.

For the above reasons, the Central Valley Water Board finds that the permitted surface water discharge is consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Board Resolution No. 68-16.

Summary of Final Effluent Limitations Discharge Point No. 001

Table F-19. Summary of Final Effluent Limitations for Discharge Point No. 001

Parameter	Units	Effluent Limitations					Basis[1]
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum	
Average Dry Weather Flow	MGD	0.43	--	--	--	--	DC
Conventional Pollutants							
Biochemical Oxygen Demand, 5-day @ 20°C	mg/L	10	15	30	--	--	TTC
	lbs/day[2]	36	54	108	--	--	TTC
	% Removal	85	--	--	--	--	CFR
Total Suspended Solids	mg/L	10	15	30	--	--	TTC
	lbs/day[2]	36	54	108	--	--	TTC
	% Removal	85	--	--	--	--	CFR
pH	standard units	--	--	--	6.5	8.5	BP

Parameter	Units	Effluent Limitations					Basis[1]
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum	
Priority Pollutants							
Copper, Total Recoverable	ug/L	20.9	--	41.5	--	--	CTR
Cyanide	ug/L	20.7	--	51.5	--	--	CTR
Zinc, Total Recoverable	ug/L	77.6	--	131.3	--	--	CTR
Bis-2-ethylhexylphthalate	ug/L	3.57	--	9.56	--	--	CTR
Chlorodibromomethane	ug/L	1.53	--	3.80	--	--	CTR
Dichlorobromomethane	ug/L	8.62	--	29.6	--	--	CTR
Non-Conventional Pollutants							
Ammonia Nitrogen, Total (as N)	mg/L	13.7	--	36.5	--	--	NAWQC
Chlorine, Total Residual	mg/L	--	0.011[3]	0.019[4]	--	--	NAWQC
Nitrate Nitrogen, Total (as N)	mg/L	90	--	--	--	--	MCL
Total Coliform Organisms	MPN/100 mL	--	23[5]	500[5]	--	240[5]	Title 22

1 DC – Based on the design capacity of the Facility.
TTC – Based on tertiary treatment 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.
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 recommendations.

2 Based on a design flow of 0.43 MGD.

3 Applied as a 4-day average effluent limitation.

4 Applied as a 1-hour average effluent limitation.

5 Effluent total coliform organisms are not to exceed 23 MPN/100mL as a 7-day median, 240 MPN/100 mL more than once in any 30-day period, and 500 MPN/100mL as a daily max.

a. **Acute Whole Effluent Toxicity.** Survival of aquatic organisms in 96-hour bioassays in undiluted waste shall not be less than:

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

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 maximum contaminant levels (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, chemical constituents, color, dissolved oxygen, floating material, oil and grease, pH, pesticides, radioactivity, sediment, settleable material, suspended material, taste and odors, temperature, toxicity, and turbidity.

   a. **Ammonia.** The Basin Plan states that, "[w]*aters shall not contain un-ionized ammonia in amounts which adversely affect beneficial uses.*

   b. **Bacteria.** Cottonwood Creek has been designated as having the beneficial use of contact recreation (REC-1). For water bodies designated as having REC-1 as a beneficial use, the Basin Plan includes a water quality objective limiting the "*...fecal coliform concentration based on a minimum of not less than five samples for any 30-day period...*" to a maximum geometric mean of 23 MPN/100ml." The objective also states that "...[no] *more than ten percent of the total number of samples taken during any 30-day period [shall] exceed 240/100 ml.*" This objective is included in the Order as a receiving water limitation.

   c. **Biostimulatory Substances.** The Basin Plan includes a water quality objective that "[W]*ater shall not contain biostimulatory substances which promote aquatic growths in concentrations that cause nuisance or adversely affect beneficial uses.*" Receiving Water Limitations for biostimulatory substances are included in this Order and are based on the Basin Plan objective.

d. **Color.** The Basin Plan includes a water quality objective that "[W]*ater shall be free of discoloration that causes nuisance or adversely affects beneficial uses*." Receiving Water Limitations for color are included in this Order and are based on the Basin Plan objective.

e. **Chemical Constituents.** The Basin Plan includes a water quality objective that "[W]*aters shall not contain chemical constituents in concentrations that adversely affect beneficial uses*." Receiving Water Limitations for chemical constituents are included in this Order and are based on the Basin Plan objective.

f. **Dissolved Oxygen.** Cottonwood Creek has been designated as having the beneficial use of cold freshwater aquatic habitat (COLD). For water bodies designated as having COLD as a beneficial use, the Basin Plan includes a water quality objective of maintaining a minimum of 7.0 mg/L of dissolved oxygen. Since the beneficial use of COLD does apply to Cottonwood Creek, a receiving water limitation of 7.0 mg/L for dissolved oxygen was included in this Order.

   For surface water bodies outside of the Delta, the Basin Plan includes the water quality objective that "*...the monthly median of the mean daily dissolved oxygen (DO) concentration shall not fall below 85 percent of saturation in the main water mass, and the 95 percentile concentration shall not fall below 75 percent of saturation*." This objective was included as a receiving water limitation in this Order.

g. **Floating Material.** The Basin Plan includes a water quality objective that "[W]ater shall not contain floating material in amounts that cause nuisance or adversely affect beneficial uses." Receiving Water Limitations for floating material are included in this Order and are based on the Basin Plan objective.

h. **Oil and Grease.** The Basin Plan includes a water quality objective that "[W]*aters shall not contain oils, greases, waxes, or other materials 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*." Receiving Water Limitations for oil and grease are included in this Order and are based on the Basin Plan objective.

i. **pH.** The Basin Plan includes water quality objective that, "[T]*he pH shall not be depressed below 6.5 nor raised above 8.5.* This Order includes receiving water limitations for pH range.

j. **Pesticides.** The Basin Plan includes a water quality objective for pesticides beginning on page III-6.00. Receiving Water Limitations for pesticides are included in this Order and are based on the Basin Plan objective.

k. **Radioactivity.** The Basin Plan includes a water quality objective that *"[R]adionuclides shall not 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."* The Basin Plan states further that *"[A]t a minimum, waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of radionuclides in excess of the maximum contaminant levels (MCLs) specified in Table 4 (MCL Radioactivity) of Section 64443 of Title 22 of the California Code of Regulations..."* Receiving Water Limitations for radioactivity are included in this Order and are based on the Basin Plan objective.

l. **Sediment.** The Basin Plan includes a water quality objective that *"[T]he suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses"* Receiving Water Limitations for suspended sediments are included in this Order and are based on the Basin Plan objective.

m. **Settleable Material.** The Basin Plan includes a water quality objective that *"[W]aters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses."* Receiving Water Limitations for settleable material are included in this Order and are based on the Basin Plan objective.

n. **Suspended Material.** The Basin Plan includes a water quality objective that *"[W]aters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses."* Receiving Water Limitations for suspended material are included in this Order and are based on the Basin Plan objective.

o. **Taste and Odors**. The Basin Plan includes a water quality objective that *"[W]ater 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."* Receiving Water Limitations for taste- or odor-producing substances are included in this Order and are based on the Basin Plan objective.

p. **Temperature.** The receiving water has the beneficial uses of both COLD and WARM. The Basin Plan includes the objective that "[a]*t no time or place shall the temperature of COLD or WARM intrastate waters be* *increased more than 5ºF above natural receiving water temperature.*" This Order includes a receiving water limitation based on this objective.

q. **Toxicity**. The Basin Plan includes a water quality objective that *"[A]ll waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life."* Receiving Water Limitations for toxicity are included in this Order and are based on the Basin Plan objective.

r. **Turbidity.** The Basin Plan includes a water quality objective that *"[I]ncreases in turbidity attributable to controllable water quality factors shall not exceed the following limits:*

- *Where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), controllable factors shall not cause downstream turbidity to exceed 2 NTU.*
- *Where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU.*
- *Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent.*
- *Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs.*
- *Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent."*

A numeric Receiving Surface Water Limitation for turbidity is included in this Order and is based on the Basin Plan objective for turbidity.

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 authorizes the Central Valley Water Board to require technical and monitoring reports. The Monitoring and Reporting Program (MRP), 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 MRP for this 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 percent reduction requirements).

2. This Order retains continuous monitoring for flow and weekly monitoring for TSS and BOD_5. TDS, EC, and pH are added requirements to assess potential sources of salinity in the discharge to aid in the identification of salinity minimization measures.

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/or groundwater.

2. Effluent monitoring requirements for flow, chlorine residual, pH, temperature, EC, TDS, dissolved oxygen, BOD_5, TSS, turbidity, total coliform organisms, hardness, copper (total), zinc (total), cyanide, bis-2-ethylhexylphthalate, chloroform, bromoform, chlorodibromomethane, dichlorobromomethane, ammonia, aluminum, standard minerals, nitrate, acute and chronic toxicity, and priority pollutants have been retained from the previous order to characterize the effluent and determine compliance with applicable effluent limitations or conduct a reasonable potential analysis.

3. Monitoring data for oil and grease, and settleable solids did not demonstrate reasonable potential to exceed water quality criteria. Thus, specific monitoring requirements for these parameters have not been retained.

4. The previous order required quarterly monitoring for ammonia. Because the discharge demonstrates reasonable potential to cause an instream exceedance for ammonia, and untreated domestic wastewater contains ammonia and inadequate or incomplete nitrification may result in the discharge of ammonia to the receiving stream, effluent limitations for ammonia have been included in this Order and monitoring has been increased to monthly.

5. Effluent monitoring requirements for electrical conductivity and total dissolved solids have been increased to monthly to aid in preparation of the Salinity Evaluation and Minimization Plan required as part of this Order.

6. Results of priority pollutant effluent monitoring conducted by the Discharger indicated concentrations of aldrin, beta-BHC, and gamma-BHC may be present in effluent; however insufficient data exists to determine reasonable potential. This Order requires quarterly monitoring for aldrin, beta-BHC, and gamma-BHC to confirm the presence or absence of these constituents in effluent.

7. The previous order required effluent monitoring for total and dissolved copper and zinc. Because effluent limitations for metals, including copper and zinc, must be expressed as total recoverable, monitoring for total copper must be used to determine compliance with effluent limitations. Monitoring for dissolved copper and dissolved zinc is not necessary to determine compliance with effluent limitations. Therefore, this Order does not retain effluent monitoring requirements for dissolved copper or dissolved zinc, however the Discharger is advised that dissolved data may be useful for future studies and evaluations.

8. Priority pollutant data for the effluent has been provided by the Discharger during the permit cycle of Order No. R5-2005-0037, and was used to conduct a reasonable potential analysis. In accordance with Section 1.3 of the SIP, the Central Valley Water Board shall require periodic monitoring for priority pollutants for which criteria or objectives apply and for which no effluent limitations have been established. Periodic priority pollutant monitoring is also necessary to provide data that would account for changes in the wastewater characterization. Monitoring for priority pollutants is required once during the 3rd year and once during the 4th year of the permit term to provide the data necessary for determining the reasonable potential for those pollutants for which no WQBELs or specific monitoring were established.

C. Whole Effluent Toxicity Testing Requirements

1. **Acute Toxicity**. Quarterly acute toxicity testing as required in Order No. R5-2005-0037 in order to demonstrate compliance with the effluent limitation for acute toxicity. This monitoring requirement is retained in this Order to determine compliance with the numeric effluent limitations for acute toxicity and the Basin Plan's narrative toxicity objective.

2. **Chronic Toxicity.** Annual chronic whole effluent toxicity testing was required in Order No. R5-2005-0037 in order to demonstrate compliance with the Basin Plan's narrative toxicity objective. This monitoring requirement is retained in this Order to determine compliance with the narrative effluent limitations for chronic toxicity and 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. Order No. R5-2005-0037 established two receiving water monitoring stations: R-1, located approximately 100 feet upstream of the discharge (RSW-001) and; R-2 located approximately 100 feet downstream of the discharge (RSW-002). An additional receiving water monitoring station was established approximately 3,000 feet downstream of the discharge (RSW-003) for the purposes of evaluating potential site specific translators. This station may or may not be used for future analysis, as a site specific translator has not been adopted for this facility to date.

c. As discussed in section IV.C.2.c of this Fact Sheet, mixing zones have been granted for copper, cyanide, zinc, ammonia, nitrate, chlorodibromomethane, dichlorobromomethane, and bis-2-ethylhexylphthalate. In order to confirm that water quality criteria and objectives are met at the edge of the mixing zones, monitoring location RSW-004 through RSW-008 have been established.

d. Receiving water monitoring requirements for flow, pH, dissolved oxygen, coliform, turbidity, temperature, hardness, EC, copper and zinc at upstream Monitoring Location RSW-001 have been retained from Order No. R5-2005-0037. Flow measurements can be obtained from USGS Gauging Station 11376000 approximately 2 miles downstream of the discharge.

e. Receiving water monitoring requirements for cyanide, ammonia, aluminum, priority pollutants, and standard minerals have been added to upstream Monitoring Location RSW-001. Monitoring of these constituents is required to characterize the background water quality relative to the applicable water quality criteria and objectives. Priority pollutant monitoring will be used to evaluate reasonable potential, in the future.

f. Receiving water monitoring requirements for dissolved oxygen, pH, turbidity, temperature, electrical conductivity, fecal coliform organisms, and total residual chlorine at downstream monitoring location RSW-002 have been retained from the previous order.

g. Receiving water monitoring requirements for hardness has been added to receiving water monitoring location RSW-002 and will be used to evaluate determine the applicable water criteria for hardness-dependent metals criteria.

2. Groundwater [NOT REQUIRED]

E. Other Monitoring Requirements

1. **Biosolids Monitoring.**
Biosolids monitoring is required to ensure compliance with the biosolids disposal requirements (Special Provisions VI.C.5.b). Biosolids disposal requirements are imposed pursuant to 40 CFR Part 503 to protect public health and prevent groundwater degradation.

2. **Water Supply Monitoring.**
In order to evaluate the sources of salinity, copper, and zinc in the wastewater, this Order requires annual monitoring for electrical conductivity, total dissolved solids, dissolved copper, and dissolved zinc.

3. **Underdrain System Discharge Monitoring.** Underdrain system monitoring of flow and total and fecal coliform is required when discharging to evaluate potential impacts to groundwater beneficial uses. This requirement has been retained from Order No. R5-2005-0037.

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. **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 Toxicity Reduction Evaluation (TRE). This Order may be reopened to include a numeric 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.

b. **Total Maximum Daily Loads (TMDLs).** This Order may be reopened, and appropriate effluent limitations, or other controls, prescribed, in order to implement any TMDLs.

c. **Salinity Evaluation and Minimization Plan.** This Order requires the Discharger to prepare a Salinity Evaluation and Minimization Plan (SEMP). This reopener provision allows the Central Valley Water Board to reopen this Order for addition and/or modification of effluent limitations and requirements for salinity based on review and implementation of the SEMP.

d. **Reasonable Potential for Constituents with Insufficient Information.** This Order may be reopened, and appropriate effluent limitations added, if results from the Monitoring and Reporting Program indicate that carbon tetrachloride, aldrin, beta-BHC, or gamma-BHC is present at concentrations that have the reasonable potential to cause or contribute to an exceedance of applicable water quality criteria or objectives.

2. **Special Studies and Additional Monitoring Requirements**

a. **Annual Performance Evaluation.** As discussed in the Fact Sheet, dilution and corresponding mixing zones have been granted for copper, cyanide, zinc, nitrate, bis-2-ethylhexylphthalate, ammonia, chlorodibromomethane, and dichlorobromomethane. In order to assure, at a minimum, current facility performance is maintained for these constituents, the Discharger is required to conduct an Annual Performance Evaluation on the removal efficiency of these constituents. In conducting this evaluation, Discharger shall determine, using appropriate statistical methods and a 99% confidence level, whether pollutant concentrations are increasing, decreasing, or exhibits no change in concentration. Discharger shall submit a work plan outlining the proposed methodology and statistical analysis to the Central Valley Water Board for approval no later than **6 months after date of adoption of this Order**. The Annual Performance Evaluation Report shall be submitted to the Central Valley Water Board **by 1 January, each year**.

b. **Annual Best Practicable Treatment or Control (BPTC) Review.** As discussed in this Order, the Central Valley Water Board finds that:

BPTC for the control and removal of copper and zinc is the use of the Facility's tertiary filters, effluent diffuser, and source control and minimization;

BPTC for the control and removal of cyanide, chlorodibromomethane, and dichlorobromomethane is the use of the Facility's tertiary filters, automated flow/concentration-based chlorination/dechlorination system, and effluent diffuser; and,

BPTC for the control and removal of ammonia and nitrate is the use of the Facility's nitrification and denitrification processes and capabilities, and effluent diffuser.

In order to ensure that BPTC is fully, and optimally implemented, the Discharger shall conduct an annual review of the treatment and control measures used to implement BPTC, to determine if any modifications, maintenance, or improvements are required to maintain BPTC performance. Such modifications, maintenance, or improvements may include maintenance of filters, effluent diffuser, or other treatment processes, calibration or fine-tuning of the chlorination/dechlorination system or nitrification and denitrification processes, or modification of the source control program. A report that includes the findings of the review, and any modifications, maintenance, or improvements that are required to fully implement BPTC shall be submitted to the Central Valley Water Board **by 1 January, each year**. The Discharger shall fully, and optimally implement BPTC at all times.

c. **Salinity Evaluation and Minimization Plan (SEMP).** The Discharger shall prepare a Salinity Evaluation and Minimization Plan (SEMP) to identify sources of salinity in effluent from the Facility, and measures available to minimize the concentration and mass loading of salinity. The plan, including a proposed schedule to implement the identified minimization measures, shall be completed and submitted to the Regional Water Board within **1 year of the effective date of this Order** for approval by the Executive Officer. Following SEMP approval, the Discharger shall implement the applicable minimization measures according to the approved schedule.

d. **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 III-8.00.) Based on annual whole effluent chronic toxicity testing performed by the Discharger from December 2006 through December 2008, the discharge does not have reasonable potential to cause or contribute to an to an in-stream excursion above of the Basin Plan's narrative toxicity objective.

This provision requires the Discharger to develop a Toxicity Reduction Evaluation (TRE) Work Plan in accordance with USEPA guidance. In addition, the provision provides a numeric toxicity monitoring trigger and requirements for accelerated monitoring, as well as, requirements for TRE initiation if a pattern of toxicity has been 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 a pattern of 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 a pattern of 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 spaced every 2 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 a pattern 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 Work Plan in accordance with USEPA guidance. Numerous guidance documents are available, as identified below:

- *Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants,* (EPA/833B-99/002), August 1999.

- Generalized Methodology for Conducting Industrial TREs*, (EPA/600/2-88/070), April 1989.*

- *Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures,* Second Edition, EPA 600/6-91/005F, 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.

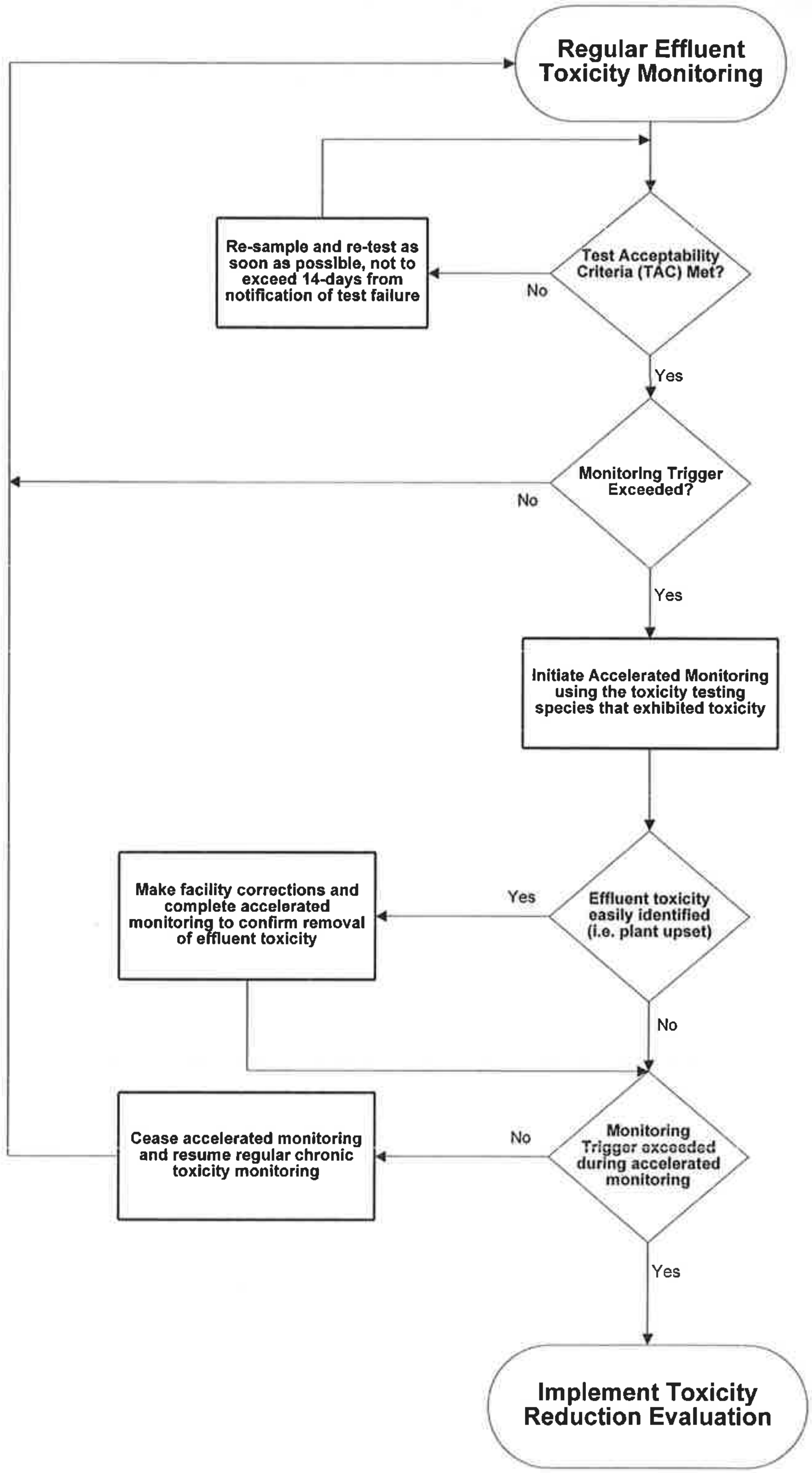
- *Methods for Aquatic Toxicity Identification Evaluations: Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity,* Second Edition, EPA 600/R-92/081, September 1993.

- *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 – Not Applicable.**

4. **Construction, Operation, and Maintenance Specifications**

   a. **Turbidity.** Operations specifications for turbidity are included 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 is capable of reliably meeting a turbidity limitation of 2 nephelometric turbidity units (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.

5. **Special Provisions for Municipal Facilities (POTWs Only)**

   a. **Pretreatment Requirements. <u>If Applicable.</u>**

      i. The Federal Clean Water Act, Section 307(b), and Federal Regulations, 40 CFR Part 403, require publicly owned treatment works to develop an acceptable industrial pretreatment program. A pretreatment program is required to prevent the introduction of pollutants, which will interfere with treatment plant operations or sludge disposal, and prevent pass through of pollutants that exceed water quality objectives, standards or permit limitations. Pretreatment requirements are imposed pursuant to 40 CFR Part 403.

      ii. The Discharger shall implement and enforce its approved pretreatment program and is an enforceable condition of this Order. If the Discharger fails to perform the pretreatment functions, the Central Valley Water Board, the State Water Board or USEPA may take enforcement actions against the Discharger as authorized by the CWA.

6. **Other Special Provisions**

   a. **Ownership Change.** To maintain the accountability of the operation of the Facility, the Discharger is required to notify any succeeding owner or operator of the existence of this Order by letter if, and when, there is any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger.

7. Compliance Schedules – Not Applicable.

VIII. PUBLIC PARTICIPATION

The California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) is considering the issuance of waste discharge requirements (WDRs) that will serve as a National Pollutant Discharge Elimination System (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. Notification was provided through direct mailing, internet posting, and physical posting at the Facility, county courthouse or city hall, and the local U.S. Post Office (if allowed).

B. Written Comments

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 Officer of the Central Valley Water Board at the address listed 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 should be received at the Central Valley Water Board offices **by 5:00 p.m. on 25 April 2010**.

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:	26/27/28 May 2010
Time:	8:30 am
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 http://www.waterboards.ca.gov/rwqcb5/ 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 Resources Control Board to review the decision of the Central Valley Water Board regarding the final WDRs. The petition must be submitted within 30 days of the Central Valley Water Board's action 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 (ROWD), 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 (530) 224-4845.

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 Bryan Smith at (530) 226-3425.

ATTACHMENT G – SUMMARY OF REASONABLE POTENTIAL ANALYSIS

Table G-1. Summary of Reasonable Potential Analysis for Discharge Point No. 001

Constituent	Units	MEC	B	C	CMC	CCC	Water & Org	Org. Only	Basin Plan	MCL	Reasonable Potential
Antimony, Total Recoverable	ug/L	0.419	0.2 J	14.0	--	--	14	4,300	--	6	No
Arsenic, Total Recoverable	ug/L	1.15	0.8	10.0	340	150	--	--	10	10	No
Beryllium	ug/L	<0.1	<0.1	--	--	--	--	--		4	No
Cadmium	ug/L	0.027	0.04	0.3	2.3	1.52	--	--	0.33		No
Chromium (III), Total Recoverable	ug/L	1.4	11.9	126.9	1,064.3	126.85	--	--	--	50	No
Chromium (VI), Total Recoverable	ug/L	2	4 J	11.0	16.00	11.00	--	--	--	50	No
Copper, Total Recoverable	ug/L	39.9	7.7	5.6	7.97	5.60	1300	--	--	1,000	Yes
Cyanide	ug/L	20	<2	5.2	22	5.2	700	220,000	10.00	200	Yes
Lead, Total Recoverable	ug/L	0.6	1.2	1.5	7.97	5.60	--	--	7.81	15	No
Mercury, Total Recoverable	ug/L	0.00334	0.0113	0.1	38.14	1.49	0.05	0.05	--	2	No
Nickel, Total Recoverable	ug/L	2.2	14.9	31.5	282.9	31.46	610	4,600	--	100	No
Selenium, Total Recoverable	ug/L	0.4	0.4 J	5.0	--	5.00	--	--	--	20	No
Silver, Total Recoverable	ug/L	0.036	0.12 J	1.5	1.45	--	--	--	11.76	100	No
Thallium	ug/L	0.004	<0.2	1.7	--	--	1.70	6.30	--	2	No
Zinc, Total Recoverable	ug/L	128	18	21.31	72.20	72.20	--	--	21.31	5,000	Yes
Bromoform	ug/L	15.1	<0.1	4.3	--	--	4.3	360	--	80	Yes
Carbon Tetrachloride	ug/L	0.3	<0.05	0.25	--	--	0.25	4.4	--	0.5	Yes
Chlorodibromomethane	ug/L	30.1	0.1 J	0.401	--	--	0.401	34	--	80	Yes
Chloroform	ug/L	58.3	<0.04	--	--	--	--	--	--	80	No
Dichlorobromomethane	ug/L	22.5	0.06 J	0.56	--	--	0.56	46	--	80	Yes
Bis (2-Ethylhexyl) Phthalate	ug/L	3	<0.7	1.8	--	--	1.8	5.9	--	4	Yes
Butylbenzyl Phthalate	ug/L	0.2	<0.4	3,000	--	--	3,000	5,200	--	--	No
Diethyl Phthalate	ug/L	0.2	<0.4	23,000	--	--	23,000	120,000	--	--	No

Constituent	Units	MEC	B	C	CMC	CCC	Water & Org	Org. Only	Basin Plan	MCL	Reasonable Potential
Aldrin	ug/L	0.043	<0.002	0.00013	--	3	0.00013	0.00014	--	--	Maybe
Beta-BHC	ug/L	0.031	<0.002	0.014	--	--	0.014	0.046	--	--	Maybe
Gamma-BHC	ug/L	0.024	<0.005	0.019	--	0.95	0.019	0.063	--	--	Maybe
Ammonia Nitrogen, Total (as N)	mg/L	NA	NA	1.72	2.14[1]	1.72[4]	--	--	--	--	Yes[5]
Electrical Conductivity @ 25°C	umhos/cm	495	243	700	--	--	--	--	700	900	No
Nitrate Nitrogen, Total (as N)	mg/L	88	0.24	10	--	--	--	--	--	10	Yes

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) USEPA National Recommended Ambient Water Quality Criteria, Freshwater Aquatic Life Protection, 1-hour Average
(2) USEPA National Recommended Ambient Water Quality Criteria, Freshwater Aquatic Life Protection, 4-day Average.
(3) The chronic criterion for the protection of freshwater aquatic life of 87 ug/L may not be applicable because receiving water conditions are not similar to those under which the criterion was developed. The discharge does exhibit reasonable potential to exceed the acute criterion for the protection of freshwater aquatic life and the secondary MCL for aluminum.
(4) USEPA National Recommended Ambient Water Quality Criteria, Freshwater Aquatic Life Protection, 30-day Average.
(5) Untreated domestic wastewater contains ammonia. 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. Therefore, ammonia in the discharge has a reasonable potential to exceed the freshwater aquatic life criteria for ammonia.
(6) Reserved.
(7) Water Quality for Agriculture.
(8) There is no reasonable potential for these parameters when evaluating data based on an annual average basis.
(9) Background concentration greater than criteria. Contaminant not detected in effluent.

APPENDIX C

NOTICE OF VIOLATION

8 April 2013

WDID 5A450001004
Inspection ID# 12046648

Mr. Randy Gillichbauer
Shasta County Department of Public Works
CSA No.17, Cottonwood WWTP
1855 Placer St.
Redding, CA 96001

CERTIFIED MAIL
7012 1640 0001 5028 6609

NOTICE OF VIOLATION, FACILITY COMPLIANCE EVALUATION INSPECTION REPORT TRANSMITTAL, WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2010-0044, NPDES PERMIT NO. CA0081507, SHASTA COUNTY SERVICE AREA NO.17, COTTONWOOD WASTEWATER TREATMENT PLANT, SHASTA COUNTY

Enclosed for your information is a copy of the NPDES Compliance Evaluation Inspection (CEI) Report for the Cottonwood Wastewater Treatment Plant (Facility), performed on 20 February 2013. The report presents thirteen (13) "Major Findings" related to required record keeping and reporting, calibration of flow meters, self-monitoring program requirements, laboratory operations, and procedures and processes for operations and maintenance. Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff has determined that the "Major Findings", as discussed in the CEI report, are violations of the subject Waste Discharge Requirements (WDRs).

The discharge of treated wastewater from the Facility is regulated by the Central Valley Water Board pursuant to WDR Order R5-2010-0044, NPDES Permit No. CA0081507. Pursuant to California Water Code (CWC) section 13385(c)(1), violations of WDRs may be subject to administrative civil liability of up to ten thousand dollars ($10,000) for each day in which a violation occurs.

Please review the attached CEI report and submit to the Central Valley Water Board by **6 May 2013 (1)** any comments/corrections regarding the CEI report and **(2)** a response to <u>each</u> "Major Finding", detailing how compliance with the WDRs will be obtained. The

response must also include an implementation schedule, where applicable, to achieve compliance with the subject violations that is as short as practicable.
If you have any questions regarding the above information, please contact Scott Gilbreath of my staff at (530) 224-4851, sgilbreath@waterboards.ca.gov, or at the footer address.

Bryan J. Smith, P.E.
Supervising Water Resource Control Engineer

SMG: lmw

Encl: 20 February 2013 Compliance Evaluation Inspection Report

cc: U.S. Environmental Protection Agency, San Francisco
SWRCB, Sacramento
C. Troy Bartolomei, Deputy Director, Shasta County Public Works, Redding
Maxwell Kuker, PG Environmental LLC, 570 Herndon, VA

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EPA Region IX and California Water Resources Control Board

NPDES Compliance Evaluation Inspection (CEI) Report

Name and Location of Facility Inspected	Entry Date	Permit Effective Date
Shasta County Service Area No. 17 Cottonwood Wastewater Treatment Plant 3425 Live Oak Road Cottonwood CA 96022	2/20/2013 **Entry Time** 9:00 AM	7/16/2010

NPDES Permit Number	Order Number		County	Permit Expiration Date
CA0081507	R5-2010-0044	☐ Major ☒ Minor	Shasta County	5/1/2015

Name(s) & Title(s) of On-Site Representative(s)	Contact Information	Notified of Inspection?
Randy Gillichbauer (Utilities Superintendent)	Phone: (530) 347-0431 Fax: (530) 347-0430 E-mail: CSA@att.net	☒ Yes ☐ No

Name, Title & Address of Responsible Official	Contact Information	Official Contacted?
Pat Minturn (Director Public Works) 1855 Placer Street Redding CA, 96001	Phone: (530) 225-5661 Fax: (530) 225-5667	☐ Yes ☒ No

Inspector(s)	Presented Credentials?
Primary: Dennis Wilson (PG Environmental, LLC) **Other(s):** Scott Gilbreath (Central Valley Water Board - Redding)	☒ Yes ☐ No

Weather Conditions at the Time of the Inspection:	Facility Receiving Water Name:
Sunny; light precipitation within the past 24 hours	Cottonwood Creek

Overview of Areas Evaluated During Inspection

S = Satisfactory, M = Marginal, U = Unsatisfactory, N = Not Evaluated

Permit: S	Flow Measurement: U	Biosolids/Solid Waste Handling & Disposal: S
Records/Reports: U	Self-Monitoring Program: U	Compliance Schedules: N
Facility Site Review: S	Laboratory: U	Pretreatment (POTWs Only): N
Effluent and Receiving Waters: S	Operations & Maintenance: U	Stormwater: N

Prepared By: Dennis Wilson (PG Environmental, LLC) on 3/3/2013

Reviewed By: Max Kuker (PG Environmental, LLC) on 3/21/2013

Report Date: 3/21/2013

Facility Narrative

On February 20, 2013 a USEPA contractor inspected the Shasta County Service Area No. 17, Cottonwood Wastewater Treatment Plant in Cottonwood, CA. Discharges from the Facility are regulated by Central Valley Water Board Order No. R5-2010-0044 (NPDES Permit No. CA0081507). The primary purpose of the inspection was to determine the accuracy and reliability of the Discharger's self-monitoring and reporting program. The primary on-site Facility representative was Randy Gillichbauer (Utilities Superintendent). A representative from the Central Valley Water Board participated in the Facility inspection.

The Shasta County Service Area (CSA) No. 17 (Discharger) owns and operates the Cottonwood Wastewater Treatment Plant (Facility). The Shasta County Department of Public Works provides oversight and management of the CSA. The Facility provides sewage service to the community of Cottonwood, CA. The primary on-site Facility representative stated there are currently 1,113 residential and small business connections to the sewer system, with an additional 134 connections in standby that have paid the connection fee but are not ready to connect. There are no Industrial Users.

The Facility provides advanced secondary level treatment of wastewater. Treatment consists of preliminary influent screening, grinding, activated sludge aeration, secondary clarification, filtration, chlorination, and dechlorination. The treated effluent is directed to Cottonwood Creek through a diffuser at Discharge Point 001. Sludge processing consists of pond stabilization and drying in on-site drying beds. Biosolids are disposed at a local landfill.

The inspectors visually evaluated the treatment train (in order from headworks to the chlorine contact basin) and site conditions in the presence of the primary on-site Facility representative and determined that all mechanical treatment units were operating and functioning properly with the exception of some solids carryover in one of the two secondary clarifiers.

The Facility's design capacity (design dry weather flow) is 0.43 million gallons per day (mgd). Average dry weather flow for the period of June 2012 through August 2012 was 0.31 mgd. The primary on-site Facility representative stated the instantaneous influent flow rate is dependent on the cyclic inflow from the pump station feeding the headworks. The instantaneous influent flow at 1:00 PM was 0.503 mgd, with the influent pump operating. At 1:05 PM the instantaneous influent flow decreased to 0.131, with the influent pump not operating. At 1:30 PM the instantaneous effluent flow was 0.219 mgd.

The Facility's operations personnel conduct self-monitoring activities. Influent samples are collected at the headworks immediately after grinding and effluent samples for Discharge Point 001 are collected after dechlorination immediately after the chlorine contact chamber. Samples for an underdrain system discharge (Monitoring Location UND-001) are collected at the underdrain discharge pipe. Sample collection locations and methods appeared to provide representative samples. All samples are analyzed at an on-site laboratory or at a contract laboratory.

Electronic self monitoring reports (eSMRs) and the "California Integrated Water Quality System (CIWQS) Violation Report" for the period of October 2012 through December 2012 were reviewed as a component of this inspection. No permit limit exceedances were identified. The evaluation also included a comparison of data points reported in the eSMRs submitted to the Central Valley Water Board against the laboratory bench sheets or contract laboratory reports documenting the actual analytical results. Discrepancies were identified and are presented in the "Major Findings – Records/Reports" section of this report.

A review of the "CIWQS Inspection Report" for inspections conducted at the Facility indicated that no compliance inspections have been conducted for the Facility since adoption of Central Valley Water Board Order No. R5-2010-0044 on May 27, 2010.

Major Findings

Records/Reports

1. Central Valley Water Board Order No. R5-2010-0044, Attachment E – Monitoring and Reporting Program, Reporting Requirements, Section X.D.3 requires submittal of an Annual Operations Report by **30 January** of each year. Section X.D.3 also requires that the Annual Operations Report shall contain the names, certification grades and phone numbers of persons employed at the Facility; a statement certifying when flow meters and other monitoring instruments and devices were last calibrated; and a statement certifying whether the current operation and maintenance manual and contingency plan reflect current operation and the dates when these documents were last revised and reviewed for adequacy. The primary on-site Facility representative stated that he was unaware of this requirement and stated that no Annual Operations Reports had been prepared since adoption of Order No. R5-2010-0044. The primary on-site Facility representative further stated that an attachment was included in the February 14, 2013 upload to the eSMR that included the grades of the operators at the Facility; however, the names and phone numbers were not included. Lastly, he also stated that the flow meters were not calibrated in 2012 and that there is no documentation that the Operation and Maintenance (O&M) Manual has been revised since its development in 1986.

2. Central Valley Water Board Order No. R5-2010-0044, Attachment E – Monitoring and Reporting Program, Effluent Monitoring Requirements, Section IV.A.1, Table E-3 requires monthly effluent monitoring at Monitoring Location EFF-001 for total recoverable copper and total recoverable zinc. The Discharger's chain-of-custody (COC) form for October 31, 2012 documented that a sample of the effluent had been collected at Monitoring Location EFF-001 for analysis of total recoverable copper and total recoverable zinc. As observed on the Discharger's contract laboratory (Basic Laboratory) results sheet for these analyses, 5.9 ug/L for total recoverable copper and 32.4 ug/L for total recoverable zinc were recorded. The October 2012 eSMR submitted by the Discharger to the Central Valley Water Board was found to not contain these results or any results for total recoverable copper and total recoverable zinc. It should be noted that both the non-reported results were in compliance with the effluent limitations for total recoverable copper and total recoverable zinc. The primary on-site Facility representative checked the data upload for the October 2012 eSMR and concurred that the total recoverable copper and total recoverable zinc results for October 31, 2012 were not included in the eSMR submitted to the Central Valley Water Board.

3. Central Valley Water Board Order No. R5-2010-0044, Attachment E – Monitoring and Reporting Program, Receiving Water Monitoring Requirements - Surface Water and Groundwater, Section VIII.A.1, Table E-8 requires weekly monitoring for DO in Cottonwood Creek at Monitoring Location RSW-002. The Discharger reported on the November 2012 eSMR a DO result of "0" mg/L for RSW-002 for a sample collected on November 15, 2012 and a result of 6.0 mg/L for RSW-002 for a sample collected on November 29, 2012 (refer to Exhibit 1). A review of the on-site laboratory results sheet revealed that the Discharger noted that the DO meter was "Not Working" on November 15, 2012; however, an analytical value of "0" mg/L was entered in the eSMR rather than "'no data available" (refer to Exhibit 2). On November 29, 2012, a result of 9.1

mg/L was recorded on the on-site laboratory results sheet for DO at RSW-002; however, an incorrect result of 6.0 mg/L was entered in the eSMR for that date (refer to Exhibit 2). It should be noted that the reporting of the incorrect results of "0" mg/L and 6.0 mg/L resulted in a reported receiving water concentration in the eSMR less in the than the receiving water quality objective of 7.0 mg/L for Cottonwood Creek, as specified in Central Valley Water Board Order No. R5-2010-0044, Receiving Water Limitations, Section V.A.5.b for the period between September 1 and May 31 of each year.

4. Central Valley Water Board Order No. R5-2010-0044, Attachment E – Monitoring and Reporting Program, Receiving Water Monitoring Requirements - Surface Water and Groundwater, Section VIII.B.1, Table E-13 requires monitoring once/month for total and fecal coliform organisms from the underdrain system discharge at Monitoring Location UND-001. The Discharger's chain-of-custody form documented that a sample had been collected on November 8, 2012 for analysis of total and fecal coliform. Basic Laboratory reported the results as 7 MPN/100 mL for total coliform and less than 2 MPN/100mL for fecal coliform. The November 2012 eSMR submitted to the Central Valley Water Board did not contain the November 8, 2012 total and fecal coliform results for Monitoring Location UND-001. The primary on-site Facility representative concurred that he missed these results from the Basic Laboratory results sheet in the data upload to the eSMR.

5. Central Valley Water Board Order No. R5-2010-0044, Attachment E – Monitoring and Reporting Program, Reporting Requirements, Section X.A.5.c requires that results less than the laboratory's Method Detection Limit (MDL) shall be reported as "Not Detected" or ND. In reviewing the October 2012 through December 2012 eSMRs submitted by the Discharger to the Central Valley Water Board it was observed by the inspector that the Discharger occasionally reports a value of "0" rather than "Not Detected" when results from the contract laboratory for BOD and TSS are less than the laboratory's MDL. It was also observed that when the results from the contract laboratory are reported as "Not Detected," the Discharger uses a "0" mg/L in the calculations for loading, resulting in a reported "0" pounds per day for BOD and TSS. The Central Valley Water Board representative attending the inspection indicated the correct method for reporting the loading would be to use the MDL for the calculation and report the loading value as less than the value calculated. The primary on-site Facility representative stated he would correct the method for calculating loadings.

6. Central Valley Water Board Order No. R5-2010-0044, Attachment D - Standard Provisions, Standard Provisions – Records, Section IV.B requires that the Discharger's records of monitoring information shall include:

    - The date, exact place, and time of sampling or measurements (40 CFR § 122.41(j)(3)(i)).
    - The individual(s) who performed the sampling or measurements (40 CFR § 122.41(j)(3)(ii)).
    - The date(s) analyses were performed (40 CFR § 122.41(j)(3)(iii)).
    - The individual(s) who performed the analyses (40 CFR § 122.41(j)(3)(iv)).

    A review of the daily on-site laboratory analysis sheets found that the individual who performs the sample collection or analysis is not recorded and that the time that samples are analyzed at the on-site laboratory is not recorded (refer to Exhibit 2). Without laboratory records indicating analysis time, it was not possible for the inspector to verify if pH and total residual chlorine were being analyzed within 15 minutes of sample collection in accordance to test procedures specified in 40 CFR Part 136. The primary on-site Facility representative stated the laboratory analysis sheet would be modified and the required sampling and analysis times would be recorded to verify holding times.

Flow Measurement

1. Central Water Board Order No. R5-2010-0044], Attachment E – Monitoring and Reporting Program, General Monitoring Provisions, Section I.D requires that "all flow measurement devices shall be calibrated at least once per year to ensure continued accuracy of the devices." The primary on-site Facility representative was unable to provide documentation that influent (Parshall flume and ultrasonic transducer), effluent (Magmeter), and underdrain system (impeller) flow meters had been calibrated within the past year. He further stated that he was not aware of this requirement for annual calibration of the flow meters and to his knowledge there are no records available at the Facility documenting that the flow meters have been calibrated since they were installed. The primary on-site Facility representative stated that a performance services agreement, which has not been created, would be required for calibration services. He further stated he would discuss the need for flow meter calibrations with the Public Works Director

Self-Monitoring Program

1. Central Valley Water Board Order No. R5-2010-0044, Attachment E – Monitoring and Reporting Program, Effluent Monitoring Requirements, Section IV.A.1, Table E-3 requires continuous monitoring at Monitoring Location EFF-001 for effluent pH, turbidity, and total residual chlorine. The primary on-site Facility representative stated that continuous analyzers to monitor effluent pH, turbidity, total residual chlorine were installed in October 2011 and have been in operation since (refer to Photo 2). These continuous analyzers monitor the effluent after dechlorination. At 1:50 PM the instantaneous effluent readings from the analyzers were 7.14 SU for pH, 1.68 NTU for turbidity, and 0.0 mg/L for total residual chlorine. The primary on-site Facility representative stated the minimum and maximum daily recorded values can be obtained from the continuous analyzers. However, the primary on-site Facility representative further stated that the results reported for pH, turbidity, and total residual chlorine in the eSMRs are from daily grab samples analyzed at the on-site laboratory rather than the results from the continuous analyzers. The primary on-site Facility representative stated he was not aware that daily minimum and maximum values could be entered into the eSMRs. He further stated that future eSMRs would contain the daily minimum and maximum recorded results from the analyzers for pH and total residual chlorine, and the daily maximum recorded result for turbidity.

2. Central Valley Water Board Order No. R5-2010-0044, Attachment E – Monitoring and Reporting Program, Other Monitoring Requirements, Section IX.B.1, Table E-14 requires annual monitoring of the municipal water supply at Monitoring Location SPL-001 for certain constituents. The primary on-site Facility representative stated that no monitoring of the municipal water supply has been conducted since adoption of Order No. R5-2010-0044. He further stated that he was aware of this requirement and was under the impression that samples collected by the Cottonwood Water District (Water District) would be sufficient to comply with this requirement. The primary on-site Facility representative produced a copy of the results from the Water District sampling in 2010 and it was observed that the analyses did not provide results for the constituents as required in Table E-14. The primary on-site Facility representative stated the annual water supply monitoring would need to be added to the contract for samples analyzed at the contract laboratory.

3. Central Valley Water Board Order No. R5-2010-0044, Attachment E – Monitoring and Reporting Program, Effluent Monitoring Requirements, Section IV.A.1, Table E-3 contains a footnote stating composite samples shall be flow proportional. The primary on-site Facility representative stated both the influent and effluent composite samplers were original equipment when the Facility was constructed in 1986 and are time based, with a 500 mL aliquot each hour. He further stated that he was aware of this requirement, but that new composite samplers with flow weighted capability cost approximately $4,000 and would need to be budgeted as part of future Facility upgrades.

4. Central Valley Water Board Order No. R5-2010-0044, Attachment D – Standard Provisions, Standard Provisions – Monitoring, Section III.B requires that monitoring must be conducted according to test procedures under 40 CFR Part 136. 40 CFR 136.3, Table II, Footnote 2 requires composite samples to be split into separate aliquots for preservation and/or analysis be maintained at less than or equal to six degrees Celsius, unless specified otherwise. It was found that influent and effluent composite samplers are refrigerated, but refrigeration was not turned on at the time of inspection since no samples were being collected. The primary on-site Facility representative did not know what the temperature setting was for the influent and effluent composite samplers. Further, it was found that the composite samplers were not equipped with a thermometer and there was no temperature log maintained; therefore, the inspector was not able to verify that collected composite samples were preserved in accordance with 40 CFR 136. The primary on-site Facility representative stated that he was not aware of this requirement, but would address this issue by placing a thermometer in the influent and effluent composite samplers and maintain a temperature log to record the temperatures during sample collection.

Laboratory

1. Central Valley Water Board Order No. R5-2010-0044, Attachment E – Monitoring and Reporting Program, General Monitoring Provisions, Provision I.B requires that "Chemical, bacteriological, and bioassay analyses of any material required by this Order shall be conducted at a laboratory certified for such analyses by the State Department of Public Health (DPH; formerly the Department of Health Services). In the event a certified laboratory is not available to the Discharger, 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 must be kept in the laboratory and shall be available for inspection by Central Valley Water Board staff. The Quality Assurance-Quality Control Program must conform to USEPA guidelines or to procedures approved by the Central Valley Water Board." Furthermore, Central Valley Water Board Order No. R5-2010-0044, Attachment E – Monitoring and Reporting Program, General Monitoring Provisions, Provision I.C requires that the Discharger "institute a Quality Assurance-Quality Control program for any onsite field measurements such as pH, turbidity, temperature and residual chlorine." A manual containing the steps followed in this program must be kept onsite 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." It was found that the Facility's on-site laboratory, which performs analyses for pH, DO, temperature, total residual chlorine, and turbidity, is not ELAP certified. Further, no approved Quality Assurance-Quality Control Program or Standard Operating Procedures (SOPs) have been developed and no equipment calibration records were available for review. The primary on-site Facility representative stated that he was unaware of this permit requirement and would request assistance from the contract laboratory for development of a Quality Assurance-Quality Control Program for the on-site laboratory.

Operations & Maintenance

1. Central Valley Water Board Order No. R5-2010-0044, Attachment D – Standard Provisions, Standard Provisions – Permit Compliance, Section I.D states that "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." It was found that the Discharger's procedures and processes to ensure that routine and preventive maintenance items are scheduled and performed on time did not appear to be adequate. The primary on-site Facility representative was unable to provide documentation showing a preventive maintenance activity schedule, or tracking sheets showing recent maintenance activities had been performed for equipment at the Facility. The primary on-site Facility representative stated that there is a record which tracks maintenance performed at the Facility; however, the only records produced during the inspection were ten years old. The primary on-site Facility representative also stated that due to the number of CSA facilities run by the operations team, maintenance activities are generally performed when other routine daily duties are completed; therefore, there is generally a backlog of needed maintenance. He further stated he would attempt to locate the more recent maintenance records for the Facility and work to improve the current maintenance management process.

Attachments:
CEI Photo Log
CEI Exhibit Log

PERMIT: **OVERALL RATING: S**

INSPECTED ITEM	EVAL
1. Current copy of Facility's NPDES permit available on site.	S
2. Correct name and mailing address of permittee identified on NPDES permit.	S
3. Facility is as described in permit.	S
4. a. Notification given to Regional Water Board of process/production modifications, collection system expansions, etc. that impacted quality/quantity of discharge or changes to the Facility or increased discharge. b. Permit modification received, if required, prior to changes.	N N
5. Recent permit modifications, amendments or compliance orders on file.	N
6. Number of discharge outfalls the same as listed in the permit.	S
7. Name of receiving waters listed correctly in the permit.	S
8. Permit status (i.e., Current, Expired, or Extended)	Current
9. Permit renewal application submitted to the Regional Water Board at least 180 days prior to the expiration date.	N
10. Other:	N

Notes:
This section was rated "satisfactory" because all checklist items reviewed were rated satisfactory.

RECORDS/REPORTS: OVERALL RATING: U

INSPECTED ITEM	EVAL
1. NPDES records maintained for the time period required (5 years): The following records and reports were requested and observed: ***- Current permit, monitoring and reporting program, and standard provisions*** ***- Latest three months of eSMRs (October 2012 through December 2012)*** ***- Flow measurement records*** ***- O&M Manuals*** ***- Spill and bypass records*** ***- Operation log books*** ***- Auxiliary power check log records*** ***- Contract laboratory records and COCs***	Yes
2. a. Did the Facility document any spills or bypasses during the period reviewed? b. Spills and bypasses reported and documented as required by the permit (i.e., as soon as possible, but no later than 24 hours from the time the permittee first became aware of the circumstances). c. Follow-up written documentation given as required by the permit (within 5 days in most cases). ***Central Valley Water Board Order No. R5-2010-0044 regulates the Facility and the associated collection system. No spills were documented to have occurred at the Facility. Collection system records were not reviewed.***	No No N

RECORDS/REPORTS: **OVERALL RATING: U**

INSPECTED ITEM	EVAL
3. Discharge monitoring report (DMR) and/or self monitoring report (SMR) evaluation:	
a. The responsible person or designee signs and certifies the DMRs and/or SMRs.	S
b. The Facility monitors more frequently than required by the permit.	Yes
c. All data collected are summarized on the DMRs and/or SMRs.	U
d. Data reported on DMRs and/or SMRs is consistent with analytical results.	U
e. Coliform concentrations calculated as required by the permit (e.g., median, geometric mean).	S
f. Numerical values for minimum detection limits are reported on DMRs and/or SMRs when laboratory reports "Not Detected" or "0" (for example, MDL= 3, Report: "<3" on DMR).	U
g. "Less than values" properly carried through loading calculations.	U
h. Flow measurement period used for loading calculations brackets the sampling period.	S
i. Influent and/or effluent loading rates properly calculated; if required.	S
j. Number Exceeding (N.E.) properly reported on all DMRs and annual reports.	N
eSMRs, not DMRs, were reviewed as a component of this inspection. ***3b. The permit requires effluent monitoring once per week for total coliform. The primary on-site Facility representative stated that three samples for effluent total coliform are collected and analyzed per week. He further stated that all the results are submitted to the Central Valley Water Board in the monthly eSMRs.*** ***3c. The Discharger sampled for total recoverable copper and total recoverable zinc on October 31, 2012 and the samples were analyzed at the contract laboratory; however, the Discharger did not report the monthly results in the October 2012 eSMR. Also, the Discharger failed to report the results for total and fecal coliform for Monitoring Location UND-001 on the November eSMR for samples collected on November 8, 2012. Refer to the "Major Findings - Records/Reports" section of this report for details.*** ***3d.The Discharger reported incorrect DO results from the laboratory analysis sheet for November 15 and 29, 2012 on the November eSMR. Refer to the "Major Findings - Records/Reports" section of this report for details.*** ***The Discharger reported a result for November 8, 2012 for pH at Monitoring Location RSW-001 as 73 SU on the November eSMR. The result recorded on the on-site laboratory analysis sheet was 7.3 SU. The primary on-site laboratory representative stated he would double check for decimal points on future eSMRs.*** ***3f. and 3g. The Discharger reports sample results for BOD and TSS less than the laboratory's MDL as "0" and carries the "0" value over to calculate loadings. Refer to the "Major Findings - Records/Reports" section of this report for details.***	

RECORDS/REPORTS: **OVERALL RATING: U**

INSPECTED ITEM	EVAL
4. Reports completed in the timeframe and with the frequency required by the permit (not all reports required for all facilities):	
a. DMRs and/or SMRs	S
b. Biosolids Monitoring Reports	S
c. Biosolids Management Reports	N
d. CSO/ I&I Reports	N
e. Compliance Schedule Reports	N
f. Pretreatment Reports	N
g. Other:	N
4b. Central Valley Water Board Order No. R5-2010-0044 does not require submittal of an Annual Biosolids Report. The primary on-site Facility representative stated that the chemical analysis required for disposal of biosolids at the Anderson Landfill are conducted and manifests for disposal at the Anderson Landfill are maintained at the Facility.	
4d. The collection system and associated records were not reviewed during the inspection.	
5. Sampling and analytical records (for water and biosolids) include:	
a. Dates, times, and location of sampling	S
b. Names of individuals performing sampling	U
c. Analytical methods	S
d. Results of analyses	S
e. Dates of analyses	S
f. Times of analyses, as necessary to verify holding times	U
g. Analysts' names or initials	U
h. Instantaneous flow at grab sample stations, if required	N
5b. Review of the sampling records indicated the name of the individual collecting a sample is not recorded on the on-site laboratory analysis sheets. Refer to the "Major Findings - Records/Reports" section of this report for details.	
5f. Time of analysis is not recorded on the on-site laboratory analysis sheets to verify holding time. Refer to the "Major Findings - Records/Reports" section of this report for details.	
5g. Analysts' name(s) or initial(s) is not recorded on the on-site laboratory analysis sheets. Refer to the "Major Findings - Records/Reports" section of this report for details.	

S = Satisfactory, M = Marginal, U = Unsatisfactory, N = Not Evaluated/Not Applicable

RECORDS/REPORTS: **OVERALL RATING: U**

INSPECTED ITEM	EVAL
6. Plant records include: a. Daily plant operational records or log book b. Equipment maintenance records and schedules c. CSO/lift station check records or log book d. Records of auxiliary power checks e. Spill Prevention Control and Countermeasure (SPCC) plan f. Pollution Prevention Plan (P3) g. Stormwater Pollution Prevention Plan (SWPPP) h. Influent and/or effluent flow measurement records maintained for the past three years i. Other: ***6b. The primary on-site Facility representative was unable to provide maintenance records and schedules for the past 10 years. This checklist item is accounted for in the "Operations and Maintenance" section of this report.***	 S U N S N N N S N
7. All records and reports required by the permit appear to be organized and available for inspection. ***The following records were requested but were not available for review:*** ***- 2012 Annual Report. Refer to the "Major Findings - Records/Reports" section of this report for details*** ***- Flow meter calibration records. This checklist item is accounted for in the "Flow Measurement" section of this report.*** ***- Maintenance records. This checklist item is accounted for in the "Operation and Maintenance" section of this report.***	U
8. Other:	N

Notes:
This section was rated "unsatisfactory" due to checklist items 3c., 3d., 3f., 3g., 5b., 5f., 5g. and 7. Maintenance records were accounted for in the "Operations and Maintenance" section of this report. Flow meter calibration records were accounted for in the "Flow Measurement" section of this report.

FACILITY SITE REVIEW: **OVERALL RATING: S**

INSPECTED ITEM	EVAL
1. All treatment units and supporting equipment are in service and functioning properly mechanically. ***The Facility's treatment train consists of the following:*** ***- One manually cleaned bar screen (not in use). The primary on-site Facility representative stated the bar screen is not used unless the grinder is off line.*** ***- One grinder (in use) (refer to Photo 3). The primary on-site Facility representative stated the grinder runs continously. He further stated the grinder bearings were worn and in need of replacement and that the new bearings had been ordered.*** ***- Parshall flume for influent flow measurement is located after screening and grinding (refer to Photo 4).*** ***- Two oxidation ditches (both in use). The primary on-site Facility representative stated that the aerators are operated 24-hours per day.*** ***- Two secondary clarifiers (both in use). Solids carryover was observed in one of the clarifiers at the overflow weir (refer to Photo 5). The other clarifier appeared to be functioning properly (refer to Photo 6).*** ***- One traveling bridge sand filter (in use) (refer to Photo 7). The primary on-site Facility representative stated that the sand media in the traveling bridge filter was replaced in October 2011.*** ***- Chlorine contact chamber (gaseous chlorine is used for disinfection). The channels of the chlorine contact basin appeared to have a green coloration (refer to Photo 8). The primary on-site Facility representative stated that the chlorine residual is measured in each channel daily and the residual is maintained at 7 mg/L which should be sufficent to control algal growth. He further stated that compliance with the total coliform limitation is achieved in the last channel (refer to Photo 8 for coliform monitoring location).*** ***- Sulfur dioxide is used for dechlorination.*** ***The primary on-site Facility representative stated that the dosing control systems for chlorination and dechlorination had been replaced and upgraded in October 2011 (refer to Photos 9 and 10).*** ***The Facility's solids handling process consists of the following:*** ***- Two aerated sludge settling basins.*** ***- Three on-site concrete lined sludge drying beds (refer to Photo 11).***	M
2. Hydraulic and organic loadings are consistent with the fact sheet and plant design criteria. a. Are there signs of overloading to the Facility and collection system, including I&I and septage loading?	S S
3. Peak flows remain within the established plant capacity. a. If flows have exceeded capacity, has the Regional Water Board been notified?	S N
4. Lift stations are properly monitored, maintained, have a backup power source and are not subject to chronic spills and/or overflows. ***Lift stations in the collection system were not reviewed as a component of this inspection.***	S
5. Odors are adequately controlled, resulting in limited complaints.	S

FACILITY SITE REVIEW: **OVERALL RATING: S**

INSPECTED ITEM	EVAL
6. Residual chlorine monitoring is well documented and sampling/monitoring is representative of the discharge.	U
a. If a UV system is used, the dosage intensity, tubes, and alarms are adequate, maintained and documented.	N
The Discharger does not report results for total residual chlorine at Monitoring Location EFF-001 from the continuous analyzer as required in the permit. This checklist item is accounted for in the "Self-Monitoring Program" section of this report.	
7. Housekeeping procedures are adequate to prevent release of pollutants to the environment:	
a. Adequate dikes and secondary containment	S
b. Spill containment and clean-up	S
c. Signs of spillage to soil, groundwater, or surface water	S
d. Stormwater and leachate management from storage piles	N
e. Leaking pipes, pumps, etc.	S
f. Drum and chemical storage areas	M
g. Minimization of pollutants entering stormwater outfalls	S
h. Other open dumps or debris piles	N
i. Other:	N
7f. Spillage was noted at the soda ash storage location in the dechlorination room (refer to Photo 12). Soda ash is added to effluent for pH control.	
8. Signs of tank deterioration and/or settlement.	S
9. Safety concerns are present that may interfere with proper operation, maintenance, and/or monitoring.	S
10. Material Safety Data Sheets (MSDS) are available for stored chemicals.	S
11. Equipment available for spill cleanup and containment.	S
12. Other:	N

Notes:
This section was rated "satisfactory" because the inspector did not believe that checklist items 1. (solids carryover) and 7f. were significant enough to downgrade the overall rating to marginal. Checklist item 6. was accounted for in the "Major Findings - Self-Monitoring Program" section of this report.

EFFLUENT AND RECEIVING WATERS: **OVERALL RATING: S**

INSPECTED ITEM	EVAL
1. Recent DMR and/or SMR history (last 3 months) (outfall number(s) ***001***):	
a. Violations of discharge limits	S
b. Spills/bypasses	S
c. Fish kills or other receiving water impacts	S
d. WET testing results are in accordance with the permit	S
e. If effluent limit violations have been identified, what actions has the Facility taken to eliminate or reduce their recurrence?	N
2. DMR and/or SMR spot check ***October 2012 through December 2012*** conducted for the months of:	
a. Internal lab sheets and contract lab results properly transferred to DMRs	U
b. Monthly average, weekly, maximum, etc., values correctly calculated per the permit	S
c. Influent and effluent loadings reported	M
d. DMR and/or SMR accurate and complete for each outfall	U
2a. Transcription errors were identified and were accounted for in the "Records/Reports" section of this report. ***2c. Effluent loadings were accounted for in the "Records/Reports" section of this report.*** ***2d. Results of analyses not reported on the eSMR from the laboratory analysis sheets were accounted for in the "Records/Reports" section of this report.***	
3. Appearance of effluent during inspection:	
a. The effluent(s) was viewed during the inspection	Yes
b. Excessive foam, scum, or sheens present	S
c. Cloudy and/or color	M
d. Excessive solids	S
e. Other:	N
The secondary effluent was viewed at the chlorine contact chamber (refer to Photo 8). ***3c. Effluent appeared to have a green coloration indicating possible algal growth (refer to Photo 8). However, results for effluent total coliform reported in the eSMRs reviewed indicated compliance with the total coliform effluent limitations.***	

EFFLUENT AND RECEIVING WATERS: OVERALL RATING: S

INSPECTED ITEM	EVAL
4. Appearance of receiving water(s) during inspection:	
a. The receiving water(s) was viewed during the inspection	No
b. Distinctly visible foam or sheens on receiving water	N
c. Biosolids accumulation or deposits of solids below discharge point(s)	N
d. Distinctly visible plume from discharge(s) to receiving water	N
e. Discharge creates objectionable odor at or near receiving water(s)	N
f. Other:	N
The Facility discharges to Cottonwood Creek approximately 0.5 miles from the Facility and access to Discharge Point 001 is through private property by dirt road. Therefore, the receiving water was not able to be viewed due to poor dirt road condition from rainfall the previous day.	
5. Other:	N
Notes: ***This section was rated "satisfactory" because checklist items 2a., 2c., and 2d. were accounted for in the "Records/Reports" section of this report. Checklist item 3c. (green coloration) was not considered signficant enough to downgrade the overall rating to marginal since the reported total coliform results are in compliance with the effluent limitations.***	

FLOW MEASUREMENT: OVERALL RATING: U

INSPECTED ITEM	EVAL
1. Flow measurement devices and methods: **Influent Measurement:** Primary Device: *Parshall flume* Secondary Device: *Ultrasonic transducer* **Effluent Measurement:** Primary Device: *Magmeter* Secondary Device: *N/A* Other method of estimating flow: *N/A* ***The influent Parshall fume is part of the original construction of Facility in 1986 (refer to Photo 4). The primary on-site Facility representative stated that a new effluent flow meter (Magmeter) was installed in October 2011.*** ***Central Valley Water Board Order No. R5-2010-0044 also requires flow measurement of the underdrain system (Monitoring Location UND-001). The primary on-site Facility representative stated an Impeller Meter has been placed in the underdrain system outfall pipe and total flow is recorded weekly (refer to Photo 13).***	 S S S N N
2. Flow measurement devices designed to meet permit requirements ("continuous measured," "continuous record," etc.).	S
3. Flow measurement location is representative of the actual discharge (considering return and bypass lines, etc.). ***The primary on-site Facility representative stated that the return flows from the on-site restroom, filter backwash, return activated sludge, sludge drying beds, and chemical analyzers are returned to an on-site drainage pump station and pumped to the headworks downstream of the influent flow meter. None of the return flows are measured.***	M
4. Flumes: a. Approach channel straight for at least 10 times the maximum head height in flume b. Flow enters flume evenly distributed across the channel and free of turbulence, boils, or other disturbances c. The flume is clean and free of debris or deposits d. All flume dimensions appear accurate, level, and plumb e. Flume head is being measured properly f. Flume is appropriately sized to measure the existing range of flows g. No obstructions downstream causing inaccurate flow measurement due to excessive "submergence" in flume h. Proper flow tables being used ***4b. Influent flow through the flume is cyclic depending on whether the influent pump is on or off. Because of the on/off pumping cycle, the flow through the flume varies and did not appear to be evenly distributed due to turbulence.***	 N M S N N N N N

FLOW MEASUREMENT: **OVERALL RATING: U**

INSPECTED ITEM	EVAL
5. Weirs:	
a. Approach channel straight for at least 10 times the maximum head height	N
b. Flow in the approach channel is evenly distributed and free of turbulence, boils, or other disturbances	N
c. No solids accumulation in the bottom of the approach channel	N
d. Weir crest is located at least two times the maximum head height off the floor of the flow channel	N
e. The weir plate is level, plumb and without distortions	N
f. Weir is beveled on downstream side if plate is > 1/8 inch thick	N
g. No leakage around the weir plate	N
h. Measuring point located at least 3 times the maximum head height behind (upstream of) the weir	N
i. There is free-fall and access for air below the nappe of the weir (i.e., water doesn't cling to the weir plate)	N
j. Weir sized properly to measure the existing range of flows	N
k. Proper flow tables being used for weir type and size	N
6. Secondary flow device properly installed and maintained, and operating without interference from foam, turbulence, webs, etc. ***Influent flow is cyclic and it is possible interference due to turbulence may occur.***	M
7. Date of last flow meter calibrations: **Influent**:	U
Performed by: N/A	
Effluent:	U
Performed by: N/A ***The primary on-site Facility representative stated that there are no records that the influent, effluent, and underdrain flow meters have been calibrated since installation. Refer to the "Major Findings - Flow Measurement" section of this report for details.***	
8. Calibration checks by plant personnel routinely performed.	N
9. Calibration records (external and internal checks) maintained.	N
10. Other:	N
Notes: ***This section was rated "unsatisfactory" due to checklist item 7.***	

S = Satisfactory, M = Marginal, U = Unsatisfactory, N = Not Evaluated/Not Applicable

SELF-MONITORING PROGRAM: OVERALL RATING: U

INSPECTED ITEM	EVAL
1. Sampling locations, type, methods, and frequencies conform to the NPDES permit for all required samples (including influent, effluent, biosolids, receiving stream, etc.). ***Sampling locations conform to the permit for all required samples; however, type and frequencies for pH, turbidity, and total residual chlorine do not conform. The permit requires continuous monitoring for pH, turbidity, and total residual chlorine. The Facility has continuous analyzers for pH, turbidity, and chlorine; however, the Discharger reports the results from daily grab samples analyzed in the on-site laboratory in the eSMRs, not minimum and maximum results from continuous measurements. Refer to the "Major Findings - Self-Monitoring Program" section of this report for details.*** ***The permit requires an annual sample for the municipal water supply at Monitoring Location SPL-001. No monitoring results were available for review for the water supply monitoring. Refer to the "Major Findings - Self-Monitoring Program" section of this report for details.***	U
2. Sampling locations and methods provide representative samples. a. Grab samples are collected during peak flow conditions rather than low-stress conditions b. Composite sampling procedures comply with the permit (time vs. flow weighted) c. Other: ***2b. The primary on-site Facility representative stated composite samples are time weighted composite samples; however, the permit requires flow proportional composite samples. Refer to the "Major Findings - Self-Monitoring Program" section of this report for details.***	 S U N
3. Automatic samplers and other sampling equipment are properly cleaned.	S
4. Samples are preserved using methods listed in 40 CFR, Part 136 (e.g., chilled, acidified). ***Composite samplers are refrigerated; however, there is no thermometer or temperature log to verify the internal temperature. Refer to the "Major Findings - Self-Monitoring Program" section of this report for details.***	U
5. Sample containers are as listed in 40 CFR, Part 136.	S
6. Chain of custody is maintained and documented.	S
7. Samples are collected using approved protocols: a. Coliform samples are collected directly into sterilized containers b. BOD samples are collected prior to disinfection or reseeded c. Oil and grease samples are collected directly into glass containers d. Other:	 S S N N
8. Other:	N
Notes: ***This section was rated "unsatisfactory" due to checklist items 1., 2b., and 4.***	

LABORATORY: **OVERALL RATING: U**

INSPECTED ITEM	EVAL
1. Onsite laboratory is ELAP-certified. a. List parameters analyzed at the onsite laboratory that are used for DMR reporting: ***pH, temperature, DO, turbidity, and total residual chlorine*** b. List additional parameters analyzed for internal monitoring and process control: ***N/A***	No
2. EPA-approved analytical methods are used by the onsite laboratory.	S
3. Adequate equipment and procedures used for on-site analyses: a. BOD and CBOD b. TSS c. pH d. Dissolved oxygen e. Residual chlorine f. Temperature g. Other: ***Turbidity***	 N N S S S S S
4. Onsite laboratory records include: a. Laboratory SOPs b. Calibration and maintenance of equipment c. Equipment operating instructions and manuals ***4a. The on-site laboratory is not certified and no QA\QC program was in place. Also, no laboratory SOPs were in place for the on-site laboratory analyses. Refer to the "Major Findings - Laboratory" section of this report for details.*** ***4b. The primary on-site Facility representative stated the pH, DO, chlorine, and turbidity meters are calibrated according to the equipment manual specifications; however, calibration records were not available for review. Refer to the "Major Findings - Laboratory" section of this report for details.***	 U U S
5. Adequate spare parts and supplies for onsite analyses.	S
6. Results of latest external DMR QA or WP study are available and are acceptable. Date of last report: / / ***The Facility does not participate in the DMR QA program.***	N
7. Satisfactory refrigeration in use.	S
8. Certified contract laboratory(s) being used:	S

S = Satisfactory, M = Marginal, U = Unsatisfactory, N = Not Evaluated/Not Applicable

LABORATORY: **OVERALL RATING: U**

INSPECTED ITEM		EVAL
Laboratory Name: ***Basic Laboratory, (ELAP No. 1677)*** Visited? ***No*** Address: ***2218 Railroad Ave.*** ***Redding, CA 96001*** Phone: ***(530) 243-7234*** Parameters: ***Acute toxicity, BOD, TSS, TDS, total coliform, ammonia, metals, hardness, organics, and priority pollutants***	Laboratory Name: ***Sierra Foothill*** Visited? ***No*** Address: ***255 Scottsville Blvd.*** ***Jackson, CA 95642*** Phone: ***(209) 223-2800*** Parameters: ***Chronic toxicity***	
9. EPA-approved analytical procedures are identified on contract lab report.		S
10. Holding times are being met by onsite and/or contract laboratory. a. pH measured in situ or within 15 minutes of sample collection. b. Residual chlorine measured in situ or within 15 minutes of sample collection. ***10a. The Discharger has been reporting effluent pH results from daily grab samples instead of from the continuous analyzer. This item was accounted for in the "Major Findings - Self-Monitoring Program" section of this report. Also, analysis time for pH is not recorded to determine if holding time is being met. This item was accounted for in the Records/Reports section of this report.*** ***10b. The Discharger has been reporting effluent total residual chlorine results from daily grab samples instead of from the continuous analyzer. This item was accounted for in the "Major Findings - Self-Monitoring Program" section of this report. Analysis time for total residual chlorine is not recorded to determine holding time. This item was accounted for in the "Major Findings - Records/Reports" section of this report.***		 U U
11. Other:		N
Notes: ***This section was rated "unsatisfactory" due to checklist items 4a. and 4b. Checklist items 10a. and 10b were accounted for in the "Self-Monitoring Program" and "Records/Reports" sections of this report, respectively.***		

OPERATIONS AND MAINTENANCE: OVERALL RATING: U

INSPECTED ITEM	EVAL
1. Preliminary treatment units (bar screens, comminuters, grit channels, etc.) properly maintained with wastes properly disposed. ***The primary on-site Facility representative stated that the bearings where in need of replacement on the headworks grinder. He further stated that the bearings have been ordered but could not state when the work would be performed.***	S
2. Adequate oxygen maintained in aerated treatment systems.	S
3. No operational problems caused by hydraulic "short-circuiting" in treatment units.	S
4. Biosolids wasting/return rates adequate to maintain system equilibrium.	S
5. Operation and Maintenance (O&M) Manuals and supporting information organized and maintained for use: a. Plant O&M Manual b. Equipment manuals c. Plant engineering drawings d. Collection system drawings available or in development e. Maintenance records/costs ***5a. The primary on-site Facility representative stated the O&M Manual has not been updated since the Facility was constructed in 1986.*** ***5e. Records of maintenance performed were not available for review. Refer to the "Major Findings - Operations and Maintenance" section of this report for details.***	 M N N N U
6. Routine and preventive maintenance items are scheduled and performed on time. ***Refer to the "Major Findings - Operations and Maintenance" section of this report for details.***	U
7. The amount of maintenance activities and parts in backlog is acceptable. ***Refer to the "Major Findings - Operations and Maintenance" section of this report for details.***	U
8. Operational problems contributing to plant upset, excessive odors, effluent violations, etc.	S

OPERATIONS AND MAINTENANCE: **OVERALL RATING: U**

INSPECTED ITEM	EVAL
9. Level of operator certification as required by the permit and staffing level as specified in O&M Manual. ***The Facility is rated as a Class III facility. The Facility is typically staffed a minimum of two hours per day, seven days per week. Facility operations are controlled and monitored manually.*** ***The operations team consists of the following:*** ***- Three Grade III*** ***- One Grade II*** ***- One Grade I*** ***The primary on-site Facility representative stated that the operations team is also responsible for the operation and maintenance of the Palo Cedro Wastewater Treatment Plant (CSA#8), the Alpine Meadows Water and Wastewater system (CSA#13), six Shasta County CSA water treatment systems, and two County septage pond sites. He further stated that staffing at the Facility varies as needed each day; however, operators are at the Facility at least two hours per day.***	M
10. Auxiliary power available as required by the permit and operates the necessary treatment units. ***Power for the Facility is typically supplied by Pacific Gas and Electric (PG&E). In the event that power cannot be supplied by PG&E, one diesel powered emergency generator is available and has the capability to run all essential Facility processes. In addition, the main Facility pump station has its own diesel powered generator and one collection system pump station (Crowley Creek Pump Station) has its own diesel powered generator. The primary on-site Facility representative stated that the three generators are checked and tested weekly.***	S
11. Alarm systems for power and equipment failure. ***Cal Safety Alarm Company is immediately notified of alarms and calls the Facility operator on call in the event of power or equipment failure.***	S
12. Treatment control procedures are established for emergencies.	S
13. Hydraulic surges are handled without excessive solids wash-out or bypasses.	S
14. Spare pumps and parts readily available. ***Major parts are ordered as needed. The primary on-site Facility representative stated that the recording equipment for flow and residual chlorine located in the control room is out of date and parts are no longer available.***	M
15. Facility appears to be well operated and maintained. ***Due to the number of CSA facilities the operations team is responsible for, work schedules are priority based and as a result some maintenance activities are backlogged.***	M
16. Other:	N
Notes: ***This section was rated "unsatisfactory" due to checklist items 5e., 6. and 7.***	

S = Satisfactory, M = Marginal, U = Unsatisfactory, N = Not Evaluated/Not Applicable

BIOSOLIDS/SOLID WASTE HANDLING AND DISPOSAL: OVERALL RATING: S

INSPECTED ITEM	EVAL
1. Biosolids/solid waste disposal/reuse method(s) (e.g., land application, landfill, etc.): ***Grit and screenings are hauled to a local landfill and biosolids are processed on site and hauled to the same landfill for disposal.***	S
2. Biosolids/solid waste disposal/reuse location(s): ***Anderson Landfill, Anderson, CA.***	S
3. The above processes are in accordance with the permit.	S
4. Storage at Facility: a. Adequately sized for periods of inclement weather b. Controls leachate, runoff, and public access	 S S
5. Recent analytical results for metals (biosolids) are within permit limits.	S
6. Biosolids land application records include: a. Farm maps and land owner agreements b. Soil nutrient analyses done within the last year for active sites c. Records showing loading rate to each site d. Pathogen/Vector reduction records (pH or temperature logs, etc.)	 N N N N
7. Other:	N
Notes: ***This section was rated "satisfactory" because all checklist items reviewed were rated satisfactory.***	

Shasta County Service Area No. 17 – Cottonwood Wastewater Treatment Plant
(NPDES No. CA0081507) Photo Log
Inspected by: Dennis Wilson (PG Environmental, LLC) and
Scott Gilbreath (Central Valley Water Board - Redding)

Photo 1: Facility entrance.

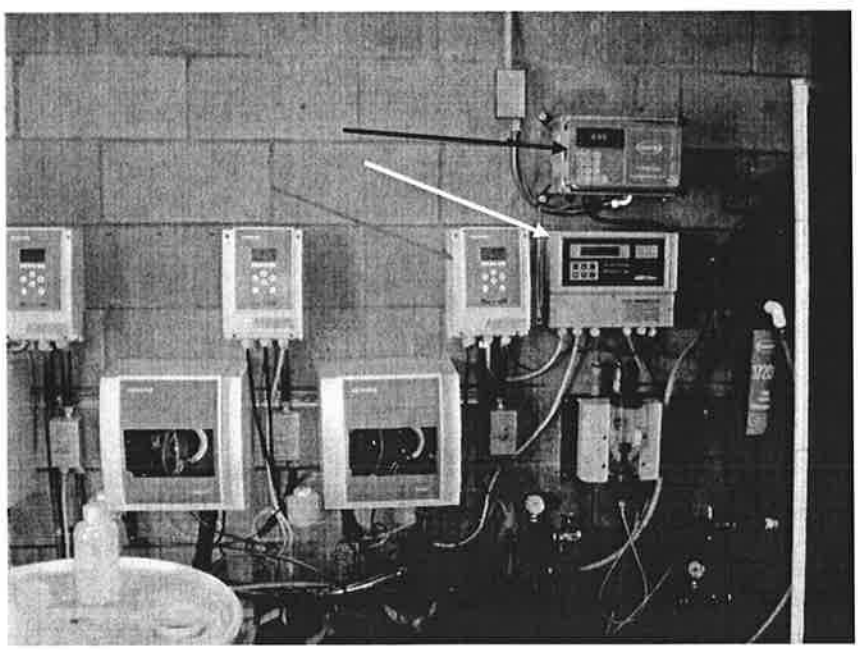

Photo 2: New effluent continuous analyzers installed in October 2011 for turbidity (black arrow), pH (yellow arrow), and total residual chlorine (red arrow).

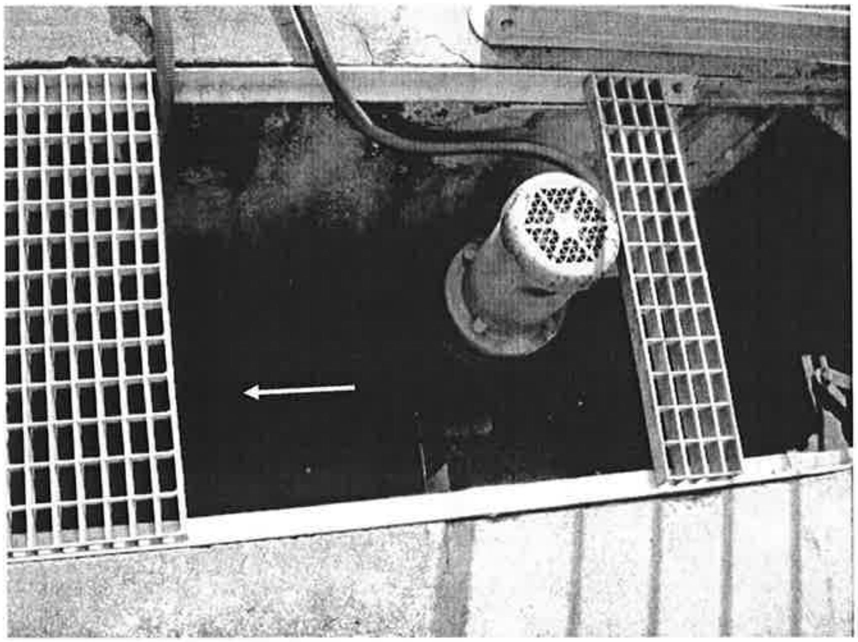

Photo 3: Grinder located at the Facility headworks. Direction of flow to the Parshall flume and oxidation ditches shown by yellow arrow.

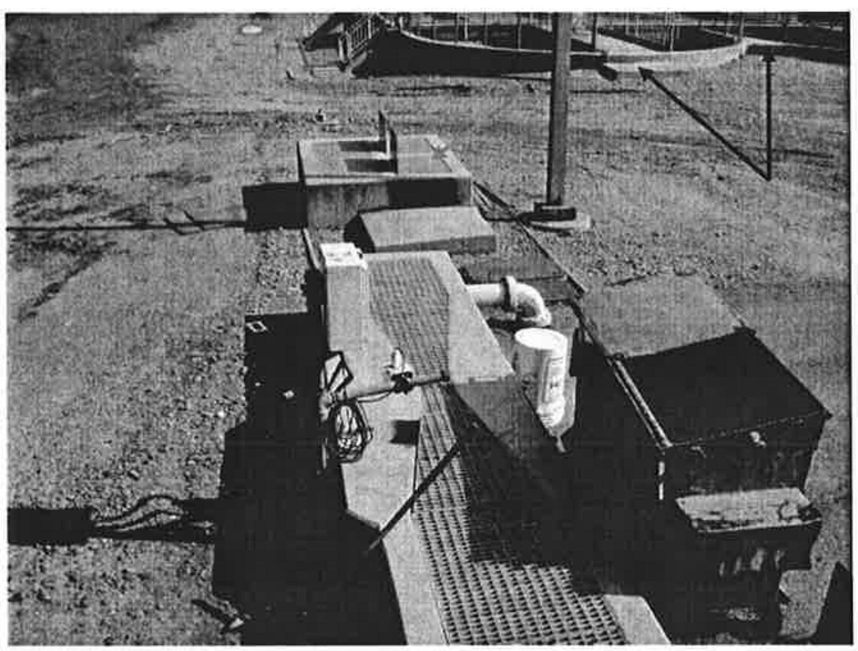

Photo 4: Influent Parshall fume. Splitter box for flow to oxidation ditches (red arrow). Two oxidation ditches (black arrows).

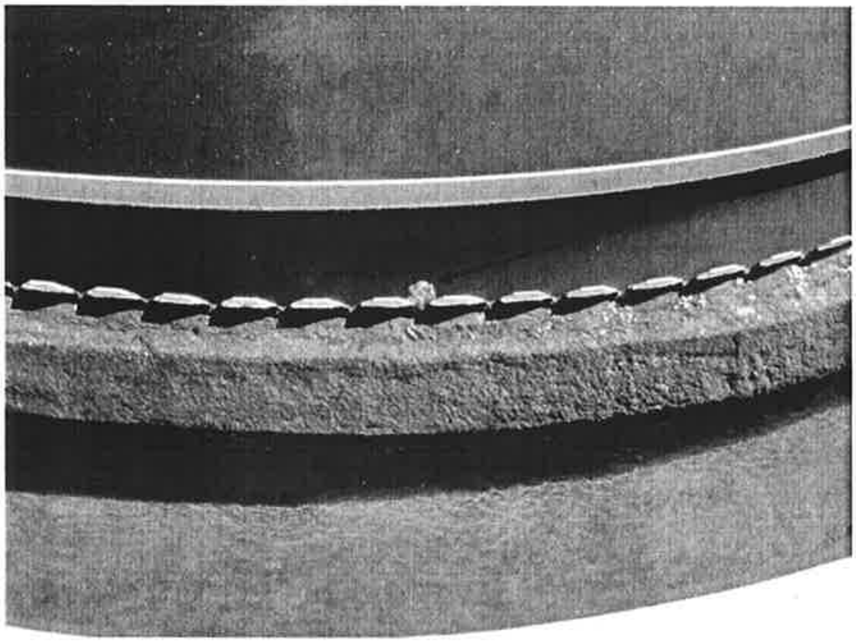

Photo 5: Solids carryover observed at the secondary clarifier weirs in one of the two clarifiers (black arrows).

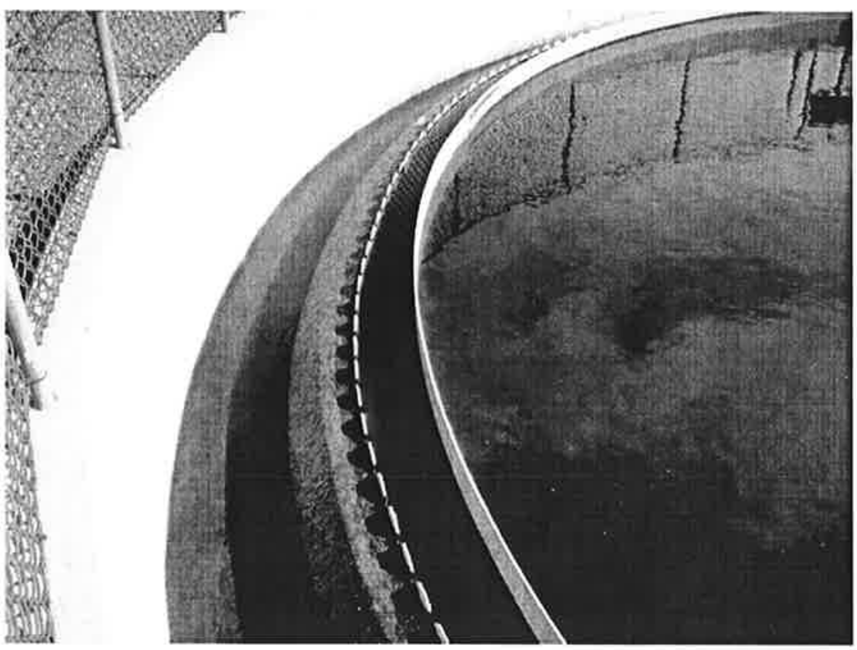

Photo 6: Second of two secondary clarifiers appeared to be functioning properly with no solids carryover.

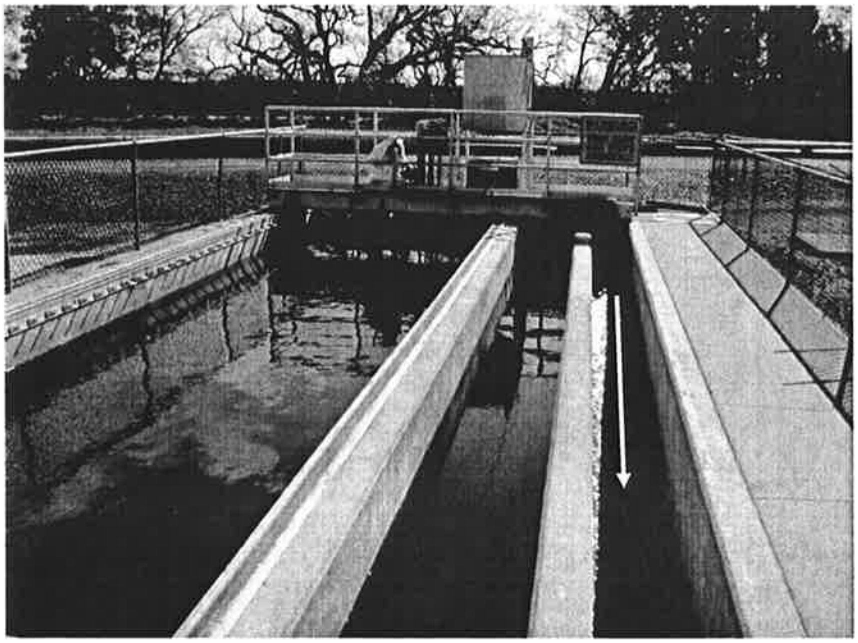

Photo 7: Traveling bridge sand filter. Sand filter was in a backwash cycle at the time of site review. Backwash flow is diverted to the on-site drainage pump station (yellow arrow).

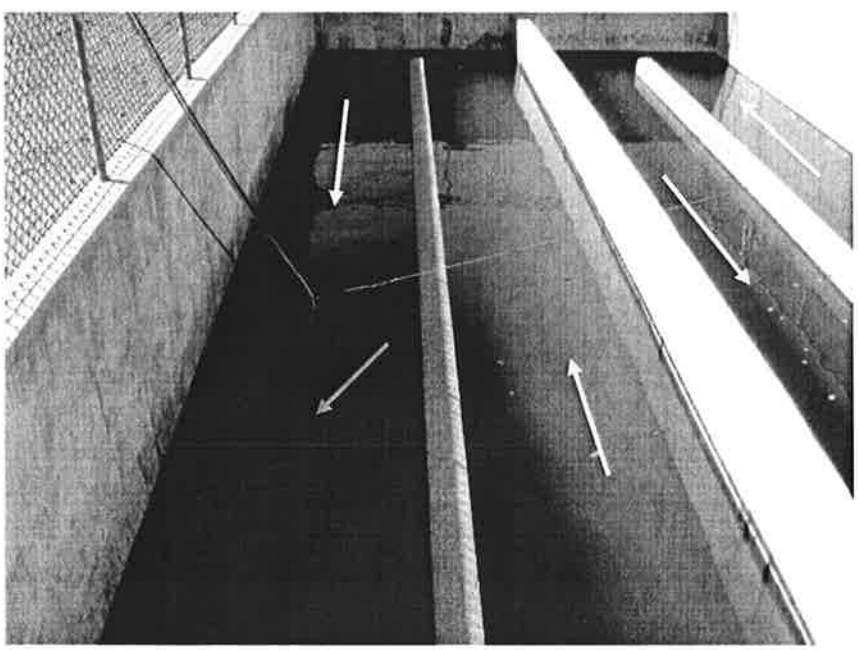

Photo 8: Chlorine contact chamber with direction of flow shown by yellow arrows. Note green coloration. Sampling location in final chlorine contact channel for total coliform organisms shown by red arrow.

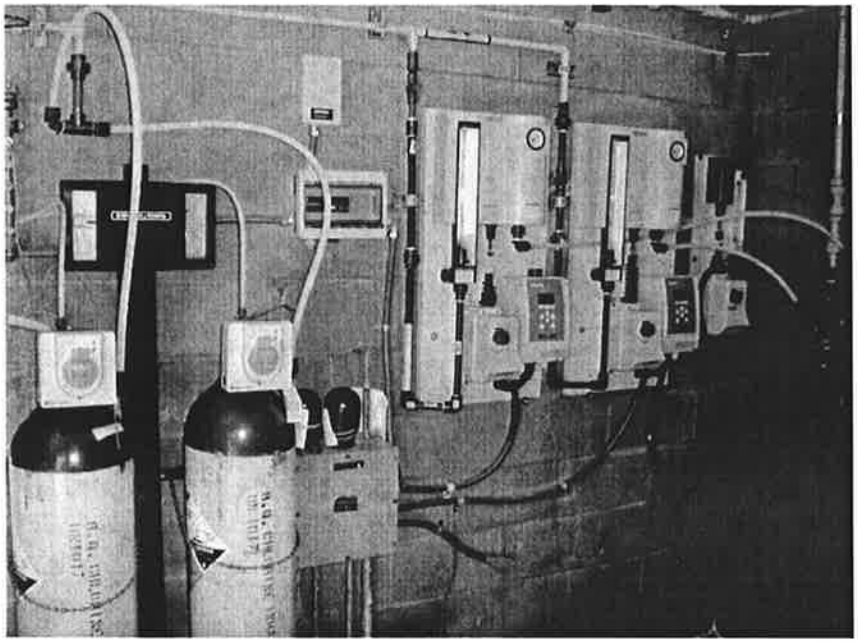

Photo 9: New chlorine gas dosing system controls installed in October 2011.

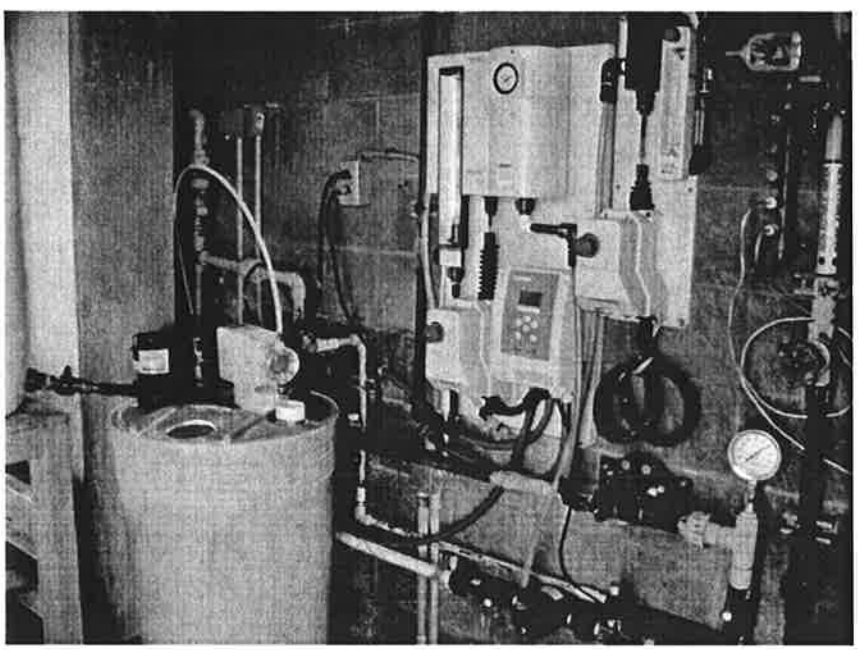

Photo 10: New sulfur dioxide dechlorination dosing system controls installed in October 2011. Yellow container contains soda ash solution which is added for effluent pH control.

Shasta County Service Area No. 17 – Cottonwood Wastewater Treatment Plant (NPDES No. CA0081507) Photo Log

Inspected by: Dennis Wilson (PG Environmental, LLC) and
Scott Gilbreath (Central Valley Water Board - Redding)

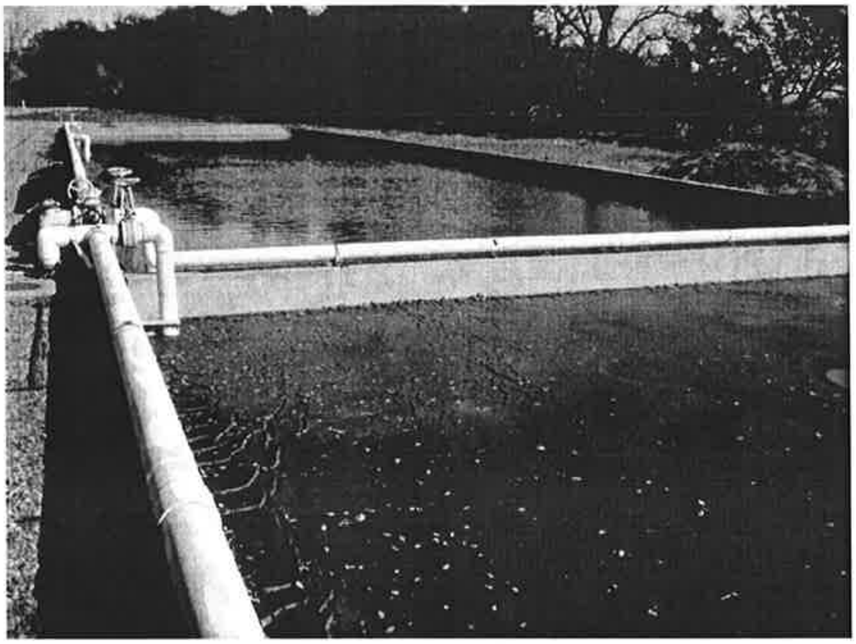

Photo 11: Two of the Facility's three concrete lined sludge drying beds.

Photo 12: Spillage of soda ash powder noted at the storage location in the dechlorination system dosing equipment room.

Photo 13: Impeller meter (yellow arrow) in the outfall pipe from the underdrain system. Monitoring Location UND-001 at the discharge point (red arrow) to an unnamed tributary to Cottonwood Creek.

Shasta County Service Area No. 17 – Cottonwood Wastewater Treatment Plant (NPDES No. CA0081507) Photo Log

Inspected by: Dennis Wilson (PG Environmental, LLC) and
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Location	Parameter	Analytical Method / Calc Type	Record Type	Qualifier	Results	Units	MDL	ML	RL	Sample Date
RSW-002	Chlorine, Total	Chlorine, Total	Analytical result	=	0	mg/L	0	0	0	11/15/2012
RSW-002	Temperature	Data Unavailable	Analytical result	=	54	Degrees F	2	0	2	11/15/2012
RSW-002	pH	pH, Electrometric	Analytical result	=	7.1	SU	0	0	0	11/15/2012
RSW-002	Dissolved	Oxygen, Dissolved	Analytical result	=	0	mg/L	0	0	0	11/15/2012
RSW-002	Turbidity	Turbidity	Analytical result	=	0.6	NTU	0	0	0	11/15/2012
RSW-002	Fecal Coliform	Standard Method	Analytical result	=	130	MPN/100	0	0	2	11/15/2012
RSW-002	pH	pH, Electrometric	Analytical result	=	6.9	SU	0	0	0	11/21/2012
RSW-002	Temperature	Data Unavailable	Analytical result	=	57	Degrees F	2	0	2	11/21/2012
RSW-002	Turbidity	Turbidity	Analytical result	=	9.6	NTU	0	0	0	11/21/2012
RSW-002	Chlorine, Total	Chlorine, Total	Analytical result	=	0	mg/L	0	0	0	11/21/2012
RSW-002	Dissolved	Oxygen, Dissolved	Analytical result	=	9	mg/L	0	0	0	11/21/2012
RSW-002	Fecal Coliform	Standard Method	Analytical result	>=	1600	MPN/100	0	0	2	11/21/2012
RSW-002	Dissolved	Oxygen, Dissolved	Analytical result	=	6	mg/L	0	0	0	11/29/2012
RSW-002	pH	pH, Electrometric	Analytical result	=	7.4	SU	0	0	0	11/29/2012
RSW-002	Fecal Coliform	Standard Method	Analytical result	=	130	MPN/100	2	0	2	11/29/2012
RSW-002	Chlorine, Total	Chlorine, Total	Analytical result	=	0	mg/L	0	0	0	11/29/2012
RSW-002	Temperature	Data Unavailable	Analytical result	=	57	Degrees F	2	0	2	11/29/2012
RSW-002	Turbidity	Turbidity	Analytical result	=	1.4	NTU	0	0	0	11/29/2012

Exhibit 1: November eSMR submitted to the Central Valley Water Board for receiving water sample results at RSW-002 from November 15, 2012 to November 29, 2012. Discharger reported a result for DO for November 15, 2012 of "0" mg/L (red arrow). Discharger reported a result for DO for November 29, 2012 of "6" mg/L (blue arrow). The on-site laboratory result sheet for November 2012 receiving water sample results showed the DO meter was not working on November 15, 2012 and the result for November 29, 2012 on the result sheet was recorded as 9.1 mg/L (refer to Exhibit 2).

Shasta County Service Area No. 17 – Cottonwood Wastewater Treatment Plant (NPDES No. CA0081507) Photo Log

Inspected by: Dennis Wilson (PG Environmental, LLC) and
Scott Gilbreath (Central Valley Water Board - Redding)

Cottonwood Creek Field Monitoring Samples

Date: 11-8-12	Weather	Creek Condition	Suspend Solids	Dish	PH	D.O	Temp	EC	Turb.	Cl2
Time: 0930	Lt. Rain	Clear	25.0014	R1						
RSW-001 Fecal & Coliform	yes (X) no ( )	100m/L	-25.0009		7.3	9.5	61	257	0.8	0
Copper & Zinc	yes ( ) no ( )		.0005							
Time: 0930			21.9883	R2						
RSW-002 Fecal & Coliform	yes (X) no ( )		-21.9878		7.4	9.6	61	258	0.8	0
			.0005							
Time:		Time:								
EFF-001 Monthly Chemicals	yes ( ) no ( )	INF-001 Monthly Chemicals			yes ( ) no ( )					
Time:										
UND-1 Fecal & Coliform	yes ( ) no ( )	Flow		:						
Date: 11-15-12	Weather	Creek Condition	Suspend Solids	Dish	PH	D.O	Temp	EC	Turb.	Cl2
Time: 9:00	Clear	Clear	25.0022	R-1			55			
RSW-001 Fecal & Coliform	yes(X) no ( )	100 m/L	-25.0021		7.7	Not Working	13	274	.4	0
	yes ( ) no ( )		.0001							
Time: 9:00			21.9894	R-2			54			
RSW-002 Fecal & Coliform	yes (X) no ( )		-21.9892		7.1	Not Working	12	266	.6	0
			.0002							
Time:		Time:								
EFF-001 Monthly Chemicals	yes ( ) no (X)	INF-001 Monthly Chemicals			yes ( ) no (X)					
Time: 11-15-12										
UND-1 Fecal & Coliform	yes ( ) no (X)	Flow No Flow		:						
Date: 11-21-12	Weather	Creek Condition	Suspend Solids	Dish	PH	D.O	Temp	EC	Turb.	Cl2
Time: 1130		Cloudy	25.0034	R1						
RSW-001 Fecal & Coliform	yes ( ) no ( )	50 m/L	-25.0031		6.9	10.1	57	245	10.0	0
Copper & Zinc	yes ( ) no ( )		.0003							
Time: 1130			21.9896	R2						
RSW-002 Fecal & Coliform	yes ( ) no ( )		-21.9894		6.9	10.2	57	250	9.6	0
			.0002							
Time:										
UND-1 Fecal & Coliform	yes ( ) no ( )	Flow		:						
Date: 11-29-12	Weather	Creek Condition	Suspend Solids	Dish	PH	D.O	Temp	EC	Turb.	Cl2
Time:	Rain	Cloudy	25.0022	R1						
RSW-001 Fecal & Coliform	yes (X) no ( )	50 m/L	-25.0020		7.4	9.2	57	150	1.6	0
	yes ( ) no ( )		.0002							
Time:			21.9902	R2						
RSW-002 Fecal & Coliform	yes (X) no ( )		-21.9899		7.4	9.1	57	144	1.4	0
			.0002							

Exhibit 2: Cottonwood Wastewater Treatment Plant on-site laboratory result sheet for November 2012. Notation on the laboratory result sheet for November 15, 2012 indicated DO meter was "Not Working" (red arrow), but the result was reported as "0" mg/L on the November 2012 eSMR (refer to Exhibit 1). Sample result recorded for DO on November 29, 2012 was 9.1 mg/L (blue arrow), but was reported as 6 mg/L on the November 2012 eSMR (refer to Exhibit 1). It should be noted that the name or initial of the person performing sample collection or analysis is not on the analysis sheet. The time is missing on November 29, 2019, and based on the time information for the other dates, there is no way of determining if this is the collection time or analysis time. Therefore, holding times cannot be determined for pH and total residual chlorine from the information on the analysis sheet.

APPENDIX D

ORDINANCE NO. 664

ORDINANCE OF THE BOARD OF SUPERVISORS OF THE COUNTY OF SHASTA REPEALING ORDINANCE 639 AND SETTING FORTH THE CHARGES AND RATES FOR SEWER RELATED SERVICES FOR COUNTY SERVICE AREA NO. 17 - COTTONWOOD SEWER

The Board of Supervisors of the County of Shasta ordains as follows:

Section 1. Rate Schedules: The following rate schedules for sewer service shall be adopted for County Service Area No. 17 - Cottonwood Sewer.

Basic Bi-monthly Charge Effective January 1, 2008:

The basic bi-monthly charge per household equivalent shall be $60.00

Basic Bi-monthly Charge Effective January 1, 2009:

The basic bi-monthly charge per household equivalent shall be $64.00

Basic Bi-monthly Charge Effective January 1, 2010:

The basic bi-monthly charge per household equivalent shall be $68.00

Bi-Monthly Standby Charge (Unchanged):

For Parcels with 1-5 unused assessment units:	$10.00
For Parcels with 6-10 unused assessment units:	$20.00
For Parcels with more than 10 unused assessment units:	$30.00

The applicable standby charge shall be paid by the owner of each parcel in the service area for which delivery of sewer service is readily available but has not been initiated, whether structures are present on the property or not. The Director of Public Works may waive the monthly standby charge if the Director determines that service is not readily available to a particular parcel. This determination will include factors such as size of the property, the topography of the property, and the shape of the property.

Installation: Main line extension installations shall be at the sole expense of the person or entity applying. When main line extensions are required, extension of service shall be constructed at the sole expense of the person or entity applying for the extension, and shall meet or exceed minimum standards and requirements of the County. A deposit to cover the improvement plan check and construction inspection will be required. The minimum deposit shall be $400.00.

Capital Improvement Fee: For new land uses that will generate wastewater in excess of the household equivalents that were previously purchased for the affected property, the property owner shall pay a Capital Improvement Fee of $3,600.00 for each additional household equivalent based on the proposed zoning or use.

Commencing January 1, 2008, and annually thereafter, the amount of the Fee shall be automatically adjusted by a percentage equal to the percentage change in the Engineering News Records' construction cost index from the index for January of the preceding year to index for the January of the adjustment year.

The Capital Improvement Fees shall be deposited into the CSA No. 17 Capital Improvement Fund for future expansion of the system.

Collection System Improvement Fee: For new land uses that will generate wastewater in excess of the household equivalents that were previously purchased for the affected property, the property owner shall pay a Collection System Improvement Fee in accordance with the following schedule for each additional household equivalent based on the proposed zoning or use.

West Area:	$1,600.00
Central Area:	$ 800.00
East Area:	$ 0.00

Commencing January 1, 2008, and annually thereafter, the amount of the Fee shall be automatically adjusted by a percentage equal to the percentage change in the Engineering News Records' construction cost index from the index for January of the preceding year to index for the January of the adjustment year.

Area boundaries are as shown on the attached **Exhibit "A."**

The Collection System Improvement Fees shall be deposited into the CSA No. 17 Capital Improvement Fund for future improvements to the main collection system in the western and central portions of the CSA.

NOTE: For purposes of this Ordinance, one "Household Equivalent" will discharge an average wastewater flow of approximately 250 gallons per day into the sanitary sewer system.

Inspection Fees

A sewer inspection fee of $100.00 will be collected at building permit issuance where connection to the sewer system is a requirement of the building permit.

Section 2. For the purposes of this Ordinance, the term "bi-monthly" shall mean occurring once every two months.

Section 3. Effective January 1, 2008, this Ordinance supersedes any prior ordinance or resolution setting water and sewer rates, fees, and charges for County Service Area No. 17 (Cottonwood Sewer).

Section 4. Effective December 31, 2007, Ordinance Number 639 is repealed.

Section 5. This Ordinance shall be in full force and effect from and after 30 days after its passage. The Clerk shall cause this ordinance to be published as required by law.

PASSED AND ADOPTED this 11th day of December, 2007, by the Board of Supervisors of the County of Shasta, State of California by the following vote:

AYES: Supervisors Hartman, Baugh, Kehoe, Cibula, and Hawes

NOES: None

ABSENT: None

ABSTAIN: None

RECUSE: None

MARK CIBULA, CHAIRMAN
Board of Supervisors
County of Shasta, State of California

ATTEST:

LAWRENCE G. LEES
Clerk of the Board of Supervisors

By Diane E Colson
Deputy

This instrument is a correct copy of the original on file in this office.

ATTEST: DEC 1 2007

Clerk of the Board
Supervisors of the County of Shasta, State of California
BY Diane E Colson

DATE	PACE ENGINEERING REDDING, CALIFORNIA	CSA 17 2013 SEWER MASTER PLAN EXISTING 2012 SEWER SYSTEM	PLATE
11/13			1

DATE	PACE ENGINEERING REDDING, CALIFORNIA	CSA 17 2013 SEWER MASTER PLAN	PLATE
09/13		STATE RESPONSIBILITY AREA FIRE HAZARD SEVERITY ZONES	2

NOTE: FIRE HAZARD SEVERITY ZONES IN LOCAL RESPONSIBIITY AREA ARE DRAFT RECOMMENDATIONS BY CAL FIRE

DATE	PACE ENGINEERING REDDING, CALIFORNIA	CSA 17 2013 SEWER MASTER PLAN	PLATE
09/13		LOCAL RESPONSIBILITY AREA FIRE HAZARD SEVERITY ZONES	3

DATE 10/13

PACE ENGINEERING
REDDING, CALIFORNIA

CSA 17
2013 SEWER MASTER PLAN

CWD WATER DISTRIBUTION SYSTEM

PLATE 4

DATE	PACE ENGINEERING REDDING, CALIFORNIA	CSA 17 2013 SEWER MASTER PLAN FUTURE 2032 SEWER SYSTEM	PLATE
11/13			5

DATE	PACE ENGINEERING REDDING, CALIFORNIA	CSA 17 2013 SEWER MASTER PLAN	PLATE
09/13		FUTURE DEVELOPMENT ZONING DENSITIES	6