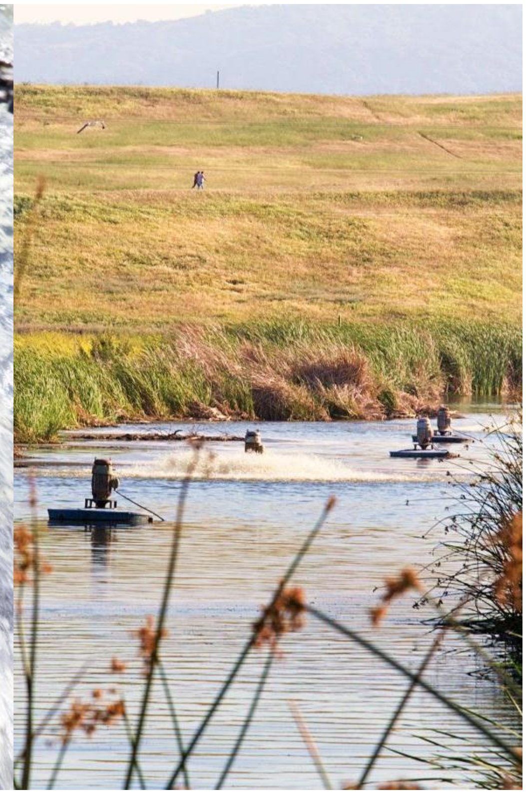
City of Sunnyvale | Environmental Services Department



Sunnyvale Water Pollution Control Plant

Plant Compliance

Annual NPDES Report
R2-2014-0035

2015

2015 ANNUAL NPDES REPORT

City of Sunnyvale

Prepared for:

Mr. Bruce Wolfe

California Regional Water Quality Control Board

San Francisco Bay Region

1515 Clay Street, Suite #1400

Oakland, CA 94612

Prepared by:

City of Sunnyvale

Environmental Services Department

Regulatory Programs Division

P.O. Box 3707

Sunnyvale, CA 94088-3707

February 1, 2016

February 1, 2016

Mr. Bruce Wolfe
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite #1400
Oakland, CA 94612

Attn: NPDES Division

Subject: **City of Sunnyvale Water Pollution Control Plant 2014 Annual Self-Monitoring Report**

The attached 2015 Annual Self-Monitoring Report is submitted in accordance with the requirements of Order No. R2-2014-0035 for the City of Sunnyvale Water Pollution Control Plant.

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.

If you have any questions, please contact me at (408) 730-7260.

Sincerely,

Bhavani Yerrapotu
WPCP Division Manager

Attachment: 2015 NPDES Annual Report

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I. INTRODUCTION

1.0. BACKGROUND

The 2015 Annual National Pollutant Discharge Elimination System (NPDES) Report for the City of Sunnyvale (City) Water Pollution Control Plant (WPCP) is prepared in accordance with NPDES Permit Number CA0037621, and San Francisco Bay Regional Water Quality Control Board (RWQCB) Order R2-2014-0035. This report summarizes the discharge monitoring results from the reporting period of January 1 to December 31, 2015, and has been divided into six chapters to address the requirements contained in Section V.C.1.f of Attachment G, as well as Provisions VI.C.2 (Effluent Characterization Study and Report) and VI.C.4.b (Sludge and Biosolids Management) of the Order.

San Francisco Bay Mercury and PCBs Watershed Permit

The City is also subject to Waste Discharge Requirements of the Mercury and PCB Watershed Permit made effective January 1, 2013 by the RWQCB under NPDES Permit No. CA0038849, Order No. R2-2012-0096. This permit's annual reporting requirements may be met either in the Annual NPDES Report or through participation in a group report submitted by the Bay Area Clean Water Agencies (BACWA). The City chose to meet these reporting requirements in the 2015 Annual NPDES Report with the reporting summarized in **Chapter II, Sections 2.1.3** and **2.1.4**.

San Francisco Bay Nutrients Watershed Permit

The City is also subject to Waste Discharge Requirements of the Nutrient Watershed Permit issued July 1, 2014 by the RWQCB under NPDES Permit No. CA0038873, Order No. R2-2014-0014. Beginning in 2015, by September 1 of each year, the City will provide its nutrient information in a separate annual report or state that it is participating in a group report submitted by BACWA. The 2015 Group Annual Report was submitted on November 12, 2015. Nutrient data is also reported electronically in the California Integrated Water Quality System (CIWQS) via monthly Self-Monitoring Reports (SMRs).

2.0. FACILITY DESCRIPTION

The City owns and operates the Donald M. Sommers WPCP, located at 1444 Borregas Avenue, Sunnyvale, CA 94089 in the lower south bay subembayment of the San Francisco Bay (**Figure 1**). The WPCP was originally constructed in 1956, and the City has periodically increased treatment capacity as the City's population has grown to 148,028 (2015) and has incorporated new technologies in wastewater treatment processes to improve effluent water quality.

The WPCP produces effluent that meets or exceeds water quality standards defined in its NPDES permit through a combination of physical, chemical, and natural biological processes to remove pollutants from wastewater. Residential, commercial, and industrial wastewater collected from the surrounding service areas, including Rancho Rinconada and Moffett Field, enters the WPCP via 283 miles of gravity sewer pipes and is subsequently treated by advanced-secondary processes before being discharged to Moffett Channel, tributary to South San Francisco Bay via Guadalupe Slough (**Figure 2**).

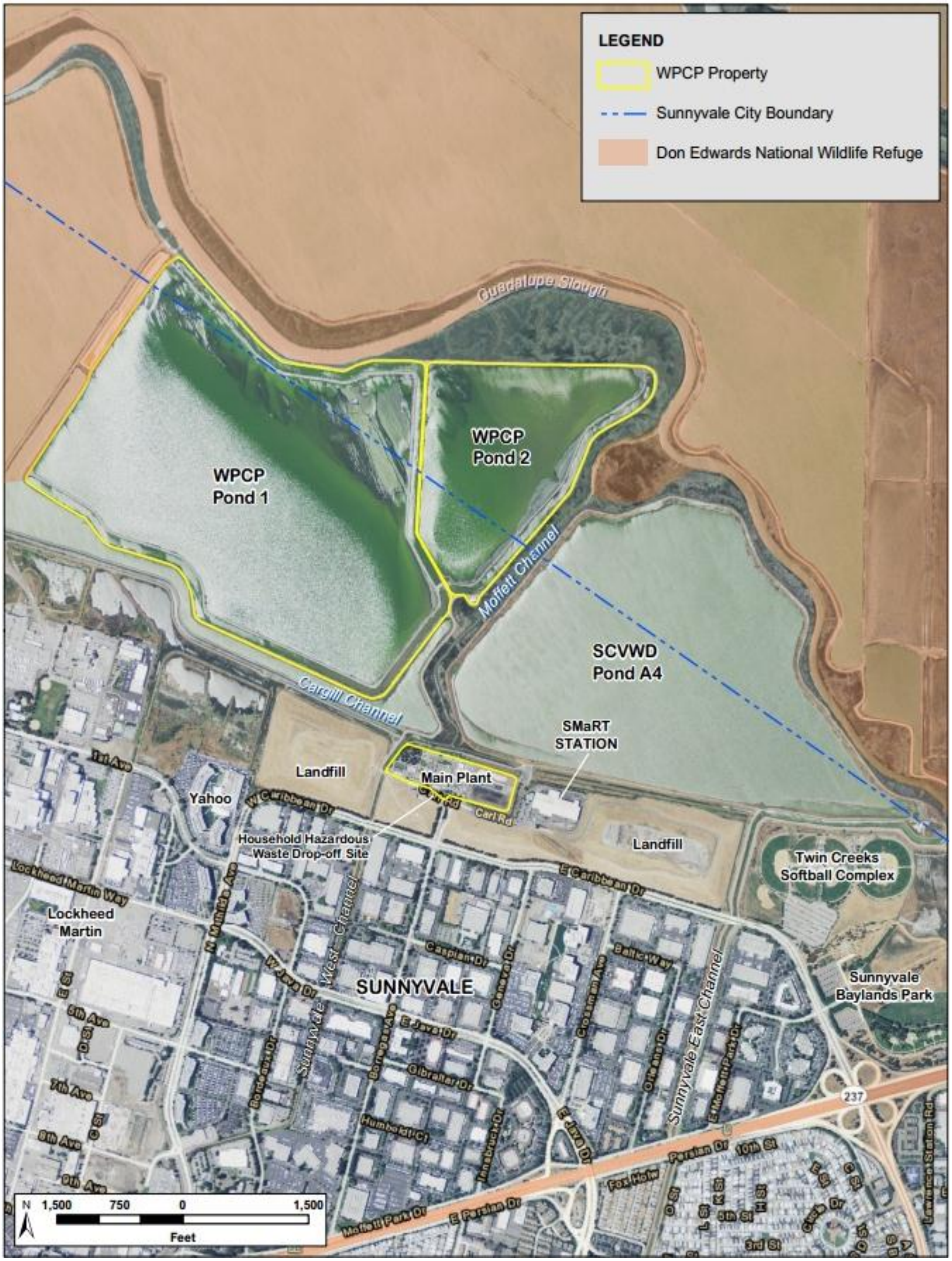

Figure 1: WPCP Site Location Map

Figure 2: Aerial photo of WPCP treatment processes spatial locations and outfall

The WPCP is one (1) of 37 Publically Owned Treatment Work (POTWs) that discharge to the San Francisco Bay (**Figure 3**). The average dry weather flow design capacity at the WPCP is 29.5 million gallons per day (MGD), which also corresponds to the permitted capacity. Peak wet weather design capacity is 40 MGD. To prevent system overloading during higher-than-normal wastewater inflows, an emergency bypass pipeline runs from the Sedimentation Basins to the Oxidation Ponds via above and below-ground sections, including an underground crossing of Moffett Channel (**Figure 34**). Over the past 10 years (January 1, 2006 to present), the WPCP's highest daily dry weather discharge was 22.9 MGD, which occurred on September 9, 2010, and the highest wet weather discharge was 28.4 MGD on December 11, 2014.

Figure 3: POTWs located in the Bay Area

2.1. Wastewater Treatment Processes

The WPCP is comprised of four distinct process areas, which include 1) the Headworks and Primary Treatment Facilities; 2) Oxidation Ponds (secondary treatment); 3) Advanced-Secondary Treatment Facilities; 4) and Solids Processing Facilities (**Figure 4**). Wastewater entering the WPCP is treated using physical, biological, and chemical processes to remove pollutants from wastewater and produce effluent that meets or exceeds water quality standards. More detailed Liquids and Solids Process Flow Diagrams are presented in **Attachment A**.

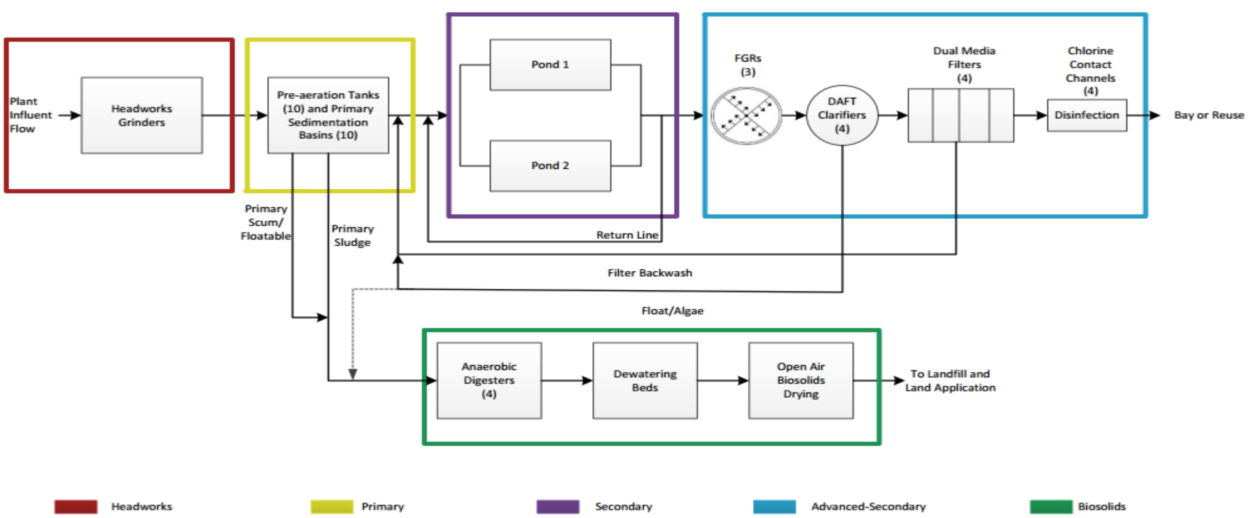

Figure 4: WPCP Process Flow Diagram

The City is in the process of implementing a 20-year Capital Improvement Program (CIP) and Master Plan that will replace the majority of WPCP facilities to address rehabilitation and repair, as well as anticipated treatment needs. Individual CIP projects are referenced below as they pertain to the various treatment steps described and are described more completely in **Chapter IV.**

2.1.1. Preliminary and Primary Treatment

The Primary Treatment Facilities were initially constructed in 1956 to provide influent screening/grinding, raw sewage pumping and metering, preaerated grit removal, and primary sedimentation. The facilities were expanded several times, most recently in 1984 with the construction of the tenth sedimentation basin, grit handling equipment, and the auxiliary pump station.

Wastewater from the service area initially enters the Headworks 30 feet below ground where channel monsters grind large debris prior to pumping the raw sewage into the Preaeration Tanks and subsequent Primary Sedimentation Basins for removal of floatable and settleable material (**Figure 5**). Floatable materials are skimmed off the surface water, while settled primary solids are removed from the bottom of the basins and pumped to Anaerobic Digesters. Primary effluent then flows to the Oxidation Ponds where it undergoes secondary treatment.

Figure 5: Preaeration Tanks and Primary Sedimentation Basins

Design of new Primary Treatment Facilities, including a new influent pump station, is currently underway and nearing completion with construction expected to be completed in 2019 (**Chapter IV, Section 7.0**). This project will also address Title V air regulatory requirements associated with phasing-out three combustion engines that power the influent pumps in favor of electric motor-driven pumps. In addition, the City is embarking on an Emergency Flow Management project that will address vulnerabilities to the aging 60-inch to 66-inch primary effluent pipeline discussed further in **Chapter III, Section 4.0**.

Figure 6: Aerial photo of the Oxidation Ponds

2.1.2. Secondary Treatment

Primary effluent undergoes secondary (biological) treatment through the use of two (440 acres total) Oxidation Ponds (**Figure 6**). The Oxidation Ponds were constructed in their present form in 1968, and were originally designed for high (biological oxygen demand) BOD loadings during the summer canning season through the use of supplemental aeration (2,500 hp of total surface aeration capacity). BOD loadings were greatly reduced with the departure of the canneries in 1983, and the original surface aerators were replaced by seven smaller (15 hp) surface aerators located in the Oxidation Pond recirculation channel to provide supplemental aeration if needed.

Primary effluent discharged into the ponds is mixed by recirculation of pond effluent back into the influent channel at a 4:1 ratio, which in effect creates a single large pond. Organic material present in the primary effluent is readily degraded in the Oxidation Ponds by aerobic and anaerobic bacteria prior to entering the WPCP's Advanced-Secondary treatment Facilities. The average detention time of the ponds is 30-45 days and highly dependent on seasonal variability in temperature and wind patterns. The Oxidation Ponds simultaneously provide flow equalization for primary effluent so that downstream advanced treatment processes can be operated at a constant flow rate. Flow equalization capacity is a function of pond depth but typically ranges from 50-100 million gallons (MG), equivalent to a 0.4 – 0.8 foot change in surface elevation.

To maintain treatment performance, the City has a long-term pond dredging project underway to remove accumulated solids (**Chapter IV, Section 6.0**), thereby recovering lost volume and improving overall treatment efficacy.

2.1.3. Advanced-Secondary Treatment

The Advanced-Secondary Treatment Facilities were originally constructed in 1975 (and expanded in 1984), to provide additional treatment of Oxidation Pond effluent. Additional improvements were made in the 1990s to facilitate recycled water production.

Pond effluent is pumped to the Advanced-Secondary Treatment Facilities, which provide nitrification, solids removal, effluent filtering, disinfection, and dechlorination prior to discharge. Initially, pond effluent is pumped to Fixed Growth Reactors (FGRs), commonly known as trickling filters, which provide biological nitrification. The FGRs are filled with plastic media (**Figure 7**) on which a film of microorganisms (biofilm) convert ammonia (NH_3) in wastewater to nitrate (NO_3^-).

FGR effluent flows by gravity to the Dissolved Air Flotation Tanks (DAFTs), where compressed air and polymer are injected to coagulate and flocculate any residual algae and particulate matter. Flocs rise to the water surface, and are skimmed off and returned to the Oxidation Ponds (**Figure 8**). The City completed AFT improvements in February 2015, which consisted of equipment and concrete repair and rehabilitation (**Chapter IV, Section 2.1.0**)

Figure 7: Fixed Growth Reactor distributing wastewater over plastic growth media

As a final polishing step, effluent from the DAFTs is conveyed to the Dual Media Filters (DMFs), which provide removal of any remaining algae and particulate matter via gravity filtration through anthracite (top, course layer) and sand (bottom, fine layer) (**Figure 9**). The filters are routinely backwashed, and the backwash water is also returned to the Oxidation Ponds.

Figure 8: Algae being skimmed off the surface of wastewater in a Dissolved Air Flotation Tank

2.1.4. Disinfection Treatment

Secondary effluent from the DMFs is then disinfected with chlorine gas for at least one hour in a series of Chlorine Contact Channels, prior to dechlorination with sodium bisulfite and discharge to Moffett Channel, tributary to the San Francisco Bay via Guadalupe Slough (**Figure 10**). A portion of the disinfected wastewater is dechlorinated in a process separate from final effluent and redistributed throughout the WPCP for filter backwashing and engine cooling.

Figure 9: Dual Media Filters treating wastewater

The City is in the design phase for disinfection improvements, which include replacing gaseous chlorine with liquid chlorine as well as other mechanical, electrical, and instrumentation and control improvements. As part of this project, the City will add an additional sodium bisulfite dosing location to provide additional flexibility and reliability to meet final effluent residual chlorine discharge limits (**Chapter IV, Section 5.0**).

Figure 10: Wastewater being disinfected in the Chlorine Contact Channels prior to discharge into Moffett Channel

2.2. WPCP Laboratory

The WPCP operates an on-site laboratory that analyzes samples collected for regulatory compliance and process reporting, industrial pretreatment samples collected from industrial facilities that discharge to the sanitary sewer system, and City drinking water samples to monitor for compliance with drinking water regulatory standards. A list of the approved analyses for the laboratory, as well as a current environmental certification, is included in **Attachment B**.

In November 2015, the WPCP laboratory received interim certification from the State's Environmental Laboratory Accreditation Program (ELAP) to perform metals analysis using the newly purchased Inductively Coupled Plasma - Mass Spectrometer (ICP-MS). The lab is now using the ICP-MS system to measure multiple metals (elements) simultaneously at very low detection levels, providing the sensitivity and accuracy required by the NPDES permit (**Figure 11**).

Figure 11: Laboratory Technician analyzing wastewater samples on the WPCPs new ICP-MS

In addition, the laboratory purchased a new Laboratory Information Management System (LIMS) in December 2015, to manage and integrate lab data from different instruments and other programs into one comprehensive system. The new LIMS is anticipated to go live in August 2016, and is expected to improve data entry efficiency and integrity through its automation features.

2.3. Sludge and Biosolids Management

Sludge and biosolids removed during primary treatment, as well as a portion from secondary treatment, are fed into Anaerobic Digesters and detained for approximately 37-41 days at a temperature of 100°F, usually followed by an additional 16 days in an unheated Secondary Digester. Within the digesters, anaerobic bacteria breakdown organic matter, producing a mixture of methane gas, carbon dioxide, and hydrogen sulfide (biogas), in addition to stabilized organic solids and water. The City is continuing with digester improvements, which consist of replacing the original floating covers with fixed covers, structural rehabilitation and repair, and replacement of other equipment. This project is nearing completion, with three of the four digesters now rehabilitated and operating, and the fourth scheduled to be completed in 2016 or early 2017 (**Chapter IV, Section 4.0**).

A portion of the biogas produced in the Anaerobic Digesters powers three main influent pump engines, which drives the pumps that lift wastewater into the Headworks from the sanitary sewer system and provides aeration to the Preaeration Tanks. The remainder of the biogas is blended with landfill gas (LFG) from the adjacent landfill (closed) and air-blended natural gas. This gas mixture is utilized by two power-generating engines, which form the backbone of the WPCPs Power Generation Facility (PGF). The PGF on average produces 1.2 megawatts (MW) of power which offsets the majority PG&E power purchases. A small portion of the biogas and LFG is flared off if gas production exceeds WPCP demand. To improve PGF operational reliability and provide an independent emergency power source, the City has begun the PGF Gas Improvements and Emergency Generator project. When completed, this project will significantly improve PGF reliability and provide backup power if required (**Chapter IV, Section 3.0**).

Anaerobically digested sludge is conditioned with polymer and dewatered on a collection of gravity drainage tiles (Dewatering Beds) to approximately 15-20% solids (**Figure 12**) and then solar dried to approximately 25-50% solids prior to disposal. In addition, secondary treatment solids removed by dredging the Oxidation Ponds are chemically conditioned and dewatered using a centrifuge to approximately 20-25% solids prior to land application or disposal at nearby landfills. A solids process flow diagram is included in **Attachment A**.

Figure 12: Dewatering Beds treating biosolids

Biosolids produced at the WPCP undergo a series of analytical tests prior to being hauled off-site for disposal to ensure they are in compliance with regulations set forth in 40 CFR Part 503. Beneficial uses include land application and placement in the Newby Island Sanitary Landfill as alternative daily cover. The WPCP has never used incineration as a means of disposal of biosolids. For additional information on sludge and biosolids management at the WPCP, refer to the *Biosolids Annual Report* for 2015, scheduled for submittal to the RWQCB on February 19, 2015, per Provision VI.C.4.b of Order No. R2-2014-0035.

During the 2015 reporting period, the WPCP disposed of a total of approximately 4,539 dry tons of biosolids, which is a 14% reduction from the amount reported in 2014 (5,302 dry tons) due primarily to a decrease in dredging activities at the Oxidation Ponds. Biosolids disposed of in 2015 consisted of 2,748 dry tons from the Oxidation Ponds dredging project, 1,572 dry tons of digester cleanings, and 219 dry tons from digester solids dewatering. As shown in **Figure 13**, the majority of biosolids (2,803 dry tons) went to beneficial reuse for land application to agricultural fields (2,732 dry tons) and compost (71 dry tons), with a relatively minor amount to landfill for use as alternative daily cover (164 dry tons). The remaining 1,572 dry tons (primarily inorganic digester cleanings) were applied to the Sunnyvale Biosolids Monofill (SBM), which is a significant increase from previous years due to the clean-out of the North Lagoon area that has historically been an accumulation and drying point for digester cleanings. Biosolids were completely removed from the North Lagoon area in preparation for the construction of the new Primary Treatment Facilities (**Chapter IV, Section 7.0**).

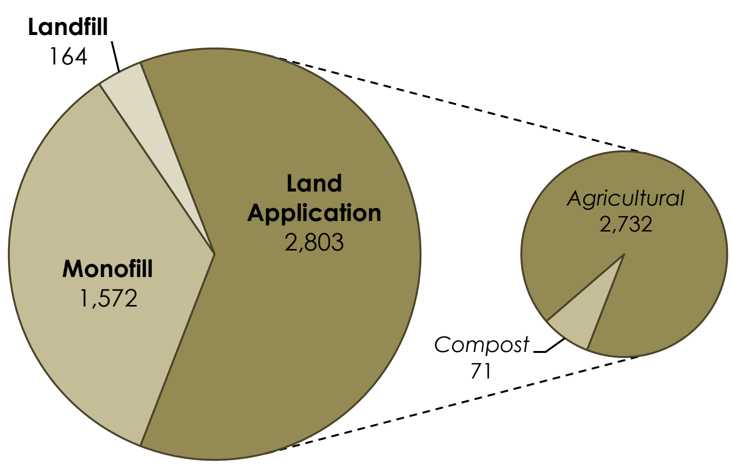

Figure 13: Application type and dry Tons of biosolids disposed from the WPCP in 2015

2.4. Recycled Water Production

Figure 14: WPCP Recycled Water distribution piping

The WPCP can operate in two different treatment modes: 1) SF Bay discharge, or 2) recycled water production (**Figure 14**). During periods of recycled water production, a portion of the advanced-secondary treated wastewater from the DMFs is further treated to meet the requirements for disinfected tertiary recycled water as specified in Title 22 of the California Code of Regulations. During periods of recycled water production, the DAFT polymer dose, chlorine dose, and chlorine contact time are adjusted to meet Title 22 requirements (recycled water average turbidity must be at or below 2 NTU, versus the 10 NTU required for Bay discharge). The portion of chlorinated effluent that is diverted to the recycled water pump station is partially dechlorinated using sodium bisulfite.

Figure 15: Recycled Water used for landscaping at NetApp

Following dechlorination, recycled water is distributed for use throughout the service area for irrigation of private and public landscapes, parks, and golf courses; for use in decorative ponds; and for other approved uses (**Figure 15**). Recycled water is also available for construction use at remote locations. Historically, up to about 10% of the daily wastewater flow has been diverted for reuse. In addition, disinfected secondary recycled water is used at the WPCP for landscape irrigation and process purposes. All water recycling is accomplished in accordance with water reclamation requirements in Regional Water Board Order No. 94-069.

In 2015, the WPCP produced approximately 253 MG of disinfected tertiary recycled, with the highest production rates between June and September when irrigation demands are greatest (**Figure 16**). As part of the Hypochlorite Conversion and Continuous Recycled Water Production Facility project, WPCP facilities are in the process of being modified to allow for simultaneous recycled water production and discharge to the San Francisco Bay. This project will vastly improve the reliability and efficiency of recycled water production (**Chapter IV, Section 5.0**).

2.5. Stormwater Management

All stormwater collected from within the WPCP, as well as from inlets in Carl Road just outside WPCP boundaries and the SBM is directed to the Headworks; therefore, coverage under the statewide permit for discharges of stormwater associated with industrial activities (NPDES General Permit No. CAS000001) is not required.

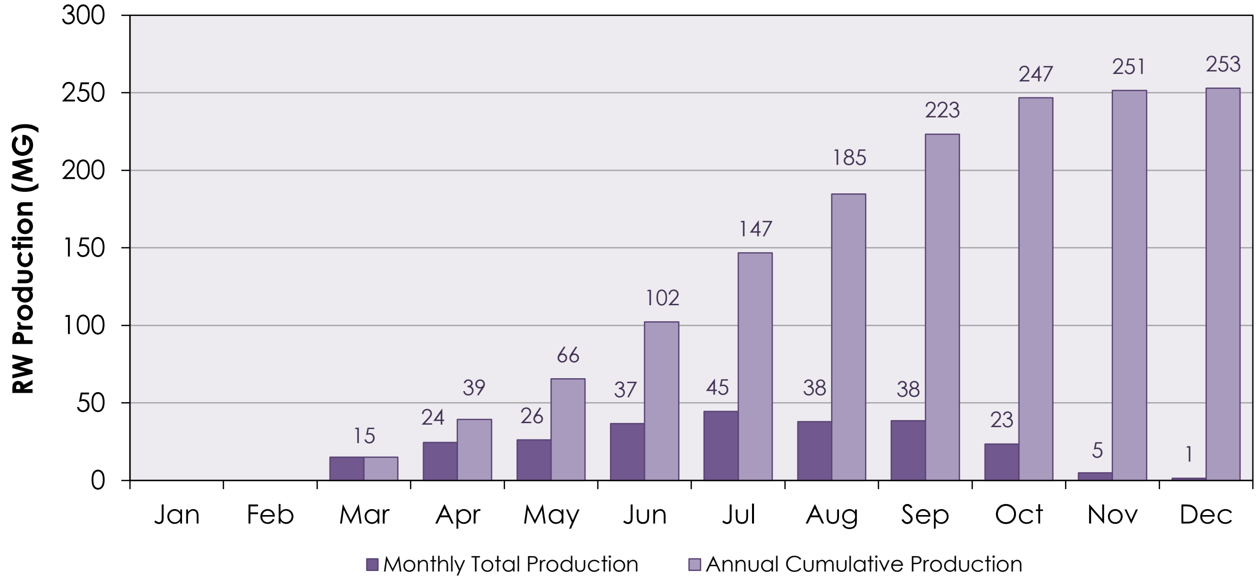

Figure 16: Recycled Water Production at the WPCP during 2015

II. Plant Performance and Compliance

1.0. PLANT PERFORMANCE

The WPCP continues to maintain a high level of performance as discussed herein. Permit Compliance is discussed in **Section 2.0** of this Chapter.

1.1. WPCP Wastewater Flows

The WPCP is designed and permitted for a daily average dry weather effluent flow of 29.5 MGD, and has a peak wet weather flow design capacity of 40.0 MGD. The annual average influent and effluent flow rates for this reporting period were 12.0 MGD and 10.0 MGD, respectively (**Figure 17**).

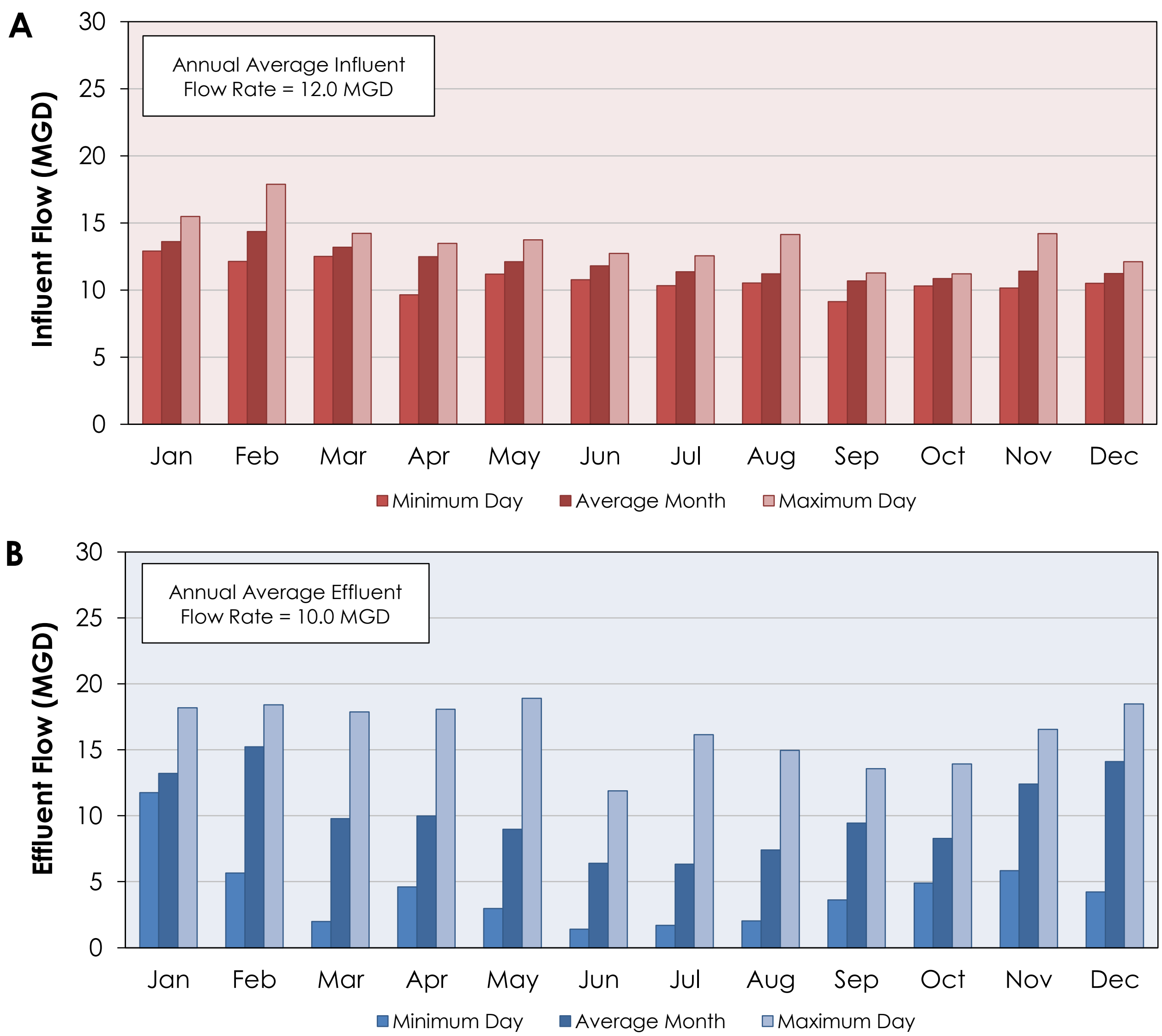

Figure 17: Monthly and Annual Average A) Influent and B) Effluent Wastewater Flow Rates through the WPCP during 2015

Monthly influent flow rates during this reporting period are shown in **Figure 17A** and are derived from daily average flow rates. Daily influent flow rates shown in **Figure 18A** ranged from 9.1 to 17.9 MGD. The maximum daily average rate (17.9 MGD) occurred on February 8, 2015, following a storm event where approximately 3-inches of rain fell over a 3-day period from February 6-8, 2015. The WPCP experienced an influent peak hourly flow rate of 28.6 MGD and an instantaneous flow rate of 31.5 MGD during the storm event. Throughout the duration of this storm event, the WPCP was able to convey the flow rates and maintain effluent discharge requirements. Annual average dry weather flows (May 1 – September 30) were approximately 11.4 MGD for influent and 7.7 MGD for effluent. Annual average wet weather flows (October 1 – April 30) were approximately 12.4 MGD for influent and 11.8 MGD for effluent.

WPCP Flow Rates

Flow Type (MGD)	Influent	Effluent
Daily	9.1-17.9	1.4-18.9
Peak-Hourly	28.6	---
Instantaneous	31.5	---
Dry Weather	11.4	7.7
Wet Weather	12.4	11.8

Daily influent and effluent flow rates recorded from 2006-2015 are shown in **Figure 18A** and reveal a downward trend, which is captured on an annual average basis in **Figure 18B**. As shown, annual average influent flows have steadily decreased by approximately 22% since 2006, with a large drop of approximately 1 MGD between 2014 and 2015. Influent flow rates during 2015 reached consecutive recorded lows despite an approximate 0.7% population increase between 2014 and 2015 and an annual average net influx of non-resident workers of approximately 15% (**Figure 18C**).

The observed decrease in influent flows is consistent with the City's increasing water conservation efforts in response to California's on-going drought conditions and a sewer repair program aimed at reducing infiltration into the system. On April 1, 2015, Governor Brown signed an executive order imposing additional drought restrictions and directed the State Water Board to impose restrictions to achieve a statewide 25% reduction in potable urban water usage through February 28, 2016 as compared with 2013 levels. In response to this executive order, on May 12, 2015, the Sunnyvale City Council adopted a resolution declaring a 30% water reduction target through June 30, 2016, and instituted measures to ensure the set goal (City of Sunnyvale - Drought and Water Conservation). By the end of December 2015, the City had achieved a total annual reduction of 27%, with the largest reduction rates (36-38%) observed between May and September when use is typically at its highest (**Figure 19**).

Monthly effluent flow rates during this reporting period are shown in **Figure 17B** and are derived from daily average flow rates. Daily effluent flow rates are shown in **Figure 18A** and ranged from 1.4 to 18.9 MGD. Annual average effluent flow (**Figure 18B**) has remained relatively consistent across the same time period, with the exception of 2015 where flows (10.0 MGD) were significantly reduced by approximately 12% from 2014 flows (11.3 MGD). Effluent flow rates below approximately 8 MGD correspond to the WPCP's Flow Management Strategy.

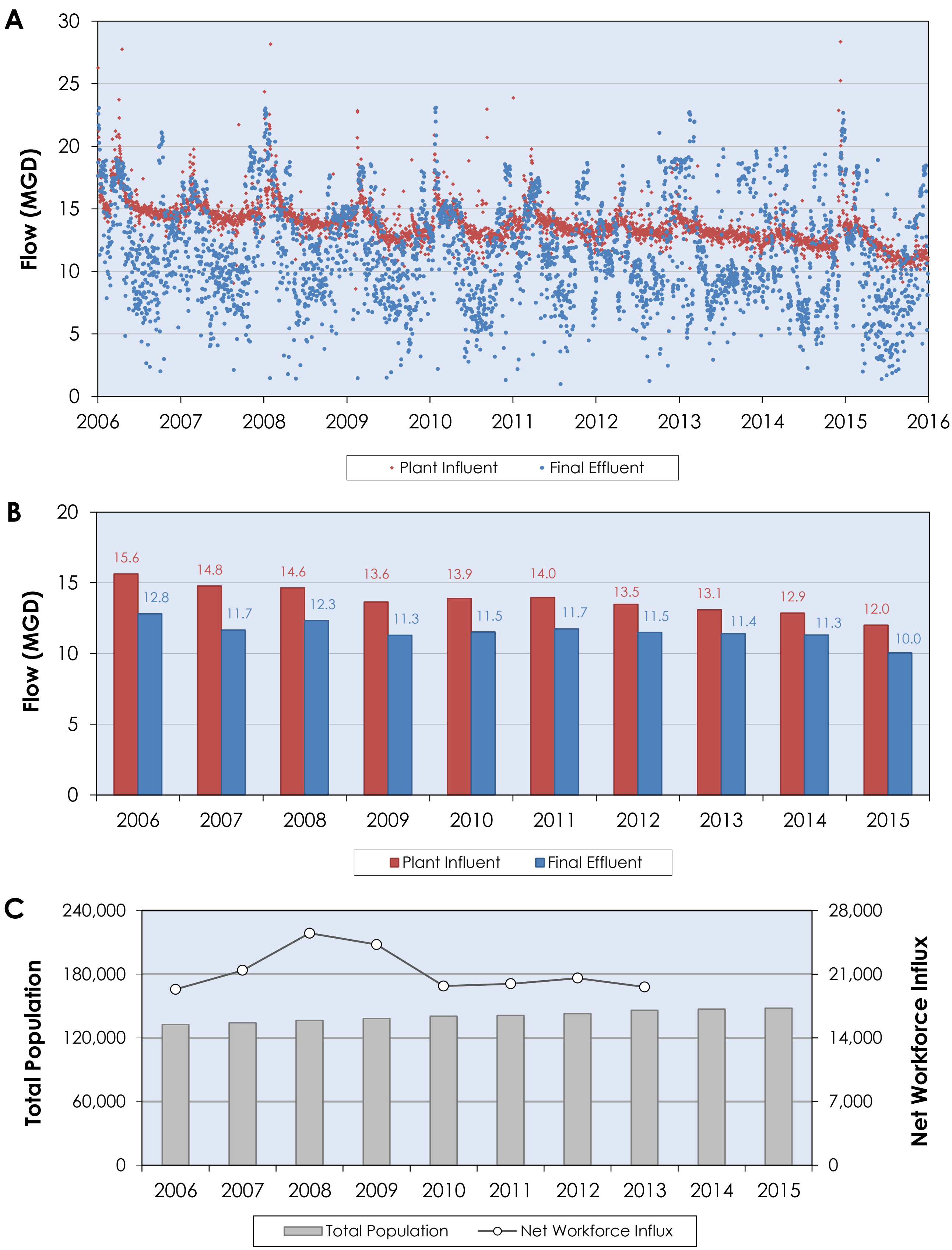

Figure 18: WPCP Wastewater Flow Rate Trends from 2006-2015. A) Daily and B) Annual Average Influent and Effluent Wastewater Flows through the WPCP from 2006-2015. C) Total Population and Net Workforce Influx in Sunnyvale from 2006-2015 (some data not yet available for 2014 and 2015)

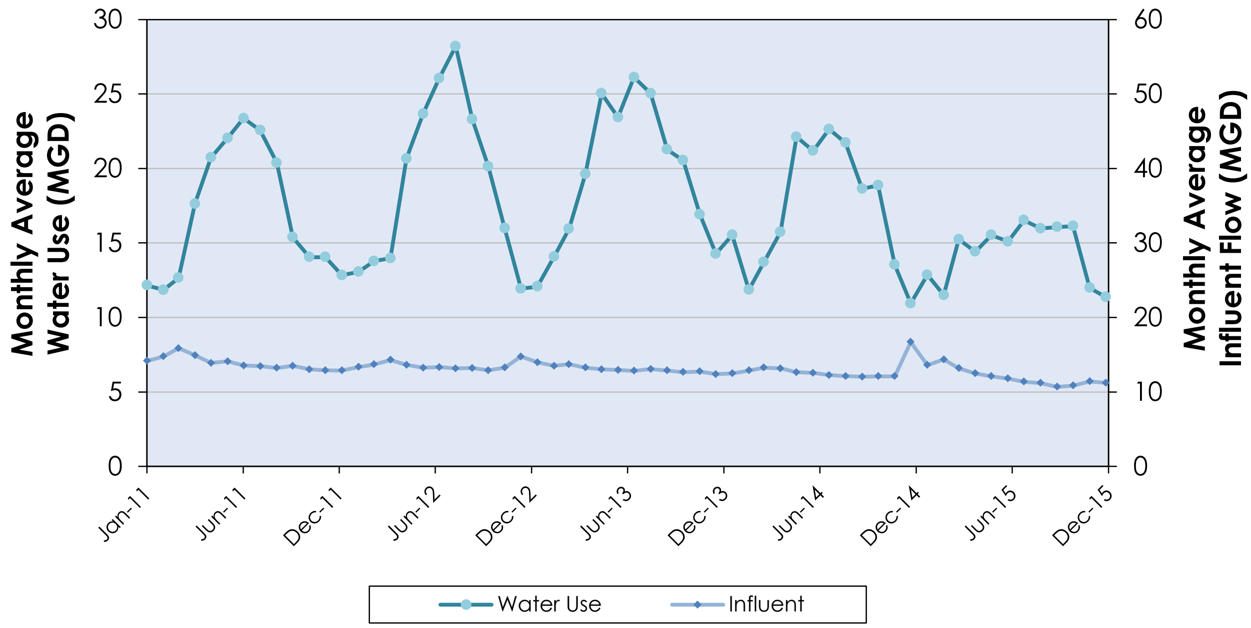

Figure 19: Monthly Average Citywide Potable Water Use and WPCP Influent Flows from 2011-2015

Daily effluent flow rates mimic the downward trend observed in influent flow rates. The large variation and difference between influent and effluent flow rates is primarily attributed to the storage capacity[1] of, and evaporation (estimated at 2 MGD on average) from the Oxidation Ponds and from recycled water production. In 2015, the WPCP produced a relatively large volume of recycled water (253 MG) as compared with previous years. No recycled water was produced by the WPCP in 2012 or 2013 due to operational challenges, resulting in higher effluent flow rates for those years.

A comparison between influent and effluent monthly average flow rates reveals the seasonal effects of recycled water production and evaporation from the Oxidation Ponds on the flow rates. During summer months (May-August) when recycled water production and evaporation rates are highest, influent monthly average flow rates are significantly higher than the corresponding effluent flow rates (**Figure 17**). The opposite is true during the fall and winter months (September-January), where recycled water production and evaporation rates are generally at their lowest.

The Oxidation Ponds have a storage capacity of 50-100 MG depending on the initial pond depth. This storage capacity is employed as part of the WPCP's Flow Management Strategy, which provides for Operations staff with the flowing, in addition to a tool to address the seasonal variability in pond treatment performance, especially in regards to ammonia removal as discussed in **Section 1.4**:

- Maintain water elevation for optimal treatment and required storage
- Maintain flexibility to repair and rehabilitate aging Advanced-Secondary Treatment Facilities
- Investigate process tuning opportunities to improve overall system performance

[1] The storage capacity of the Oxidation Ponds (estimated at >550 MG) affords flexibility in setting the effluent flow to a desired rate in order to maintain pond levels and optimize the process with internal recirculation flows, and allow the advanced secondary treatment portion of the plant to be shut-down for maintenance.

1.2. Carbonaceous Biochemical Oxygen Demand

Carbonaceous biochemical oxygen demand (CBOD) measures organic pollution in wastewater and is used by the RWQCB as one of the parameters for evaluating and regulating WPCP performance. The WPCP's NPDES permit includes the following limits for CBOD:

- Maximum Daily Effluent Limit (MDEL) concentration = 20 mg/L
- Average Monthly Effluent Limit (AMEL) concentration = 10 mg/L
- Average monthly minimum percent removal = 85%

Figure 20 summarizes CBOD concentration data and removal performance from 2011-2015. In general, CBOD influent concentrations are trending upwards. This increasing trend is attributed to the City's population growth and average daytime workforce influx (~ 15% population increase), coupled with lower water usage through drought conservation efforts, as the same amounts of pollutants are concentrated in a smaller volume of water.

As shown in **Figure 20A** and **Figure 20B**, effluent daily composite and average monthly effluent CBOD concentrations remained below their respective permit limits during the reporting period. Daily values ranged from 2.6-8.8 mg/L and average monthly values ranged from 3.9-6.3 mg/L. The percent removal of CBOD, as measured by the difference in influent and effluent concentrations, remained above the permit's minimum removal rate of 85% with an average of 97% over the reporting period (**Figure 20C**). This indicates a high degree of performance, considering influent concentrations are trending upwards and reached a record ten-year value of 310 mg/L during this reporting period. Effluent CBOD concentrations demonstrated a general trend of lower removal during the colder months and higher removal during the warmer months. This trend can be attributed to the Oxidation Pond treatment process whose CBOD removal performance is typically dependent on temperature.

CBOD Removal

	Limit	Performance
% Removal:	85%	97%
Daily (MDEL):	20 mg/L	2.6 – 8.8 mg/L
Monthly (AMEL):	10 mg/L	3.9 – 6.3 mg/L

Figure 21 summarizes daily and annual influent and effluent CBOD loading rates as measured in pounds per day (lbs/day) and pounds per year (lbs/yr) from 2011-2015. Influent CBOD loading rates are trending slightly upwards, mirroring the influent CBOD concentration data trend shown in **Figure 18**. This similarity in trending is plausible, given the City's population growth and daytime work force influx that will increase pollutant loads to the wastewater system. The effluent CBOD loading rates are trending in a relatively consistent pattern and reflect the WPCP's ability to reduce CBOD loads to the San Francisco Bay.

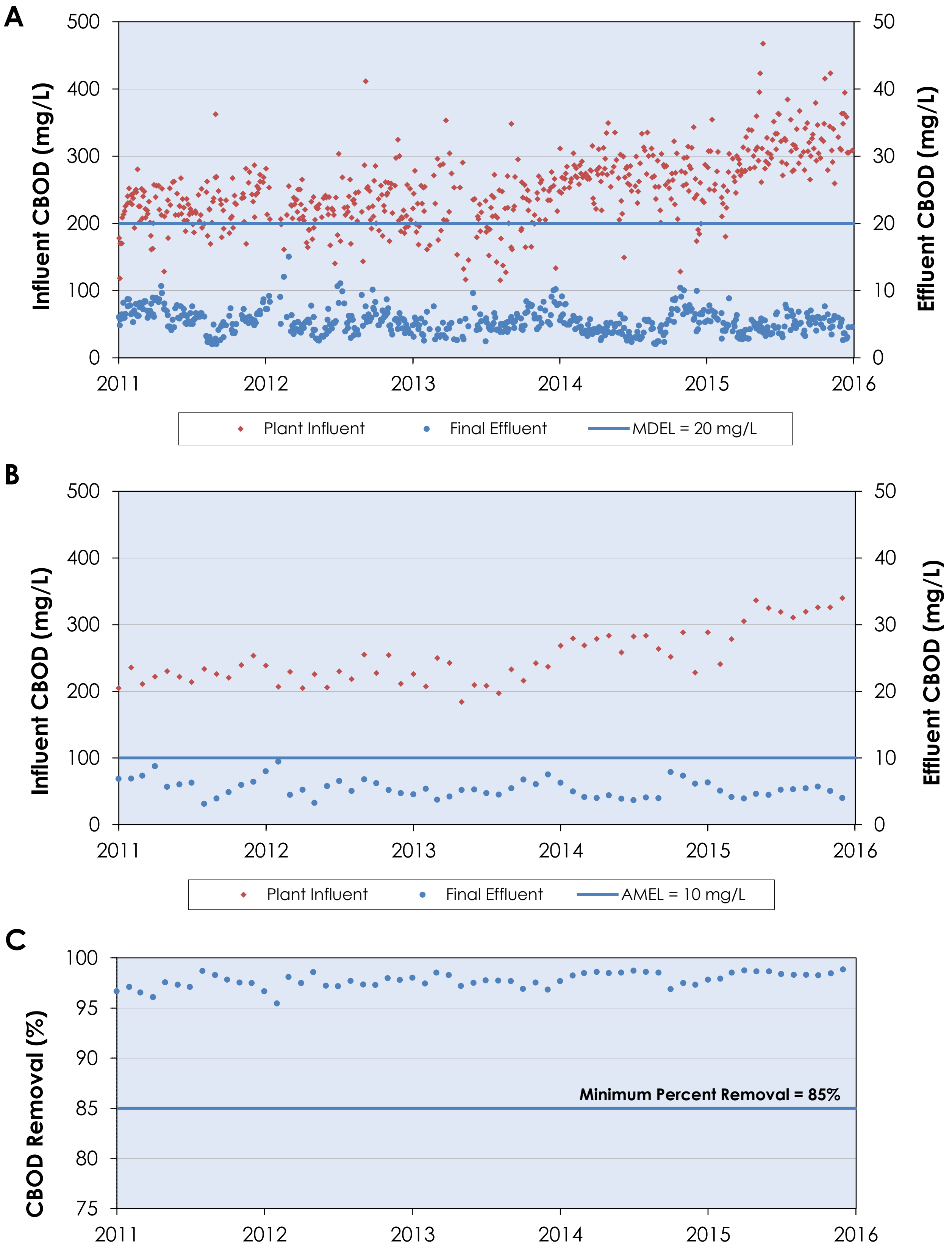

Figure 20: CBOD Trends through the WPCP from 2011-2015. A) Daily and B) Average Monthly Influent and Effluent CBOD (mg/L) through the WPCP from 2011-2015. C) Average Monthly Effluent Percent Removal (%) of CBOD from 2011-2015

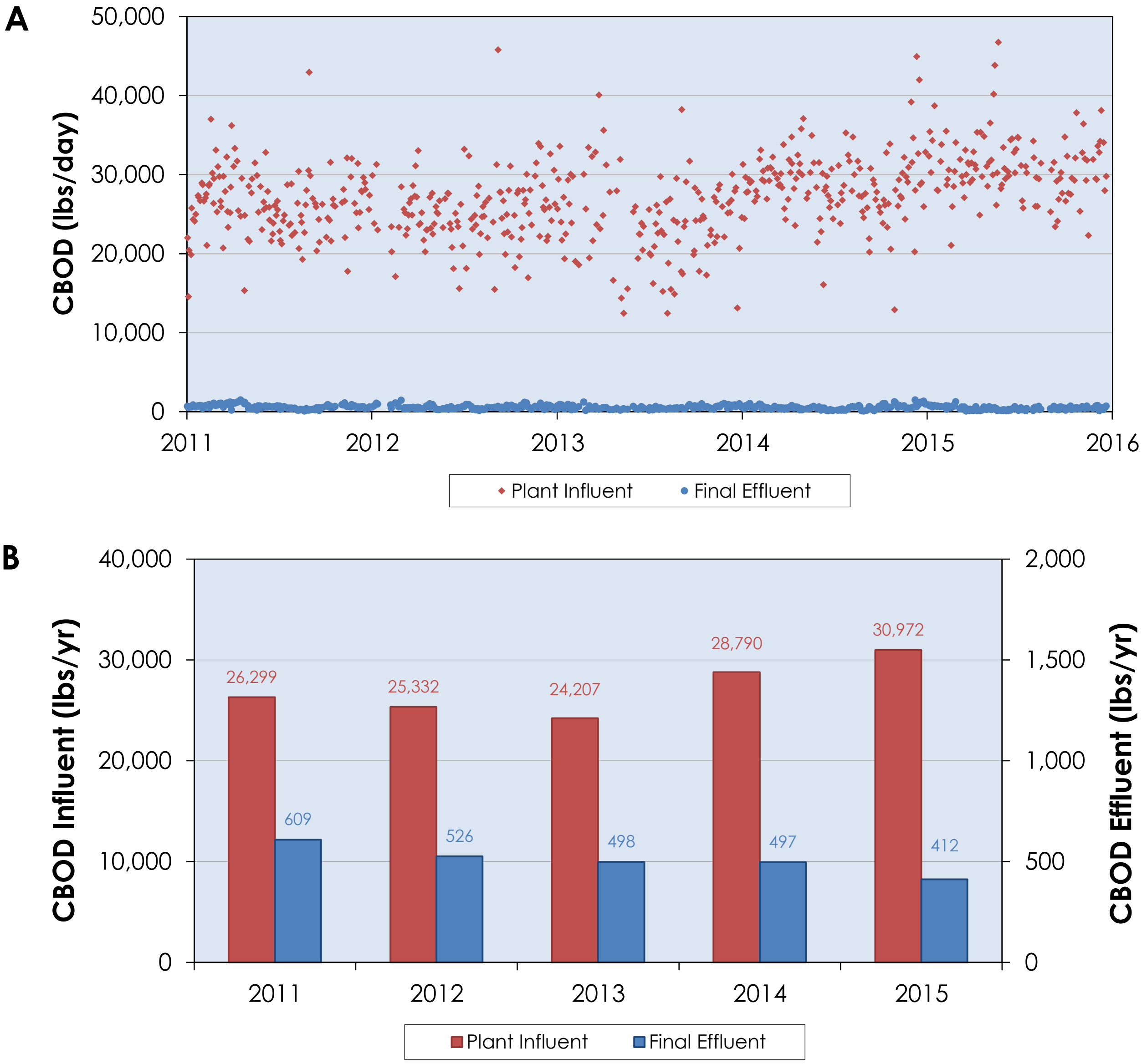

Figure 21: Average A) Daily and B) Annual CBOD Loading Rates at the WPCP from 2011-2015

1.3. Total Suspended Solids

Total suspended solids (TSS) is a measure of the suspended solids content of wastewater which will not pass through a filter, and similar to CBOD, is used by the RWQCB for evaluating and regulating the WPCP's performance. The WPCP's NPDES permit includes the following limits for TSS:

- Maximum Daily Effluent Limit (MDEL) concentration = 30 mg/L
- Average Monthly Effluent Limit (AMEL) concentration = 20 mg/L
- Average monthly minimum percent removal = 85%

Figure 22 summarizes TSS concentration data and removal performance from 2011-2015. As shown in **Figure 22A** and **Figure 22B**, effluent daily composite and average monthly TSS concentrations remained below their respective permit limits. Daily values ranged from 4.3-15 mg/L and average monthly values ranged from 7.2-12 mg/L. The percent removal of TSS, as measured by the difference in influent and effluent concentrations, remained above the permit's minimum removal rate of 85% with an average of 97% over the reporting period (**Figure 22C**). This indicates a high degree of performance, considering influent concentrations are trending upwards and reached a record ten-year value of 348 mg/L during this reporting period.

TSS Removal

	Limit	Performance
% Removal:	85%	97%
Daily (MDEL):	30 mg/L	4.3 - 15 mg/L
Monthly (AMEL):	20 mg/L	7.2 - 12 mg/L

In general, TSS influent concentration data exhibited a slight increasing trend despite significant variability during the 2010 reporting period (not shown here). In late 2010, and again in September 2013, the influent compliance sample location was relocated upstream to address this issue, resulting in more adequate mixing and accurate data collection during subsequent reporting periods. Additionally, lab personnel instituted a bimonthly cleaning regiment for the influent sampler intake line with replacement of the hose as needed. Consequently, influent TSS concentration data from October 2013 through December 2015 show less variability and a more consistent and stable upward trend. The variability that can be seen towards the end of 2015 is likely due to an increase in precipitation as compared with 2014. The increasing TSS concentration trend is attributed to the City's population growth and daytime workforce influx (~ 15% population increase), coupled with lower water usage during this time period.

Effluent TSS concentration data from 2011 – 2015 show a relatively consistent seasonal trend, with the exception of 2014 data. The significant decrease in effluent TSS concentrations in mid-2014 correspond to a pilot study assessing an alternate operational strategy for recycled water production where the entire effluent (recycled water and discharge) was treated to Title 22 recycled water requirements. Recycled water is currently produced in a "batch" operation and stored in a tank to be distributed to meet demand and does not occur simultaneously with SF Bay discharge.

Figure 23 summarizes daily (lbs/day) and annual (lbs/yr) average influent and effluent TSS loading rates from 2011-2015. Influent loading rates show an upward trend in comparison with 2011-2013 data that mirrors the influent TSS concentration data trend shown in **Figure 22**. These trends are similar to the influent CBOD concentration and loading rates trends. As with the CBOD trends, the similarity of the influent TSS concentration and TSS loading rates trending is plausible, given the City's population growth and daytime work force influx which will increase pollutant loads to the wastewater system. The effluent TSS loading rates are trending in a relatively consistent pattern and reflect the WPCP's ability to maintain TTS loadings despite an upward trend in influent loading.

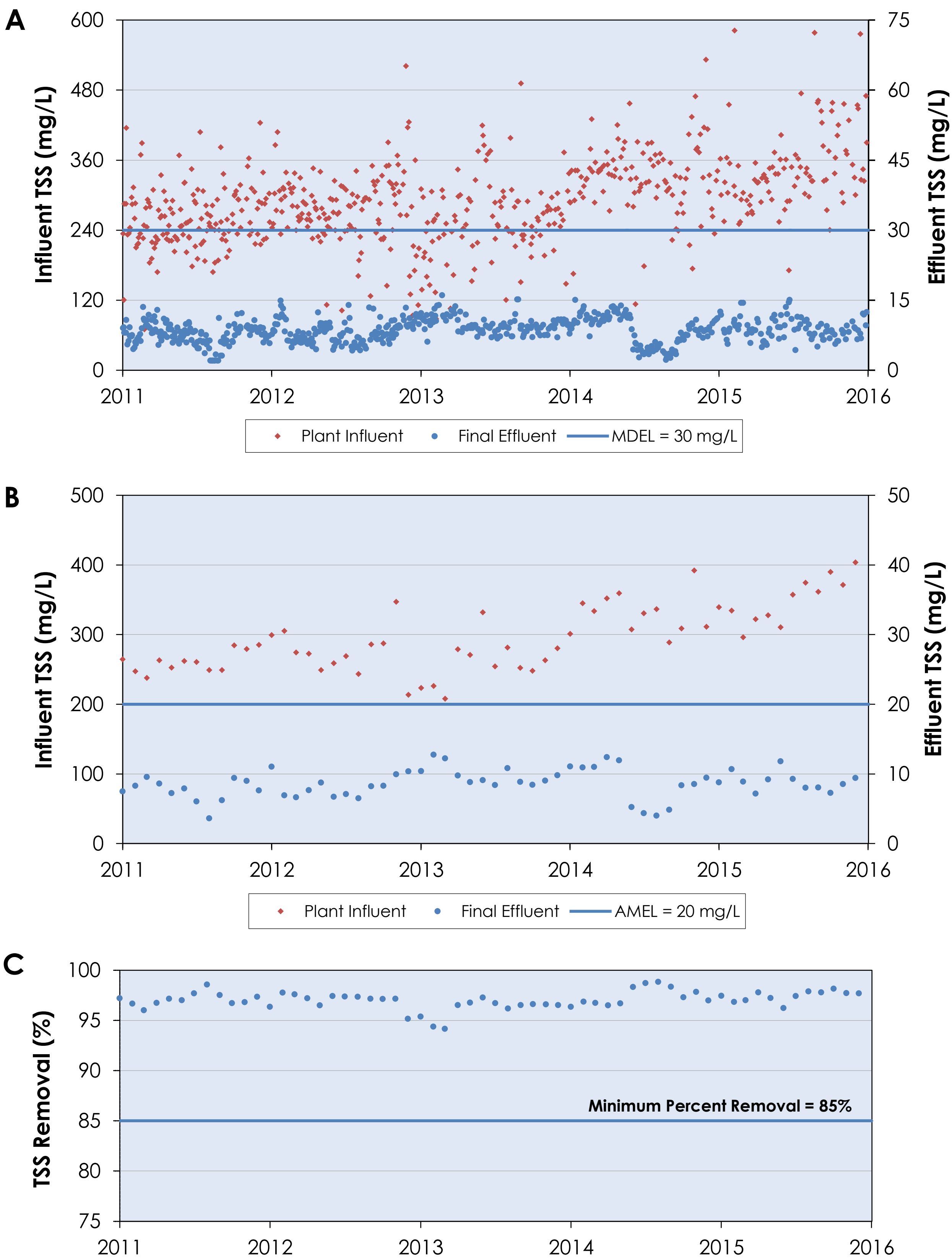

Figure 22: TSS Trends through the WPCP from 2011-2015. A) Daily and B) Average Monthly Influent and Effluent TSS (mg/L) through the WPCP from 2011-2015. C) Average Monthly Effluent Percent Removal (%) of TSS from 2011-2015

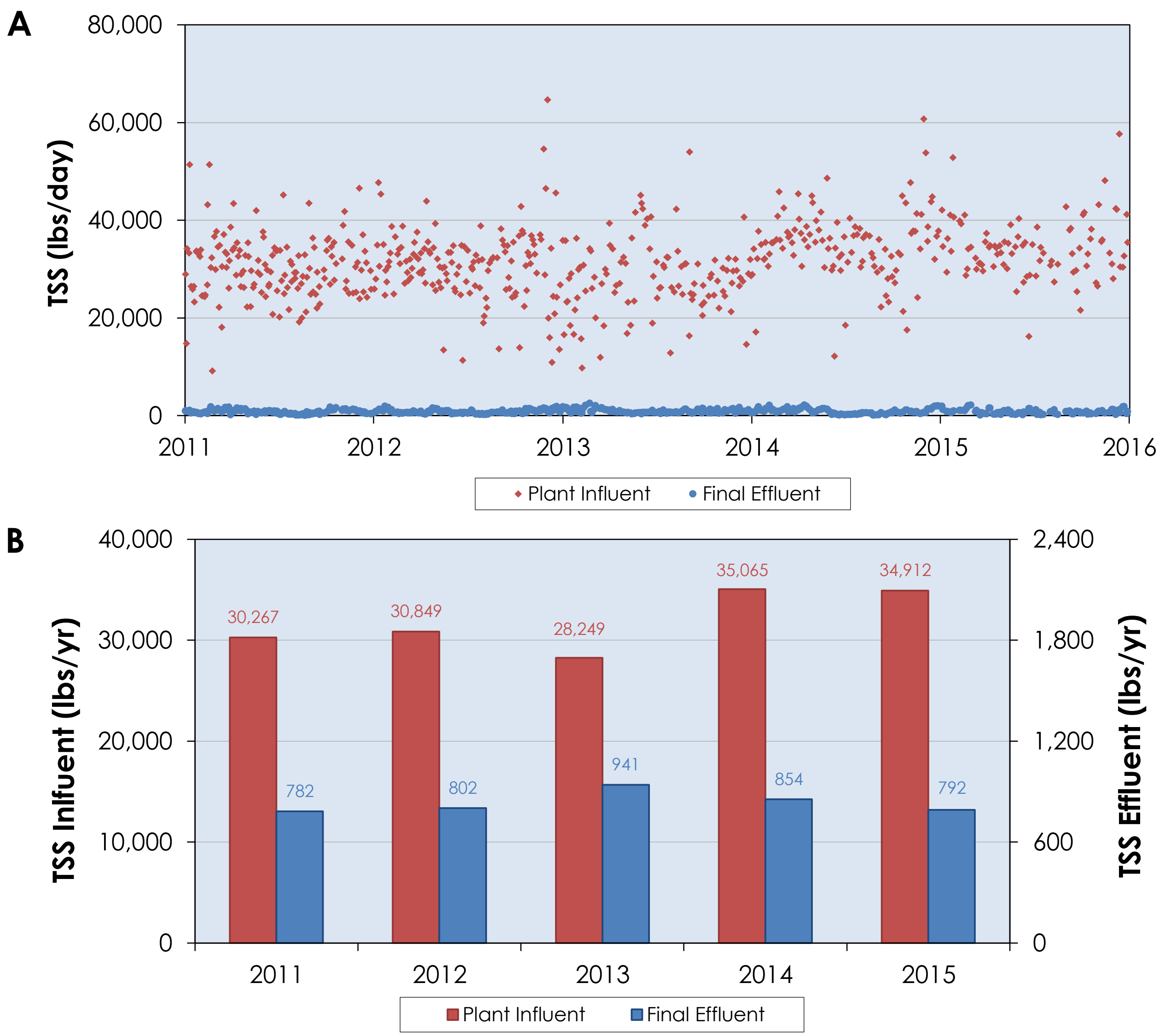

Figure 23: Average A) Daily and B) Annual TSS Loading Rates at the WPCP from 2011-2015

1.4. Total Ammonia

<u>Overview and Permit Limits</u>

Ammonia removal occurs in both the Oxidation Ponds and the FGRs. Ammonia removal in the Oxidation Ponds (as a result of uptake by algae and bacterial nitrification) is highly seasonal. Low removal rates are typically observed during the fall and winter (Oct-May) when ambient temperatures are low and daytime shorter. In contrast, higher removal rates occur during the summer (May-Sept) when ambient temperatures are high and daytime is longer. Consequently, from October to May, nitrification in the FGRs is the primary process of ammonia removal from wastewater. The WPCP's NPDES permit includes seasonal performance limits for ammonia that reflect the variability in the performance of the two processes. The NPDES ammonia effluent limits are as follows:

- Maximum Daily Effluent Limit (MDEL) concentration: Oct-May = 26 mg/L; Jun-Sept = 5 mg/L
- Average Monthly Effluent Limit (AMEL) concentration: Oct-May = 18 mg/L; Jun-Sept = 2 mg/L

Data Review

Ammonia Removal

Freq	Limit	Performance
Daily (MDEL):	26 mg/L (Oct-May) 5 mg/L (Jun-Sept)	0.1 - 12 mg/L 0.1 - 1.8 mg/L
Monthly (AMEL):	18 mg/L (Oct-May) 2 mg/L (Jun-Sept)	0.5 - 5.6 mg/L 0.1 - 0.6 mg/L

Figure 24 summarizes ammonia concentration data and removal performance. **Figure 24A** shows removal performance of the Oxidation Ponds and FGRs, respectively. Seasonal removal rates are clearly apparent, with the Oxidation Ponds demonstrating ammonia removal from April to October, and the FGRs removing the majority of the ammonia during the remainder of the year. The significant increase in ammonia concentrations in effluent from the Oxidation Ponds is attributed to low ambient temperatures throughout the majority of December 2015. Daily and average monthly effluent ammonia in 2015 remained below their respective seasonal permit limits as shown in **Figure 24B** and **Figure 24C**. Influent ammonia concentrations appear to be trending upward during the reporting period, following a period of relative stability between 2011-2014. Similar to CBOD and TSS, this upward trend is likely the result of enhanced water conservation efforts in response to the Governor's statewide mandate on restrictions and subsequent decrease in influent flows.

Figure 25 summarizes average daily (lbs/day) and annual (lbs/yr) influent and effluent ammonia loading rates from 2011-2015. The influent ammonia loads remained stable from 2010-2014, with a slight increase during 2015. Effluent ammonia loading rates are scattered with the higher values generally occurring during the winter season and lower values generally occurring during the summer season, reflecting the seasonal nature of the Oxidation Ponds and FGRs performance. As shown, effluent loading rates have decreased significantly from 2012-2013 levels, a clear indication of the success of optimization efforts as well as the increase in recycled water production. Additional information pertaining to ammonia and other nutrient trends over the past three years is available in the *Nutrient Watershed Permit Annual Report* submitted by BACWA to the RWQCB on November 12, 2015.

Strategies to Optimize Performance

Historically, ammonia removal via the Oxidation Ponds has been highly variable and seasonal in nature. Although variability in weather patterns plays a significant role, the loss of pond volume due to solids deposition has likely impacted performance by reducing the "working" capacity. Consequently, the City began a long-term dredging project in 2009 to restore the pond capacity (**Chapter IV, Section 6.0**). Dredging was conducted during this reporting period and occurred over the winter season with minimal impact to ammonia removal performance as the FGRs are the primary process for ammonia removal in the winter months. During this reporting period, a total of 2,748 dry tons (88,000 wet tons) of sediments was removed and hauled off-site for beneficial re-use, primarily in the form of agricultural land application and compost (**Figure 13**).

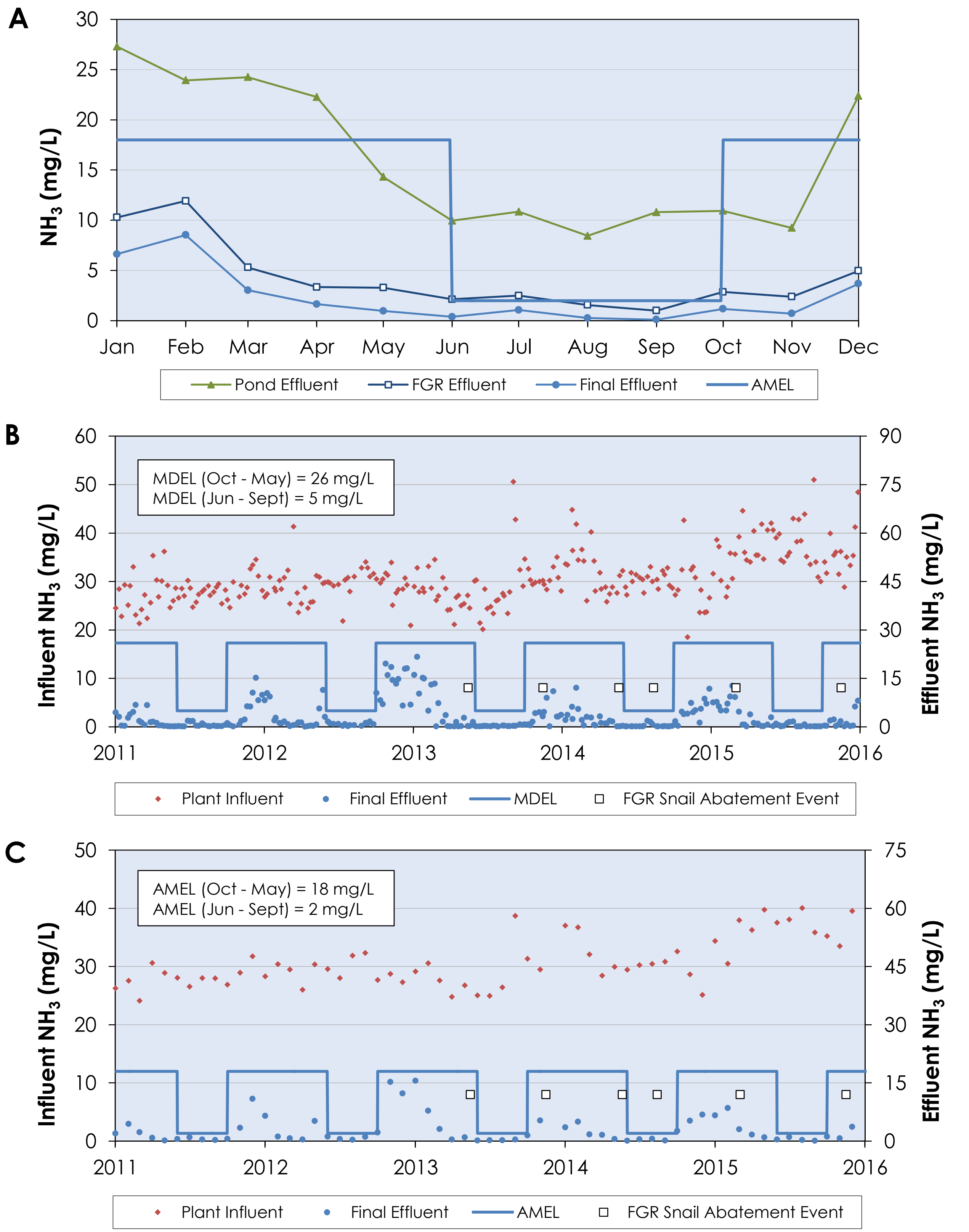

Figure 24: Ammonia Trends at the WPCP from 2011-2015. A) Monthly Average Total Ammonia from Pond, FGR, and Final Effluent during 2015. B) Daily and C) Monthly Average Influent and Effluent Total Ammonia through the WPCP from 2011-2015.

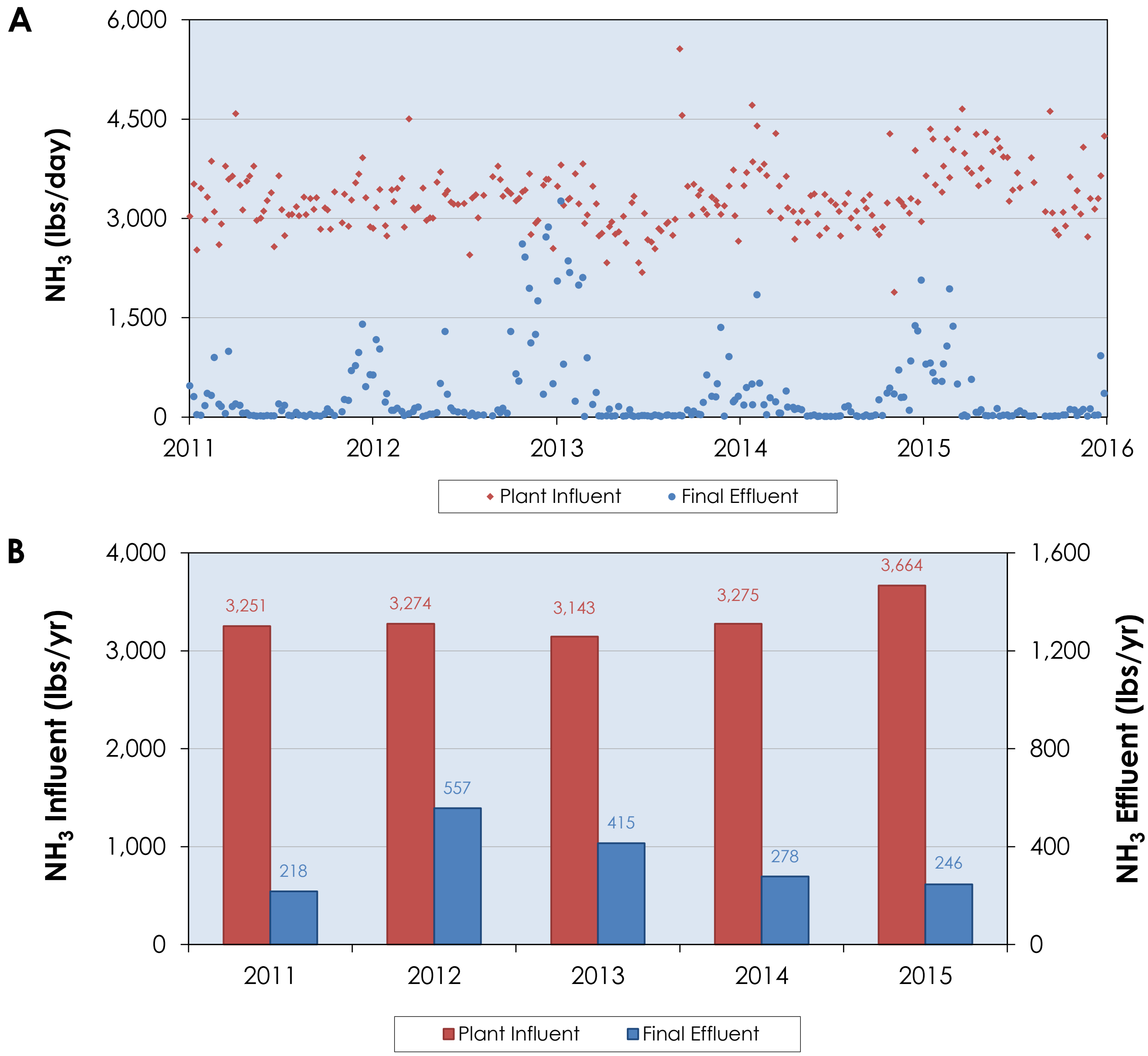

Figure 25: Average A) Daily and B) Annual Ammonia Loading Rates at the WPCP from 2011-2015

In 2013, the City instituted a periodic FGR snail control program to optimize FGR nitrification. Trickling filters, such as the FGRs, are prone to declining ammonia removal performance as a result of snail predation on nitrifying bacteria inhabiting the plastic growth media. The chemical treatment process instituted at the WPCP doses effluent from the Oxidation Ponds with ammonium sulfate and sodium hydroxide in a batch process. The rise in pH from the sodium hydroxide effectively converts the ammonium sulfate to unionized ammonia, which is toxic to the snails but beneficial to nitrifying bacteria. Two snail control events were performed during this reporting period (March 3 and November 16, 2015) and are noted in **Figure 24B** and **Figure 24C**. Approximately 8-9 tons of liquid ammonium sulfate was used in each control event.

As an additional measure to enhance ammonia removal in the FGRs, between June 2014 and July 2015 the WPCP reconfigured the wastewater distribution arms on each FGR to better control the rotational speed of the arms. Biofilms composed primarily of ammonia oxidizing bacteria that accumulate on the plastic growth media are susceptible to shear forces from the applied Oxidation Pond effluent. In general, the growth rate of these biofilms is in part dependent on the ammonia loading rate. However, high loading rates (i.e. high rotational speed) increase the shear forces exerted on the biofilm, which can result in large sections of biofilm peeling off of the growth media and a decrease in ammonia removal efficiency. As such, the new configuration allows for more flexible operation to control the rotational speed of the arms and in large part mitigates the shear forces. Ammonia loading rates to the FGRs are governed by the Pond Flow Management strategy to maximize performance to the FGRs.

1.5. Plant Performance Summary

The WPCP maintained a high degree of pollutant removal efficiency during the 2015 reporting period without any exceedance of its effluent permit limitations and despite an increase in influent concentrations and loads. The observed increase in influent concentrations and loading rates are attributed to a 0.7% population increase between 2014 and 2015 and a large daily net workforce influx of approximately 20,000 (15%) non-resident workers, as well as successful water conservation efforts. As shown in **Figure 26**, around June 2013 both CBOD and TSS influent concentrations began increasing concurrently with decreases in potable water use and influent flow rates that continued through the 2015 reporting period. Both influent and effluent flow rates reached record annual average lows of 12.0 MGD and 10.0 MGD, respectively. The decrease in effluent loading rates is attributed to WPCP performance optimizations and the diversion of wastewater to recycled water production.

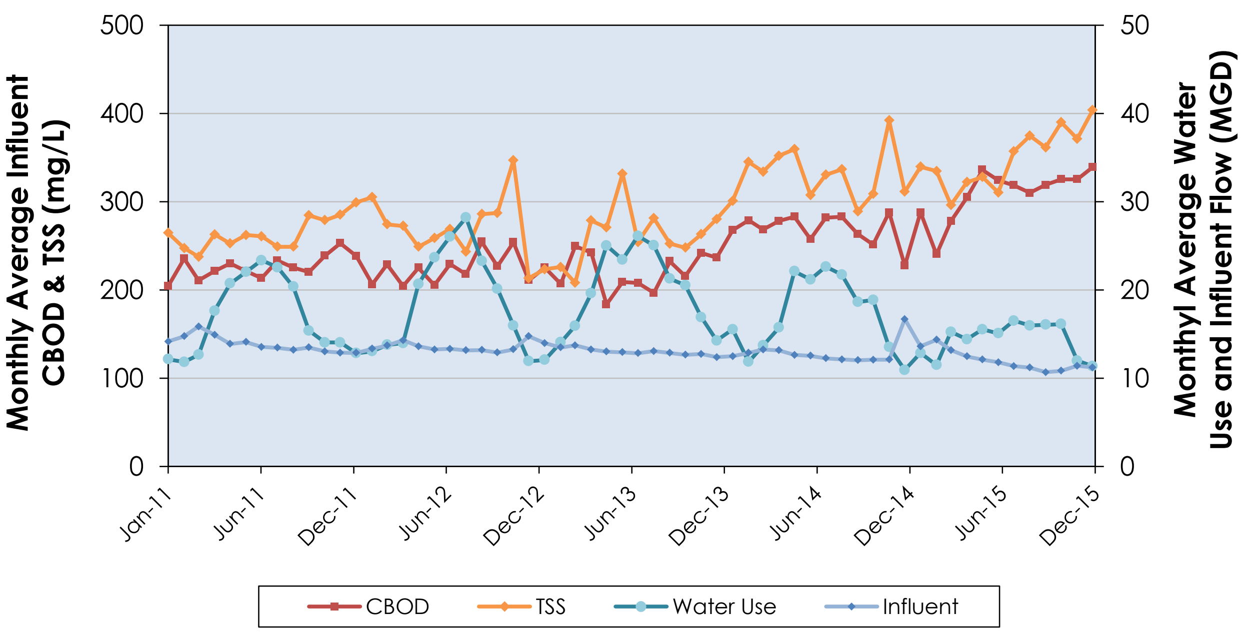

Figure 26: Monthly Average CBOD and TSS Influent Concentrations, Citywide Potable Water Use, and WPCP Influent Flows

2.0. PERMIT COMPLIANCE

Table 1 summarizes effluent compliance sampling conducted during 2015, including regulatory limits, the range of sample results, and the number of samples collected and exceedances. During 2015, the WPCP maintained a high degree of performance with no exceedances of regulatory limits.

2.1. Effluent Limitations

All required monitoring data was reported electronically to CIWQS via monthly SMRs as required in the permit. Per Attachment G, Provision V.C.1.h.3 of the permit, such reporting removes the requirement for tabular and graphical summaries of monitoring data in this annual report. However, the City has prepared the following tabular and graphical summaries for internal use, and has included them here for informational purposes.

2.1.1. Constituent Removal

Figure 27 through **Figure 31** show constituent removal and any applicable corresponding effluent limitation (MDEL, AMEL) or applicable water quality objective (WQO) values. WQOs are numerical standards established in the Basin Plan and are distinct from effluent limitations. Whereas effluent limitations apply to the actual discharge from the WPCP, WQOs are designed to protect water quality, aquatic life, and human health in the receiving water and carry no immediate regulatory action. Therefore, WQOs presented in the following figures, which are taken directly from the current NPDES permit, are included solely for informational purposes. In addition, per Provision VI.C.2.a of the current NPDES permit the results from the 2014 and 2015 priority pollutant monitoring have been included in **Attachment C** and are discussed further in **Chapter VI, Section 1.0**.

During the reporting period, effluent from the WPCP was in compliance with all effluent limitations and remained below applicable WQOs. On several occasions, effluent pH values approached the lower discharge limit of 6.5 as shown in **Figure 30**. The minor depression in pH is primarily attributed to the more rigorous Title 22 water quality requirements associated with recycled water production at the WPCP. Higher doses of chlorine and increased chlorine contact time are required to meet Title 22 requirements. Since recycled water is currently produced in batch mode, and does not occur simultaneously with discharge to the SF Bay, the higher chlorine residuals required under Title 22 may be carried over when the discharge mode switches from recycled water production back to SF Bay discharge. Consequently, a higher dose of sodium bisulfite (SBS) is required to ensure complete dechlorination of effluent. The reaction of free chlorine (Cl_2) with SBS ($NaHSO_3$) produces sulfuric acid ($NaHSO_4$) and hydrochloric acid (HCl) according to the reaction ($NaHSO_3 + Cl_2 + H_2O \leftrightarrow NaHSO_4 + 2HCl$), resulting in acidification of discharge water. The high volume of recycled water produced during the 2015 reporting period (253 MG) relative to previous years placed additional operational challenges on meeting discharge requirements for both pH and residual chlorine, and on occasion the pH approached, but never exceeded, the lower discharge limit. In response, WPCP staff developed SOP #3042A entitled *Effluent Chlorine Residual Monitoring and Reporting* to establish the procedures required to ensure that pH values remain in compliance during the transition from recycled water production to SF Bay discharge. The SOP is currently pending review and management approval.

Table 1: Effluent Monitoring Sample Results for Standard Parameters in 2015

Parameter Class	Parameter	Parameter Limit Type	Parameter Limit	2015 Final Effluent Sample Results Min	Avg	Max	Number of Samples / Exceedance
Standard	CBOD	MDEL (mg/L)	20	2.60	4.87	8.80	118 / 0
		AMEL (mg/L)	10	3.89	4.90	6.30	12 / 0
		Percent Removal (%)	85	98	98	99	12 / 0
	TSS	MDEL (mg/L)	30	4.30	8.91	15.0	96 / 0
		AMEL (mg/L)	20	7.16	8.91	11.8	12 / 0
		Percent Removal (%)	85	96	97	98	12 / 0
	Ammonia (as N)	MDEL [Oct-May]* (mg/L)	26	0.06	2.88	12.6	38 / 0
		AMEL [Oct-May]* (mg/L)	18	0.71	3.29	8.5	8 / 0
		MDEL [Jun-Sept] (mg/L)	5	0.10	0.52	1.60	14 / 0
		AMEL [Jun-Sept] (mg/L)	2	0.10	0.45	1.06	4 / 0
	Oil & Grease	MDEL (mg/L)	10	1.40	1.78	2.80	4 / 0
		AMEL (mg/L)	5	1.40	1.78	2.80	4 / 0
	Turbidity	MDEL (NTU)	10	0.99	5.99	8.88	55 / 0
	pH	Cmax / CMin	8.5 / 6.5	6.5	7.0	7.4	341 / 0
	Chlorine Residual	IMEL (mg/L)	0	0	0	0	336 / 0
	Enterococci	30 day Geo Mean (MPN/100mL)	35	1.21	2.70	5.57	12 / 0
Toxicity	Acute Toxicity	90th% (% Survival)	70	100	100	100	4 / 0
		Moving Median (% Survival)	90	100	100	100	4 / 0
Organics	Cyanide	MDEL (ug/L)	18	1.40J	<1.72	4.3J	12 / 0
		AMEL (ug/L)	8	1.40J	<1.72	4.3J	12 / 0
	TCDD-TEQ	AMEL (ug/L)	63	ND	ND	ND	2 / 0
	Bis (2-Ethylhexyl) Phthalate	MDEL (mg/L)	12	ND	ND	ND	4 / 0
		AMEL (mg/L)	5.9	ND	ND	ND	4 / 0
Metals	Copper	MDEL (ug/L)	20	0.6	1.94	2.88	12 / 0
		AMEL (ug/L)	10	0.6	1.94	2.88	12 / 0
	Mercury	AWEL (ug/L)	0.027	0.0009	0.0014	0.0018	12 / 0
		AMEL (ug/L)	0.025	0.0009	0.0014	0.0018	12 / 0
		ALEL (kg/yr)	0.150	---	---	0.018	1 / 0
	Nickel	MDEL (ug/L)	37	3.19	4.02	5.11	12 / 0
		AMEL (ug/L)	24	3.19	4.02	5.11	12 / 0

Legend:
1: Samples collection required only during active discharge – sample count below 365 indicates periods of zero discharge
ALEL: Average loading effluent limit
AMEL: Average monthly effluent limit
AWEL: Average weekly effluent limit
IMEL: Instantaneous maximum effluent limit
MDEL: Maximum daily effluent limit
MPN: Most probable number
mL: Milliliter
mg/L: Milligram per liter
ug/L: Microgram per liter
kg/yr: Kilogram per year
J: Analyte detected, but not quantifiable
ND: Analyte was "not-detected" above the laboratory method detection limit
NTU: Nephelometric turbidity unit
<#: Analytical results less than the laboratory detection limit

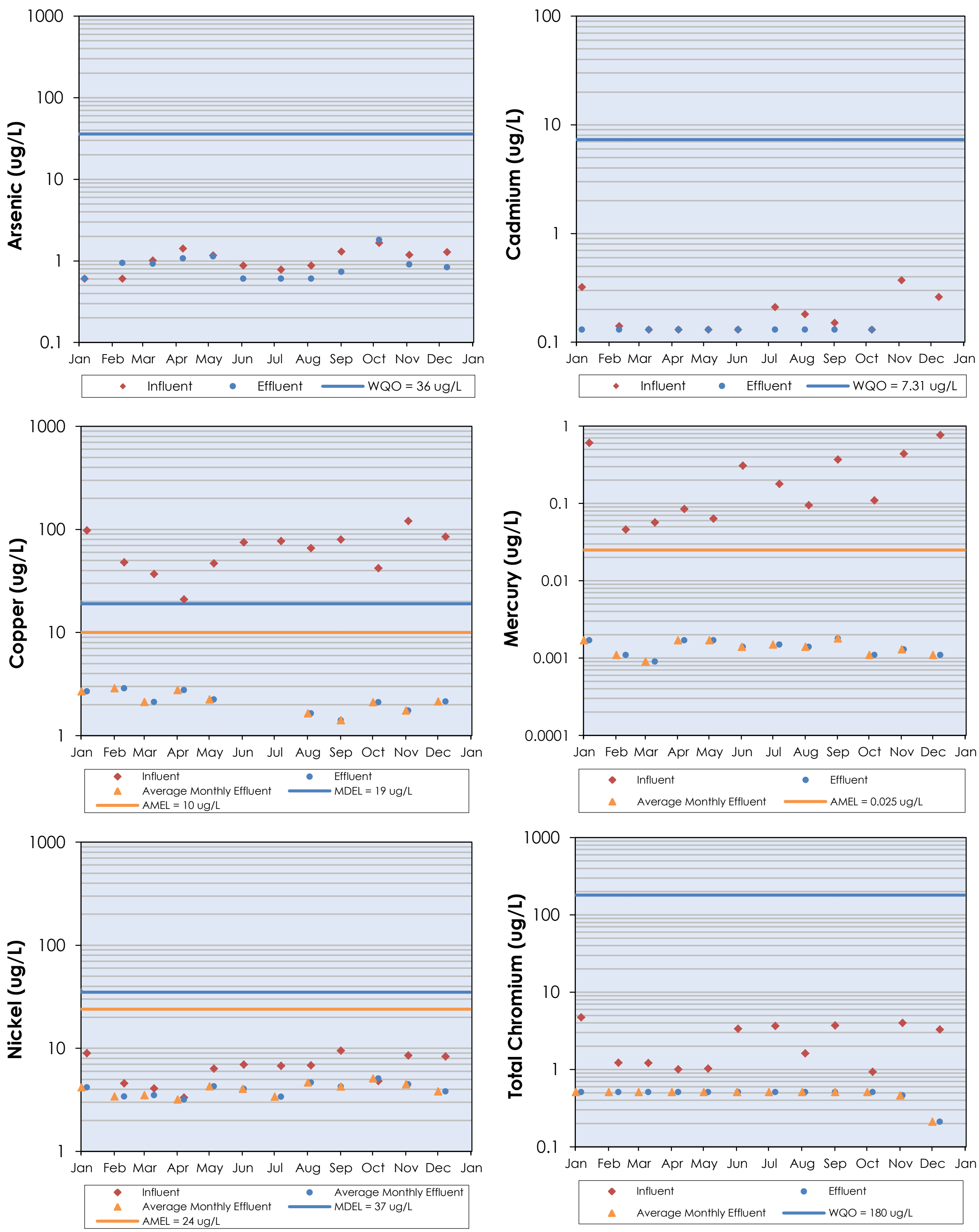

Figure 27: Concentrations of Common Metal Pollutants at the WPCP during 2015

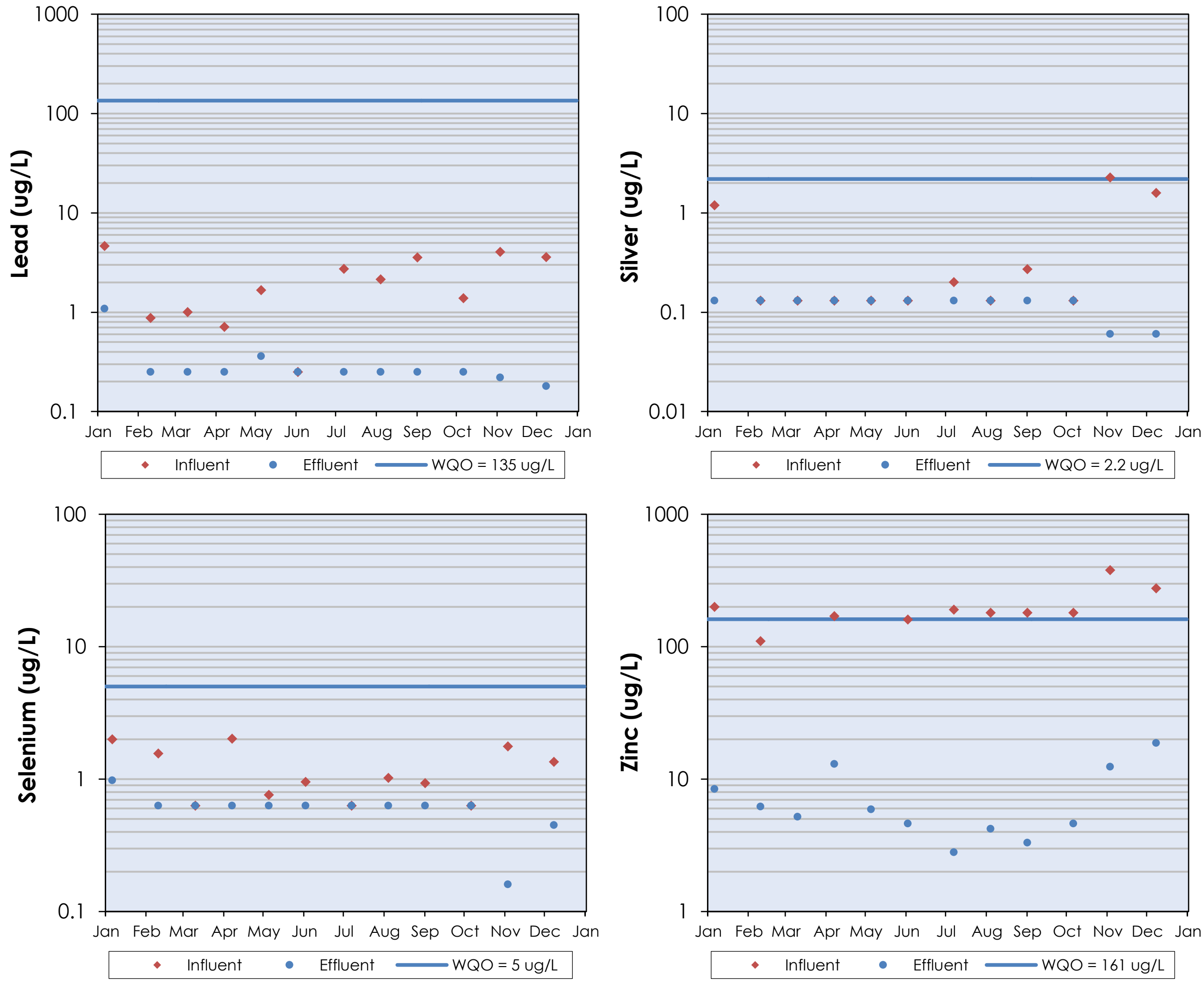

Figure 28: Concentrations of Common Metal Pollutants at the WPCP during 2015

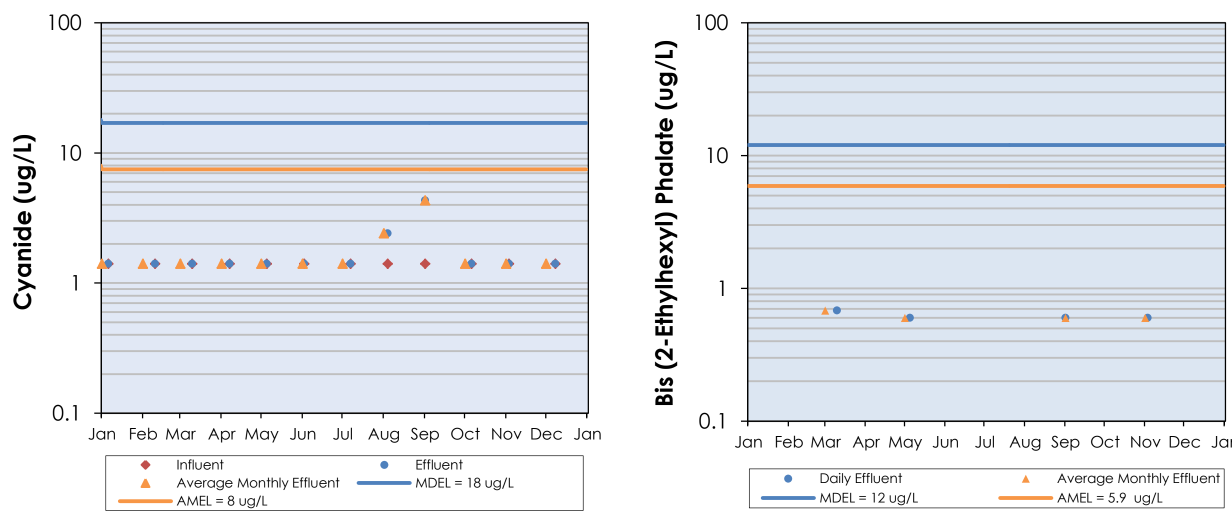

Figure 29: Concentrations of Common Organic Pollutants at the WPCP during 2015

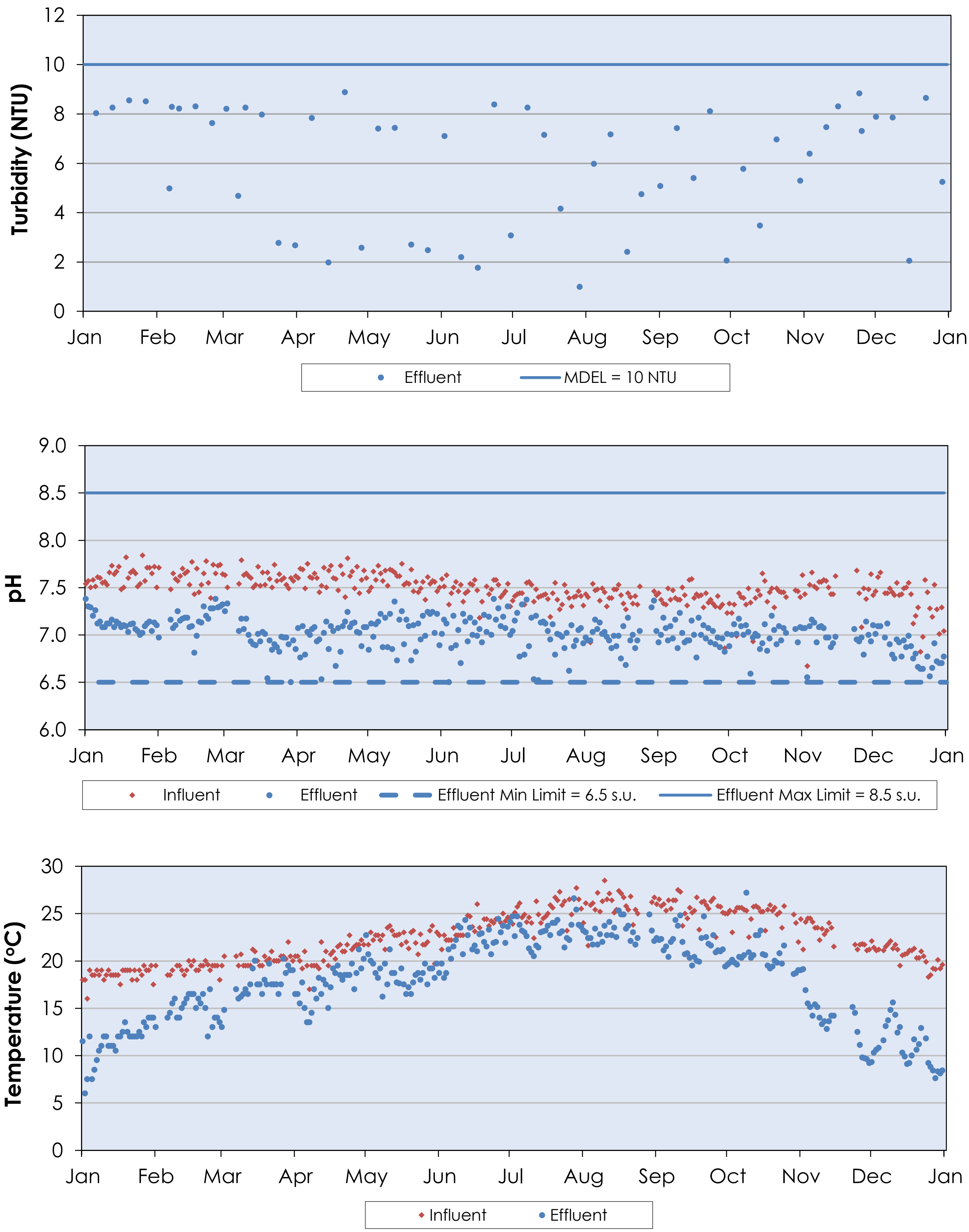

Figure 30: Common Physical Parameters at the WPCP during 2015

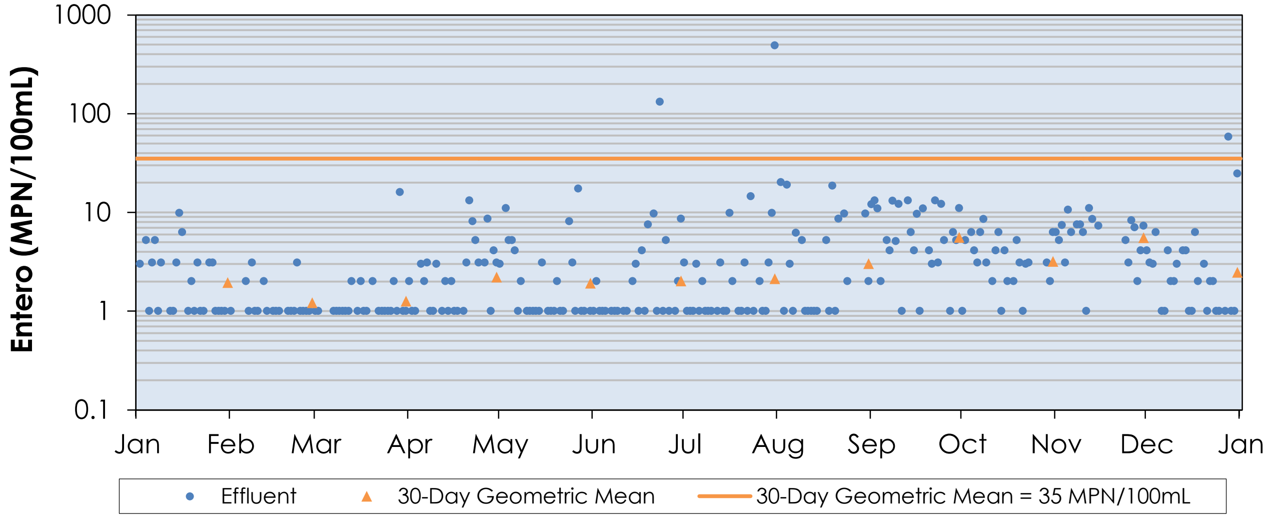

Figure 31: Effluent Enterococcus Measurements at the WPCP during 2015

2.1.2. Chronic Toxicity Effluent Triggers

The current permit requires the use of the diatom *Thalassiosira pseudonana* (**Figure 32**) for monthly chronic toxicity compliance testing. The NPDES permit contains effluent triggers for chronic toxicity if the single test maximum exceeds 2.0 toxicity units (TUc) and the three-sample median exceeds 1.0 TUc. **Table 2** lists results for testing conducted between January 2015 and December 2015. Of the twelve chronic toxicity tests that were conducted in 2015, minor toxicity was detected in only one test conducted in September. The algal growth IC25 was

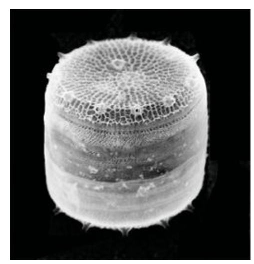

Figure 32: ***Thalassiosira pseudonana***

Table 2: Summary of Chronic Toxicity Testing Results for WPCP Effluent

Test # (Year)	Sample Dates	Growth TU_c	3-Sample Median (Growth TU_c)
1(2015)	1/7/15	<1	<1
2 (2015)	2/11/15	<1	<1
3 (2015)	3/11/15	<1	<1
4 (2015)	4/8/15	<1	<1
5 (2015)	5/6/15	<1	<1
6 (2015)	6/3/15	<1	<1
7 (2015)	7/8/15	<1	<1
8 (2015)	8/5/15	<1	<1
9 (2015)	9/2/15	1.1	<1
10 (2015)	10/7/15	<1	<1
11 (2015)	11/4/15	<1	<1
12 (2015)	12/9/15	<1	<1

93.8% effluent, resulting in a mild toxicity of 1.1 TUc. However, the test results did not exceed either of the above-referenced trigger values, which, if exceeded would require the WPCP to conduct accelerated monitoring and additional investigations.

2.1.3. Mercury Effluent Limitations and Trigger

The WPCP continues to be an active member of BACWA and participates in the annual submittal of water quality data pertaining to mercury discharge. In accordance with the Mercury and PCBs Watershed Permit, Permit CA0038849, reissued as Order R2-2012-0096, effluent mercury concentrations are measured monthly for regulatory compliance. During the reporting period, effluent mercury concentrations remained below the average monthly trigger (0.011 ug/L) and limit (0.025 ug/L). The annual effluent mercury loading for the City was 0.018 kg/yr, which is well below the permit limit of 0.12 kg/yr (**Figure 33**) and is an approximate 50% reduction compared with 2013 (0.0372 kg/yr) and 2014 (0.0361 kg/yr) loading rates. This decrease correlates well with those observed in CBOD (**Figure 21**) and TSS (**Figure 23**) loading rates, and is primarily attributed to increased recycled water production and the consequent diversion of treated wastewater from SF Bay discharge.

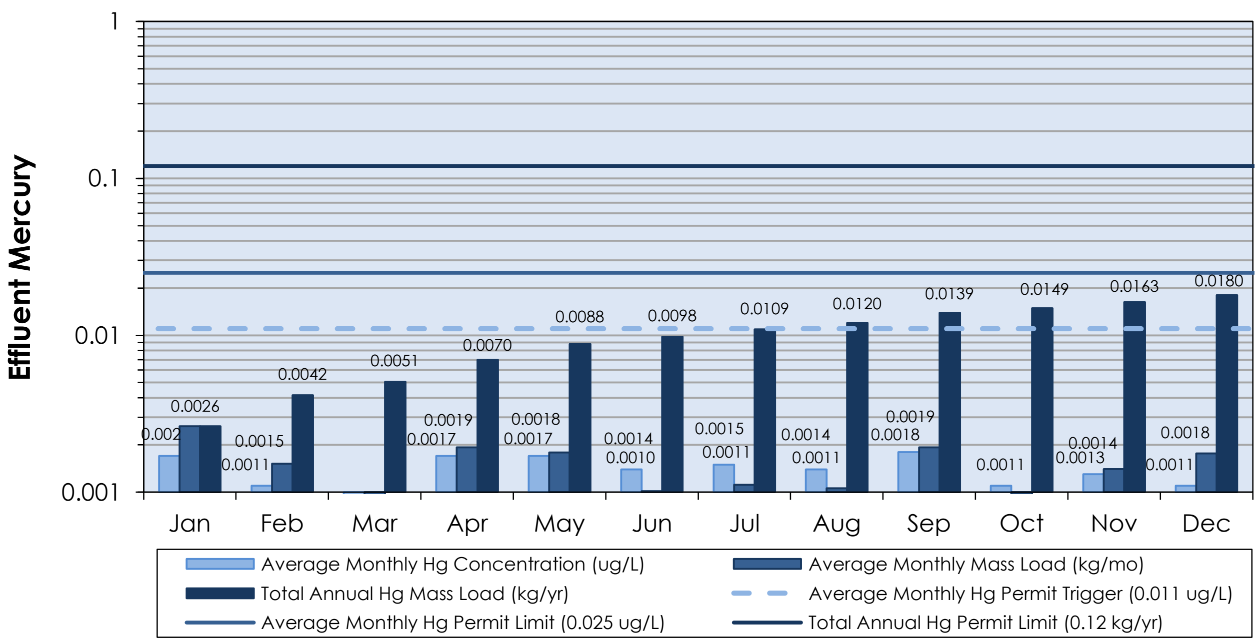

Figure 33: Effluent Mercury Concentrations and Loading Rates during 2015

2.1.4. PCB Effluent Limitations

The WPCP also participates in the annual submittal of water quality data pertaining to PCB discharge. In accordance with the Mercury and PCBs Watershed Permit, Permit CA0038849, reissued as Order R2-2012-0096, PCB concentrations are measured semi-annually as total aroclors using EPA Method 608 for regulatory compliance. PCBs were not detected using this method during the current reporting period (**Table 1**). In addition to the regulatory compliance monitoring, the WPCP is also required to measure total PCB congeners using EPA Proposed Method 1668c on a quarterly basis.

2.2. Avian Botulism Control Program

In accordance with Provision VI.C.5.A of Order R2-2014-0035, the City submits an annual *Avian Botulism Control Program Report* by February 28 for the preceding year. The program consists of monitoring for the occurrence of avian botulism and the collection of sick or dead birds and other dead vertebrates found along Guadalupe Slough, Moffett Channel, and the Oxidation Ponds and levees. Controls to limit the outbreak and spread of this disease consist primarily of the collection and proper disposal of sick and dead birds. The San Francisco Bay Bird Observatory was contracted by the City to locate and collect sick birds and dead vertebrates from June through November of 2015 when the potential for outbreak is the highest. WPCP Operations and Laboratory staff also conduct weekly surveys throughout the year around the Oxidation Ponds and collect sick, injured, or dead birds and mammals. No cases of avian botulism were identified during the 2015 reporting period.

2.3. NPDES Compliance Evaluation Inspection

On March 2, 2015, a representative from the RWQCB performed the annual NPDES Compliance Evaluation Inspection (CEI) at the WPCP. A report of their inspection findings was transmitted to the WPCP on May 21, 2015. Section XI of the CEI report listed the following three main findings requiring corrective action(s) on the part of the WPCP:

1. The Discharger needs to evaluate and streamline, as necessary, how the CMMS system tracks its maintenance work orders to reduce the number of work orders identified as overdue and to ensure that the facility is adequately maintained, repaired, and upgraded as required by Attachment G, section I.D.2.
2. The Discharger needs to update the Regional Water Board as to its progress in completing the following actions as required by Attachment D, section V.A:
    - Conversion from SM 4500-Cl C: Colorimetric (iodine) titration to SM4500-CL C: amperometric titration using Wallace & Tiernan A790 Amperometric Titrator
    - Addition of secondary sodium bisulfite dosing station
    - Installation of new PLC to control all flow control valves
    - Construction of catch basin/grated trench to prevent WPCP overflows from traveling offsite
3. The Discharger should update its O&M manual to include staffing requirements that, at a minimum, provide the following information:
    - Treatment Plant classification
    - Minimum certification requirements for operations personnel pursuant to Chapter 26, Title 23 of the California Code of Regulations
    - Organization chart
    - Shift schedule and typical task assignments

On June 30, 2015, the WPCP submitted a response letter to the RWQCB, detailing the completion of Findings #1 and #3, and a portion of Finding #2 (conversion from colorimetric to amperometric titration method). The additional corrective actions listed under Finding #2 have been incorporated into the

Hypochlorite Conversion and Continuous Recycled Water Production Facility project scheduled for completion in July 2016 (**Chapter IV, Section 5.0**). A more detailed account of the correction actions implemented in response to the report findings can be found in the June 30, 2015 letter entitled *City of Sunnyvale, Water Pollution Control Plant (NPDES No. CA0037621) – Response to Compliance Evaluation Inspection Report*.

III. Facility Reports

1.0. OPERATION AND MAINTENANCE MANUAL

The WPCP's Operation and Maintenance (O&M) Manual is maintained in both electronic and hard copy formats. The electronic version is located on the WPCP's network at J:\ESD\WPCP\General\Operations\O&M Manual. The O&M Manual's Table of Contents listings are hyperlinked to individual sections. From 2010 through 2014, the Manual was used extensively for training new WPCP Operators, and a number of minor corrections and revisions were noted. The corresponding changes were made to the master document, and the electronic version on the WPCP network was updated. Since most of the revisions were relatively minor or typographic in nature, replacement of the affected sections in all of the hard-copy O&M Manuals at the WPCP is being implemented only when significant updates are made to individual sections. WPCP Operators are aware that the electronic version is the most current.

The following sections of the O&M Manual were substantially revised or updated during 2015 and have been added to both the electronic and hard copy versions:

- *WPCP Overview Chapter*: This chapter was expanded to address recommendations contained in the Water Board's June 30, 2015 CEI Report related to information about WPCP classification, organization, Operator certification and shift scheduling. Information regarding the WPCP Laboratory and Pretreatment Program were also added, and minor revisions were made to the Liquid Process Flow schematic.
- *Fixed Growth Reactor Chapter*: Text was revised to incorporate a discussion of the Mode I operational testing, snail control treatment, and various operational measures implemented over the past two years to enhance mass removal of ammonia.
- *Polymer Feed Chapter*: Text and figures were revised to reflect new equipment and controls.
- *Anaerobic Digestion Chapter*: Text and figures were revised to reflect changes stemming from the Digester #1 and #2 rehabilitation project, which involves conversion from floating to fixed covers and replacement of virtually all piping, mechanical and electrical equipment and controls. The rehabilitation for Digester #1 was completed in November 2015. Work on Digester #2 has begun and is scheduled for completion in 2017. The draft of the revised chapter is currently being reviewed by WPCP Operations staff.
- *Flow Measurement Chapter*: Updated information regarding WPCP flowmeters.
- *Electrical One-Line Drawings*: Revisions were made to one-line drawings for the new Digester Motor Control Center (Fig 11-12b) and Landfill Gas Flare (Fig II-20) to reflect changes resulting from new construction in those areas. Minor changes were also made to drawings for Plant Electrical System Overview (Fig II-1), Sedimentation Motor Control Center (Fig II-15), Primary Control Building Emergency MCC (Fig II-16), and Lab/Tertiary Control Building Panels (Fig II-21).

In addition to the WPCP O&M Manual, the WPCP maintains an Operator in Training (OIT) Manual. This manual includes 35 "Ops Tasks" that address specific tasks in a highly detailed manner. New Operators must demonstrate proficiency in each Ops Task before being allowed to perform the task independently. The following Ops Tasks were updated in 2015:

- Ops Task #4 Sludge Pumping and Transfer System
- Ops Task #5 Raw Sludge Pumping System Operation
- Ops Task # 18 Float Pumping Station Operation
- Ops Task #23 Polymer Feed System Operation.docx
- Ops Task #35 Rotating LFGF blowers .doc

Ops Tasks are kept on the WPCP network at J:\ESD\WPCP\general\Operations\OIT Manual\OIT Manual Updated.

Finally, the WPCP also maintains a series of Standard Operating Procedures (SOPs), which also contain detailed instructions for certain operational and administrative tasks. A number of the SOPs are safety-related, such as those for confined space entry or loading or unloading of one-ton chlorine cylinders. Updating of WPCP SOPs is an ongoing process. In addition, every Operator is required to perform an annual review of every SOP. This process is tracked by support staff. These reviews feed into the annual SOP updating process. The following SOPs were updated in 2015:

Minor Edits/Updates

- SOP #1000I: SOP Approval Procedure
- SOP #1001D: Housekeeping Responsibilities
- SOP #1002D: Using the Telephone System at WPCP
- SOP #1003F: Entry to WPCP During Business Hours & Non-Business Hours
- SOP #1005B: Landfill Gas Flare Station
- SOP #1006B: PW-180 Blanket Order Request Form
- SOP #1008D: Authorized Use of Exercise Equipment at the WPCP
- SOP #1009C: CAL/OSHA Updates
- SOP #1011C: T-3 Composite Sampler Orientation after a Shutdown
- SOP #1012B: Tractor Replacement (De-watering) During Fleet Downtime
- SOP #1013C: Reporting Influent Incidents
- SOP #1020D: Corp Yard Automated Fuel System
- SOP #1021B: WPCP Mechanics Tools
- SOP #1030C: Front Desk Security
- SOP #1031B: WPC Operator Wastewater Certification Renewal, Certification Increase, and Examination Application
- SOP #2002D: Channel Monster Room Entry Procedures
- SOP #2003B: Auxiliary Pump Station Entry Procedures
- SOP #2004C: High Pressure Backflushing of Dual Media Filtration Head Loss Indicator Lines and Screens
- SOP #2010D: No Smoking Areas at WPCP
- SOP #2021B: Plant Shut-down Notification
- SOP #2025C: Management of Change in Acutely Hazardous Materials Processes Chlorine Gas Facility
- SOP #2026C: Welding, Brazing, Soldering, Cutting & Any Related Hot Work

- SOP #3001B: CL_2 Feed Room Exhaust Fans
- SOP #3004F: Chlorine Gas Leak Emergency Response
- SOP #3006F: Use of Two-Way Radios at the Water Pollution Control Plant (WPCP)
- SOP #3008B: Chlorine One-Ton Cylinder Leak Practice
- SOP #3015D: Distribution of Paychecks
- SOP #3016B: Pump and Equipment Washdown Procedure
- SOP #3017C: Bicycle Use and Maintenance
- SOP #3019B: Utility Power and Generator Outage Relay Trip Sheet
- SOP #3020B: Collecting Raw Sludge Samples
- SOP #3024C: HazMat Storage of Miscellaneous Items
- SOP #3028C: Cold Start-Up of Waste Gas Burner #1
- SOP #3033B: Chlorine Building Security System
- SOP #3034B: Main Heat Reservoir System – Shutdown, Draining & Start Up
- SOP #3038B: State Agency Notification for Wastewater Spills, Upsets, Bypasses or Permit Violations
- SOP #3040A: Scraping, Hosing and Flushing Dewatering Beds
- SOP #3041B: Securing Chlorine Feed to AFT Distribution Box or Post AFT Diffusers Prior to Tertiary Recirculation
- SOP #3045A: Biosolids Removal Procedures
- SOP #4000E: Taking Lube/Gear Oil Samples
- SOP #4001C: Two Man Electrical Procedure
- SOP #4002C: Circuit Breaker 52-0 Operation
- SOP #4003C: Main Heat Reservoir Pump #1 & #2 Selector Switch Operation
- SOP #4007B: Welding, Burning and Cutting
- SOP #4009B: Maintenance Call-In Procedure

Major Edits/Updates with Review; Awaiting Circulation

- SOP #1010D: Grit Pick Up Procedure (DRAFT)
- SOP #1022B: Universal Waste, Light Ballast, and Lead-Acid Battery Collection, Recycling or Disposal (DRAFT)
- SOP #1023C: Used Oil, Oily Waste, and Oil Filter Accumulation, Labeling & Recycling (DRAFT)
- SOP #2020E: Emergency Evacuation of the Sunnyvale WPCP (DRAFT)
- SOP #3002E: Chlorine Gas System Status Definitions (DRAFT)
- SOP #3003F: Procedures for Handling the Chlorine Gas System (DRAFT)
- SOP #3010B: Use of Pressure Washer (DRAFT)
- SOP #3027B: Ignition of Waste Gas Burners (DRAFT)
- SOP #3032E: Chlorine One Ton Delivery Procedure (DRAFT)
- SOP #3036B: Operations, Calibration, and Maintenance of ITX Multi Gas Monitors (DRAFT)
- SOP #3037C: Purge and Leak Testing of the Chlorine Liquid Supply Piping (DRAFT)
- SOP #4005D: Sedimentation Basin PM (DRAFT)

SOPs Added/Created

- SOP #2027A: Construction Site Safety (DRAFT)
- SOP #3029B: Chlorine Feed System Shutdown/Gas Evacuation Procedure (DRAFT)

Some of the above SOPs were revised and are in final review for management signature. The WPCP SOPs (including revision drafts) are kept at J:\ESD\WPCP\Admin\SupportServices\SOP Original Word Doc.

Finally, in 2015 Maintenance staff created the Plant Electrical Reference Manual. This Manual is a detailed compilation of information (mostly from existing sources) in electronic format for use by Operations and Maintenance staff. The Manual consists of 12 sections covering a wide range of topics, only portions of which are included in the O&M Manual. The Manual is located on the WPCP network at J:\ESD\WPCP\General\Maintenance\Electrical Reference Manual.

2.0. PLANT MAINTENANCE PROGRAM

The WPCP continues to use the Maximo computerized maintenance management system (CMMS) software as the core data management tool for its maintenance program. Electronic versions of Maximo documents reside on the WPCP network drive at J:\ESD\WPCP\WPCPData\SOPs\SOP - signed PDF.

The WPCP can use DataSplice handheld computing units and software to interface with the Maximo system. The DataSplice handhelds provide a field interface to work orders for corrective maintenance and preventative maintenance (PM) procedures, preventative operations procedures (POPs), and equipment information (via a bar-code reader) and also expedite data entry for work orders and other maintenance/process control measurements. The Maintenance section is considering supplementing the DataSplice units with laptop computers, whose larger screens would provide a more convenient interface for certain maintenance functions.

An outside consultant provides ongoing support for use and improvement of the Maximo CMMS. There are currently over 7,600 pieces of equipment identified in the Maximo equipment database. The system has improved the efficiency of the WPCP's Maintenance Program, and contributes to WPCP reliability through more timely access to maintenance information and work order status, better inventory control, and advanced features such as predictive maintenance. In a given year, the Maximo CMMS generates and tracks about 1,250 PMs that are performed by Maintenance staff, and about 15,000 POPs that are performed by Operations staff.

In 2015, WPCP operations and maintenance staff continued the ongoing process of updating (and where necessary, developing) PMs and POPs. The WPCP places a strong emphasis on preventative maintenance as a means to achieve high mechanical reliability. Staff members from both Operations and Maintenance sections perform preventative maintenance functions.

Some of the more significant non-CIP maintenance and upgrades to WPCP equipment in 2015 included:

- Rehabilitation of Headworks #1 and #3 Channel Macerators
- Replacement of #2 Raw Sludge Transfer Pump
- Rotated #2 and #3 FGR distribution arms to improve nitrogen removal
- Replacement of obsolete effluent residual chlorine discharge meter
- Replacement of #4 Filtered Water Pump discharge and check valve

- Upgrades to the OPTO SCADA system to increase system speed
- Replacement of the Digester Supernatant main header
- Replacement of the Main Influent Pump seal water supply header
- PGF #2 generator clean, dip and bake
- PGF #1 and #2 top end overhauls
- PGF #1 heat exchanger re-tubes
- Oxidation Pond levee weed removal

The WPCP uses an on-line system (D-A Lube) for tracking results from laboratory analysis of lubricating oil removed from WPCP equipment under the preventative maintenance program. D-A Lube provides rapid reporting of analytical results, and flags high contaminant levels and other conditions that may indicate mechanical problems (e.g. excessive wear, presence of moisture, etc.).

In addition, the WPCP continued upgrades to its OPTO SCADA system screens and programming.

3.0. WASTEWATER FACILITIES REVIEW AND EVALUATION

Provision VI.C.4.a requires that the City regularly review and evaluate its wastewater facilities and operational practices to ensure that the wastewater collection, treatment, and disposal facilities are adequately staffed, supervised, financed, operated, maintained, repaired, and upgraded as necessary, in order to provide adequate and reliable transport, treatment, and disposal of all wastewater from both existing and planned future wastewater sources under the City's service responsibilities. A description or summary of review and evaluation procedures, and applicable wastewater facility programs or CIP projects is included in each annual SMR.

The responsibility to conduct reviews of the WPCP, to develop goals, objectives and priorities, to formulate rules and procedures, and to maintain budgetary control are explicitly listed as duties of the Environmental Services Department (ESD) Division Managers (WPCP, Water and Sewer Services, Solid Waste and Recycling, and Regulatory Compliance), and of section managers within these divisions. In some cases, assistance for the review and evaluation process is provided through special studies conducted by outside consultants, such as the WPCP's Master Planning effort. These efforts are described elsewhere in this annual report. The Environmental Management Chapter of the City's General Plan also plays a role by establishing long-term goals and policies, and providing action statements designed to ensure their implementation. For the sewer system, metrics used to assess the effectiveness of collection system operations are described in the City's Sewer System Management Plan, which is audited on a biennial basis. Results of the current evaluation are summarized below, in other sections of this annual report, and in other regulatory and planning documents.

Facility Upgrades

Numerous WPCP upgrade projects are currently in progress as described above under **Section IV**. Also described in this section is the City's current WPCP Master Planning process. As indicated, a contract for the design of the new Primary Treatment Facilities was approved in 2013, and design is well underway with construction contract to be awarded in 2016. A consultant has been selected to provide Program

Management service for this and other Master Plan projects. In addition, a Construction Management contract was awarded in May 2015 to oversee the major rebuild of the WPCP.

Financing

The WPCP and Collection System are financed by revenues generated from fees levied on users of the sewer system. Sewer rates are evaluated periodically by a financial consultant to determine if revenues are sufficient to support current and future operations and maintenance, equipment replacement, and planned capital improvements. Utility rates are typically adjusted by the City Council each fiscal year to keep revenues and expenditures in balance. The Council adopted new utility rates in June 2015, approving a 8% increase in the rate for sewer service for Fiscal Year 2015/2016. This increase translates into a monthly increase of $2.97 for an average single-family residence and $1.92 for multi-family residences.

Capital and operating budgets are projected over a 20-year horizon and are updated on an alternating biennial cycle. The current capital budget projections include funding for major WPCP reconstruction and/or rehabilitation projects, which were ongoing in 2015. City budgets also provide for ongoing rehabilitation of the sewer system.

Collection System

The sanitary sewer collection system is operated and maintained by the ESD Water and Sewer Systems Division, whose offices are located at the City's Corporation Yard. Staffing is as follows (wastewater-related positions only):

- Managers: Water and Sewer Services Division Manager, Wastewater Operations Manager.
- Operations & Maintenance Staff: twelve full-time workers, including a wastewater collections supervisor, two wastewater collections crew leaders, two senior wastewater collections workers, four utility workers, and three maintenance workers.

WPCP and Water and Sewer Services operations are supported by local administrative staff at the WPCP and Corporation Yard, the ESD Director, the Department of Public Works Engineering Division (providing engineering support for CIP projects), and staff from other City Departments (City Attorney's Office, Purchasing, Finance, Human Resources). The City also has contracts with various consultant firms for technical and regulatory support, planning studies, engineering design for CIP projects, and other needs. The City believes that current staff allocation and supervision are sufficient to perform its mission and meet the requirements listed in the introduction to this section.

A series of prioritized CIP projects have been developed for the sewer system in addition to allocating funding annually for ongoing emergency or incidental sewer repair and rehabilitation. In 2015, the City completed a number of notable projects, including rehabilitating structural, mechanical, electrical, and SCADA elements of its five wastewater lift stations. In addition, the City completed the Collection System Wastewater Master Plan, which analyzed and developed alternatives for future wastewater CIP projects and funding. The City also initiated a condition assessment project (estimated completion in 2016) to clean and evaluate the Lawrence Sanitary Sewer Trunk Main and completed construction of two large vortex separators to remove trash from the collection system.

In 2016, the City will finalize design work for the Storm Pump Station No. 1 and Baylands Storm Pump Station No. 2 Rehabilitation Projects. The projects are projected to start construction in mid-2016. The City has also scheduled an upgrade to its GIS system and CCTV software and equipment to improve condition assessment capabilities. The City runs its own construction crews and does point repairs regularly, as well as manhole and lateral repairs.

Staffing and Supervision

The WPCP is operated and maintained by the ESD, WPCP Division, with offices at the WPCP. Staffing is as follows:

- Division Managers: The WPCP Division Manager is responsible for overall operation and maintenance of the WPCP. The Regulatory Programs Division Manager provides support to the WPCP Division on regulatory issues, and has responsibility for the Laboratory, Pretreatment Program, and Compliance Programs which also operate at the WPCP. Both Managers report to the ESD Director.
- WPCP Managers: The WPCP Chief Plant Operator and WPCP Maintenance Manager report to the WPCP Division Manager. The Lab Manager reports to the Regulatory Programs Division Manager.
- Operations staff: 25 full-time Operators including five senior Operators and 19 Operators.
- Maintenance staff: two Senior Mechanics, six Mechanics and one Senior Storekeeper.
- Laboratory staff: two Senior Environmental Chemists, three Chemists, and three Lab/Field Technicians.
- Industrial Pretreatment Program: One Senior Inspector, four Environmental Compliance Inspectors, and two Lab/Field Technicians.
- Compliance and Technical Support: One Senior Environmental Engineer and one Environmental Engineering Coordinator.

In addition, the City has created two new positions to support the WPCP during this time of significant CIP projects:

- Principal Design and Construction Operator: Provides supervisor level coordination, evaluation and scheduling work for all capital projects related to the reconstruction of the WPCP.
- WPCP Control Systems Integrator: Supervises and performs control system work of considerable complexity in the planning, design, construction, and operation of the WPCP.

Operations

WPCP operations are performed by a highly skilled group of State Water Board-certified Operators organized into five shifts (Day, Swing, Grave, Relief 1 and Relief 2). A minimum of four Operators are on duty at all times, including at least one Senior Operator. The WPCP places major emphasis on training new Operators as a way to maintain a high level of skill. The OIT Program provides both mentoring and rigorous training in all aspects of WPCP operations. The WPCP O&M Manual and OIT Training Manual are key elements of the OIT Program. In addition to demonstrating an understanding of the O&M Manual, OITs must also be familiar with applicable SOPs and be certified by a Senior Operator in 35 specific Operations Tasks before being allowed to perform those tasks independently. Safety training is an ongoing and mandatory process for all Operators, and numerous elective training and career advancement opportunities are also provided. Operators perform all routine WPCP operational tasks, special assignments, and are responsible for POPs, as described under the Plant Maintenance Program (**Section 2.0**). Operators receive ongoing support from the WPCP Chief Plant Operator, Division Manager, Support Services staff, and outside consultants.

Maintenance

WPCP Maintenance is performed by a skilled crew of six Maintenance Mechanics under the direction of the WPCP Maintenance Manager and the two Senior Mechanics. Maintenance staff members are responsible for most preventive and corrective maintenance tasks, with certain specialty maintenance functions (such as PGF engine overhauls) performed by outside contractors. Maintenance staff members also have mandatory training requirements and have opportunities for elective training. The Maintenance section uses the Maximo CMMS, as described under the Plant Maintenance Program (**Section 2.0**).

The Wastewater Collections Section utilizes the staffing described above for maintenance of the wastewater and stormwater sewer systems. The Division also utilizes outside contractors for specialty services, and receives engineering and regulatory support from other City work units and engineering consultants.

4.0. CONTINGENCY PLAN

On December 1, 1999, the WPCP submitted a revised Contingency Plan pursuant to Provision 10 of NPDES Order 98-053 and RWQCB Resolution 74-10. Since that time, the Plan has been updated annually, and was reprinted in 2005, 2007, 2012, and 2013.

For the 2015 annual review, the “Emergency Only” Telephone Notification List was updated and attached to the existing Plan.

Several projects currently planned or in progress will impact contingency operations at the WPCP. These include the Emergency Flow Management evaluation, the PGF Gas Improvement and Emergency Generator project, and the Primary Treatment Facilities project. The projects and their impacts on the Contingency Plan are discussed below.

Emergency Flow Management Evaluation

In 2014, the City embarked on an analysis to evaluate options for conveying raw wastewater around the WPCP’s Primary Treatment Facility in the event of an emergency situation where some or all of the facility was disabled. In addition, the WPCP evaluated an alternative means of conveying primary effluent to the Oxidation Ponds in the event of a failure of the existing primary effluent line. This task was part of the Emergency Flow Management Project (**Chapter IV, Section 3.0**). The effort included installation of a system for bypass pumping and alternative routing of primary effluent to the Oxidation Ponds so as to allow physical entry, inspection and condition testing of the primary effluent pipeline between the primary sedimentation basins and manhole MH5, immediately before the line passes under the "Cargill Pond" and discharges into the recirculation channel of the Oxidation Ponds (**Figure 34**). Also inspected was the primary bypass pipeline, which was originally designed to allow WPCP influent to flow directly to the Oxidation Ponds, bypassing the WPCP influent pumps and primary treatment process. Out of concerns for surcharging in the trunk sewers if such a bypass is used, and the existence of a redundant system for influent pumping (i.e., the Auxiliary Pump Station), the primary bypass pipeline has not been tested or used for over 25 years.

Figure 34: Primary bypass pipeline and Primary effluent pipeline inspection

The inspections found that the condition of the primary effluent pipeline was better than previously believed based on the 2006 Asset Condition Assessment Report, allowing its risk of structural failure and the potential to be downgraded. It also found the condition of the primary bypass pipeline to be generally good, although the line would need to be cleaned and its large flap gates rehabilitated or replaced in order to be serviceable. The primary bypass channel, which is part of the primary sedimentation basin structure and provides another means of bypassing the Primary Treatment Facility in the event of failure (but which requires functioning WPCP influent pumps), would also be available with relatively minor repairs to the numerous slide gates that are used to reroute flow.

A final report for Emergency Flow Management Project is expected in early 2016. Based on the report's findings and recommendations, the WPCP plans to address a potential failure of the primary effluent pipeline in connection with the WPCP Primary Treatment Facility reconstruction project, which will provide two key infrastructure components, including a new primary effluent junction structure and a new pipeline to divert primary effluent to the tertiary drainage line, providing an alternative means for primary effluent to reach the oxidation ponds. Construction of the new Primary Treatment Facility will begin in late 2016 and is expected to be complete in 2019. The existing primary effluent pipeline can then be taken out of service for rehabilitation. The new diversion pipeline will remain as a permanent backup means of routing primary effluent to the ponds.

To address a potential failure of the current primary treatment process, the WPCP plans to proceed with repairs and rehabilitation of the primary bypass pipeline and primary bypass channel, either or both of which could be used to bypass WPCP influent flow around the grit chambers and primary sedimentation basins in the event of a failure.[2] This will address the WPCP's most crucial vulnerability until such time as new Primary Treatment Facilities are constructed.

The above projects will impact the description of preventatives measures found in Section 4: Spill Prevention Plan of the Contingency Plan, specifically Table 1: Possible Sources of Treatment Plant Spills and Bypasses, which summarizes all potential major spills, their possible cause, consequences of the spill and preventative measures. These changes will be made as part of 2016 revisions.

Emergency Power Generation Projects

The PGF Gas Improvement and Emergency Generator Project (**Chapter IV, Section 3.0**), scheduled to begin construction in early 2016, will provide a 1,000 kW trailer-mounted portable diesel generator to provide power to select essential WPCP processes to continue operating during a loss of utility power. The WPCP's current operational strategy during utility power outages relies on the WPCP's digester gas driven influent pumps (which do not require electrical power) to deliver influent flow to the primary sedimentations basins, followed by gravity flow to the Oxidation Ponds, where the wastewater can be held in storage with the Tertiary Plant shut-down until power is restored. A smaller (80 kW) generator is used to power essential electrical loads in the Primary Treatment Facility during such times.

Additional backup power generation capacity will be provided as part of the Primary Treatment Facility reconstruction project. A backup diesel generator will be installed as an element of that project's upgrading of the WPCP's power distribution system

This project will change operational strategies during a utility power outage and will significantly enhance electrical power reliability at the WPCP. References to electrical power failures occur in Section 2.1 and throughout Section 3 of the Contingency Plan. The Contingency Plan will thus require significant revision and reprinting upon completion of the PGF Gas Improvement and Emergency Generator Project in late 2016 or early 2017. For the 2015 update, the above narrative will be attached to the current (May 2012) version of the Plan.

5.0. SPILL PREVENTION CONTROL AND COUNTERMEASURE

In 2010, a new section was added to the Contingency Plan to specifically address the Spill Prevention Plan requirements of NPDES Permit Attachment G. The Spill Prevention Control and Countermeasure (SPCC) Plan is documented in Section 4 of the Contingency Plan and has not changed. In addition to this document, the WPCP's SPCC Plan addresses spill response for non-wastewater spills at the WPCP.

[2] The "crossover tubes" that connect the ten grit chambers to their corresponding sedimentation basins are deemed most vulnerable to seismic failure. Failure of one or more crossover tubes would result in flooding of the sedimentation gallery.

IV. CAPITAL IMPROVEMENT PROGRAM

1.0. OVERVIEW

The City is in the process of developing a comprehensive Master Plan for the WPCP and is aligning resources to escalate the rate of capital project implementation at the WPCP. The original components of the WPCP were completed in 1956, many of which are still in service. Most of the other major components of the WPCP were completed over the subsequent 15-20 years, with the exception of the PGF, Toxic Gas Ordinance scrubber, and Dewatering Area. Based on a 2006 Asset Condition Assessment Report, the City began implementing several rehabilitation projects and also developed a long-term Strategic Infrastructure Plan to serve as a road map for the physical improvements and process enhancements needed to maintain a high level of treatment and to meet current and expected regulatory requirements and stewardship objectives. To help implement the Strategic Infrastructure Plan, in 2013, the City secured the professional services of an engineering design team of consultants to develop a comprehensive Master Plan, which included the "basis of design" development for the various process areas to be rebuilt and a programmatic environmental impact report (PEIR). The implementation of the Master Plan is estimated to cost around $400 million in the next 20 years.

The City is embarking on a Capital Improvement Program (CIP) to address identified needs and commence the first stage of the Master Plan. The CIP projects are intended to maintain or enhance WPCP reliability. Virtually every process at the WPCP will be improved upon in some manner, and more than one process may be influenced by a single project, such as the Primary Treatment Facilities Design and Construction project. **Table 3** lists all the projects included in the CIP. Key projects currently underway are highlighted in the table and presented in CIP Fact Sheets in the preceding sections[3]. During fiscal year 2014-2015, the City expended approximately $11.8 million on select CIP projects.

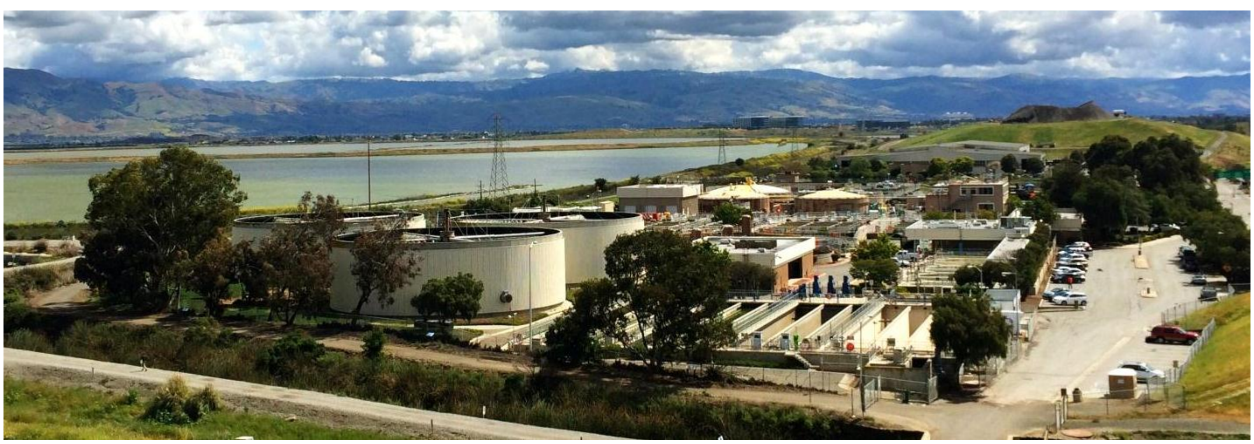

Figure 35: View of WPCP looking east

[3] CIP information gathered from the *Adopted Budget and Resource Allocation Plan for the City of Sunnyvale Fiscal Year 2015-2016, Volume III – Project Budget*.

Table 3: Summary of CIP Projects, Estimated Costs and Completion Dates

CIP Project Name	Estimated Project Life Total Cost	Estimated Completion Date	Treatment Process Improvements					
			Headworks	Primary	Secondary	Advanced Secondary	Solids Handling	PGF
Air Flotation Tank Construction	$ 4,891,579	2015				X		
Emergency Flow Management	$ 2,883,001	2016		X				
Anaerobic Digester Rehabilitation	$ 13,622,000	2016					X	X
Hypochlorite Conversion & Continuous Recycled Water Production Facilities	$ 5,761,210	2016				X		
Gas Improvement and Emergency Generator	$ 2,450,000	2024						X
Oxidation Ponds and Digester Solids Dewatering	$ 23,514,210	2023			X			
Primary Treatment Facilities Design and Construction	$ 120,899,541	2019	X	X				
Master Plan	$ 8,100,400	2016	X	X	X	X	X	X
Construction of New WPCP	$ 151,649,131	2024	X	X	X	X	X	X
WPCP Asset Condition Assessment	$ 356,751	2024						
Primary Process Repairs	$ 954,000	2016		X				
Secondary Process Repairs	$ 550,000	2016			X			
Tertiary Process Repairs	$ 1,310,000	2016				X		
Laboratory Information Management System (LIMS)	$ 250,000	2016	X	X	X	X	X	
WPCP Program Management	$ 28,521,787	2024	X	X	X	X	X	X
Support Facilities Repairs	$ 702,404	2020	X	X	X	X	X	X
Solids/Dewatering Repairs	$ 100,000	2016						X
Oxidation Pond Levee Rehabilitation	$ 150,000	2016			X		X	
CIP Total	***$ 366,666,014***							

Notes:
1) Rows highlighted indicate major CIP projects presented in CIP Fact Sheets in the preceding section.
2) All values reported in current dollars.

2.0. AIR FLOTATION TANK CONSTRUCTION

WPCP
CIP Fact Sheet

PROJECT TITLE:

AFT CONSTRUCTION

CONSTRUCTION FIRMS:

- **DW NICHOLSON (AFTs #2/3)**
- **ANDERSON PACIFIC (AFTs #1/4)**

START DATE:

MARCH 2014

PROJECT STATUS:

COMPLETED 2015

Air Flotation Tank Construction

WHAT IS IT?

This project includes the repair/ replacement of the influent gates and coating of the concrete walls on Air Flotation Tanks (AFTs) #1-4, thereby extending their life approximately 15-20 years. In addition, the project includes the replacement of the pressurization tanks on each AFT, a collector drive on AFT #4, and other mechanical components.

This photo, taken in 2009, gives us a glimpse inside one of the aging AFTs.

WHY?

AFTs are used to remove algae entrained in the wastewater stream during secondary treatment in the Oxidation Ponds. Effective algae removal ensures that water discharged to SF Bay complies with turbidity regulatory standards. AFTs #1-3 were built in 1975 and AFT #4 in 1982, and all are in need of significant rehabilitation.

3.0. EMERGENCY FLOW MANAGEMENT

WPCP CIP Fact Sheet

PROJECT TITLE:

GAS IMPROVEMENTS AND EMERGENCY GENERATION

CONSTRUCTION FIRM:

ANDERSON PACIFIC

START DATE:

JANUARY 2016

PROJECT STATUS:

IN PROGRESS—SCHEDULED FOR COMPLETION IN DECEMBER 2019

Emergency Flow Management

WHAT IS IT?

GAS IMPROVEMENTS

The current operation of the Air Blended Natural Gas (ABNG) system does not provide adequate mixing or control of consistent BTU value to each 800 kW Caterpillar generator engine. The recommended changes are summarized in the following:

- Upgrade system capacity to accept a NG (undiluted) feed stream
- Relocate the feed point of the ABNG stream to upstream of the LFG blowers
- Install a gas chromatograph on the blended gas stream just upstream of the PGF

EMERGENCY GENERATOR

The Emergency Standby generator will provide standby power for existing Primary Influent Pump Station, Auxiliary Pump Station (APS) and other essential Tertiary treatment equipment.

WHY?

GAS IMPROVEMENTS

These improvements significantly increase the reliability of the PGF engines and reduce engine breakdowns, allowing the WPCP to reliably offset energy consumption.

EMERGENCY GENERATOR

Currently, the power generating engines are not configured to provide in-house power to various critical wastewater process systems. The generator will provide standby power to ensure continued operation of the WPCP in the event of a power outage.

PROJECT AREAS

4.0. ANAEROBIC DIGESTER REHABILITATION

WPCP CIP Fact Sheet

PROJECT TITLE:

DIGESTER REHABILITATION

CONSTRUCTION FIRM:

AZTEC CONSTRUCTION

START DATE:

JANUARY 2014

PROJECT STATUS:

IN PROGRESS — SCHEDULED FOR COMPLETION IN MAY 2016

Anaerobic Digester Rehabilitation

WHAT IS IT?

The Digester Rehabilitation project focuses on the design and construction to renovate digesters #1 & 2. This includes replacement of lids, rehabilitation and seismic retrofit of the digester tanks themselves, the sludge mixing equipment, and related peripheral equipment. The structural integrity of the digester lids must be maintained to prevent releases of potentially hazardous methane gas that could pose the potential for explosion and/or result in BAAQM violations.

Contractors working on a digester lid in May 2014

WHY?

Digesters #1 and #2 were built in 1955. The digester lids have deteriorated, and methane gas has been found between the structural layers of the lids. Spot repairs have been completed and have provided some addition to the lids' useful life, but are no longer adequate. To prevent failure, the lids need to be replaced. Replacement is estimated to extend the life of the digesters by 30 years.

5.0. HYPOCHLORITE CONVERSION & CONTINUOUS RECYCLED WATER PRODUCTION

WPCP CIP Fact Sheet

PROJECT TITLE:

HYPOCHLORITE & RECYCLED WATER CONSTRUCTION

CONSTRUCTION FIRM:

ANDERSON PACIFIC

START DATE:

May/July 2015

PROJECT STATUS:

IN PROGRESS

Sodium Hypochlorite Conversion & Continuous Recycled Water

WHAT IS IT?

SODIUM HYPOCHLORITE: This project provides for the design and construction of a liquid chlorine disinfection system to replace the existing gaseous chlorine system.

RECYCLED WATER: The Recycled Water project provides the design and construction of a separate process for increased recycled water production that can occur simultaneously with discharge to the SF Bay.

Construction area for new Recycled Water pumping station.

WHY?

SODIUM HYPOCHLORITE: Chlorine gas is extremely hazardous and most POTWs have transitioned away from its use in their disinfection process. The WPCP plans to use a combination of less hazardous liquid chlorine derived from sodium hypochlorite and ultraviolet (UV) light for disinfection.

RECYCLED WATER: Recycled Water is currently produced at the WPCP through a labor intensive batch process that incurs high chemical costs and does not allow for simultaneous discharge to the SF Bay. Having a separate process will reduce cost and provide a more stable and reliable product to end-users.

PROJECT AREAS

6.0. OXIDATION POND AND DIGESTER SOLIDS DEWATERING

WPCP CIP Fact Sheet

PROJECT TITLE:

POND AND DIGESTER SOLIDS DEWATERING

CONSTRUCTION FIRM:

SYNAGRO

START DATE:

JANUARY 2014

PROJECT STATUS:

IN PROGRESS

Synagro Dewatering

WHAT IS IT?

The Synagro Dewatering project was initiated in 2009 to address the accumulation of solids in the Oxidation Ponds through dredging and pumping a slurry to a centrifuge to remove water prior to hauling it off site for beneficial reuse. Prior to this project, no solids had been removed since inception of secondary pond treatment in the late 1960s. In 2015, the Synagro solids processing work site was relocated to the north side of the primary sedimentation basins to make way for the new Primary Treatment Facility.

New Synagro Dewatering Area

WHY?

According to a 2006 study, solids carried over from various stages in the WPCP's treatment process have accumulated to an estimated 35-45%, resulting in a decline in treatment capacity and efficacy. Based on the successful dredging rates in 2014/15, this rate of activity will need to continue into 2015/16. At that point, the development of the WPCP Master Plan will be complete, which will define the future uses of the Oxidation Ponds.

PROJECT AREAS

7.0. PRIMARY TREATMENT FACILITIES DESIGN AND CONSTRUCTION

WPCP CIP Fact Sheet

PROJECT TITLE:

PRIMARY TREATMENT FACILITIES DESIGN AND CONSTRUCTION

DESIGN FIRM:

CAROLLO ENGINEERS

CONSTRUCTION FIRM:

TBD

START DATE:

PENDING

PROJECT STATUS:

IN PROGRESS

Primary Treatment Facilities

WHAT IS IT?

The Primary Treatment Facilities project includes the phased design and construction of the replacement of the current headworks, primary sedimentation tanks, influent pump station, grit removal facilities, and associated electrical, mechanical, and control systems. The current Primary Treatment process at the WPCP removes 50-70% of solids and floating material from the wastewater stream using a combination of 10 Preaeration Tanks and Sedimentation Basins that are reinforced concrete structures with process piping, mechanical drives and motors, and associated instrumentation.

WHY?

The oldest of the Primary Sedimentation Basins were part of the original plant built in 1955. The concrete in these tanks is eroding and exposing the reinforced steel inside the structures. In addition, the tanks were built before the current, more stringent seismic requirements were put in place, leaving the current structures vulnerable to earthquake damage. The WPCP Strategic Infrastructure Plan was completed in 2010, and recommended full replacement and relocation of primary treatment, influent pumping and headworks, grit removal, and power distribution facilities, to the current sludge drying paved area east of the current primary tanks. The 100% design for Package 1, Site Development is completed and is expected to go out for bid in February 2016. Primary Package 2 design under review, and is expected to be completed by mid-year 2016.

8.0. MASTER PLAN

WPCP CIP Fact Sheet

PROJECT TITLE:

MASTER PLAN

DESIGN FIRM:

CAROLLO ENGINEERS

START DATE:

N/A

PROJECT STATUS:

N/A

WPCP Master Plan

WHAT IS IT?

The Master Plan project is related to the WPCP reconstruction program. Carollo Engineers will be preparing preliminary engineering studies, reports and investigations necessary to further analyze and develop the concepts outlined in the Strategic Infrastructure Plan. Carollo will also be responsible for preparing the Programmatic Environmental Impact Report for the entire program. The final outcome of this project will include taking each of the program's design elements to the 10% design stage and completing all the necessary, related design standards. At the conclusion of this project, the program will be fully developed and all the necessary design and construction packages will be defined. The City can then begin implementing the design and construction of the various components necessary to reconstruct the WPCP.
Carollo engineers will be responsible for preparing a Master Plan, site planning, and creating a Programmatic Environmental Impact Report (PEIR) for the entire reconstruction effort, including public outreach. They will also be responsible for the Engineering design and construction support services for the primary treatment facility.

WHY?

The goal of this project is to further analyze those concepts and develop a master plan for reconstructing the WPCP. This is essential so that the City can fully understand the scope, schedule, and budget for the entire reconstruction program and have a well thought out plan to complete it.

PROJECT AREAS

V. PERMIT SPECIAL STUDIES

Under Provision VI.C of the previous Order (R2-2009-0061), the City was required to perform several special studies, including 1) Chronic Toxicity Identification and Toxicity Reduction Study; 2) Receiving Water Ammonia Characterization Study; and 3) Total Suspended Solids Removal Study. All of these special studies were completed and reported prior to 2015. The current Order (R2-2014-0035) does not contain any special study provisions.

VI. OTHER STUDIES AND PROGRAMS

1.0. EFFLUENT CHARACTERIZATION STUDY AND REPORT

The WPCP is required under Provision VI.C.2 of its current NPDES permit to continue to characterize and evaluate the final effluent to verify that the "no" or "unknown" reasonable potential analysis conclusions of the current Order remain valid and to inform the next permit issuance. The results of the effluent monitoring for priority pollutants are included in **Attachment C**. No pollutants were identified as having reasonable potential based on the 2015 results, and no significant increases were observed between the datasets where analytical results were above detection limits.

2.0. NUTRIENT MONITORING FOR REGIONAL NUTRIENT PERMIT

In 2015, the City continued to collect influent and effluent samples for analysis of nutrients in accordance with the RWQCB's April 2014 regional NPDES Permit for nutrients, Order R2-2014-0014. As required by that Order, results from the WPCP's ongoing monitoring are submitted electronically to CIWQS in monthly SMRs. These results are compiled by BACWA into a group annual report and submitted to the RWQCB. Therefore, the results will not be discussed in detail in this report.

3.0. DILUTION STUDY

In 2013, a *Preliminary Dilution Study* was conducted to analyze the spatial and temporal dilution of WPCP effluent in Moffett Channel and Guadalupe Slough, based on data collected as part of a receiving water study for ammonia required under the WPCP's previous NPDRES permit (R2-2009-0061). A second study was completed in 2014/15 to further substantiate the original analysis. Subsequently, a numeric model used to estimate dilution was developed and is currently under review.

4.0. REGIONAL WATER MONITORING PROGRAM AND RECEIVING WATER MONITORING REQUIREMENTS

Provision VI in Attachment E requires the City to continue its participation in the Regional Water Monitoring Program (RMP), which was formally established in 1993. This monitoring is necessary to characterize the receiving water and the effects of the discharges authorized in R2-2014-0035. The City's RMP participation is documented in a letter issued by BACWA annually.

The City is also required to monitor receiving waters at or between RMP monitoring station C-1-3 and Sunnyvale station C-2-0 (**Figure 36**) near the confluence of Guadalupe Slough and Moffett Channel to provide data necessary for reasonable potential analyses for unionized ammonia. This is the area where the highest un-ionized ammonia would be expected based on the *Receiving Water Ammonia Characterization Study – Final Report*, dated April 15, 2012. The parameters to sampling include salinity, temperature, pH, and total ammonia as nitrogen.

This sampling needs to occur over a 12 month contiguous period sometime over the duration of the Permit. The permit provides two alternatives for meeting this requirement:

- The City may conduct this receiving water monitoring on its own or
- Rely upon equivalent data obtained following another alternative approach through the RMP or in coordination with others.

Before pursuing an alternative approach, the City will first obtain written concurrence from the RWQCB's Executive Officer that the alternative approach is equivalent to the monitoring described above. The City will then submit the data in a report with its application for permit reissuance. The City is evaluating how it will meet this monitoring requirement, but anticipates that the monitoring will be conducted during the third quarter of 2017.

Figure 36: RMP monitoring station locations along Guadalupe Slough

ATTACHMENTS

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ATTACHMENT A

Wastewater Treatment Process:

Liquids and Solids Handling Process Schematics

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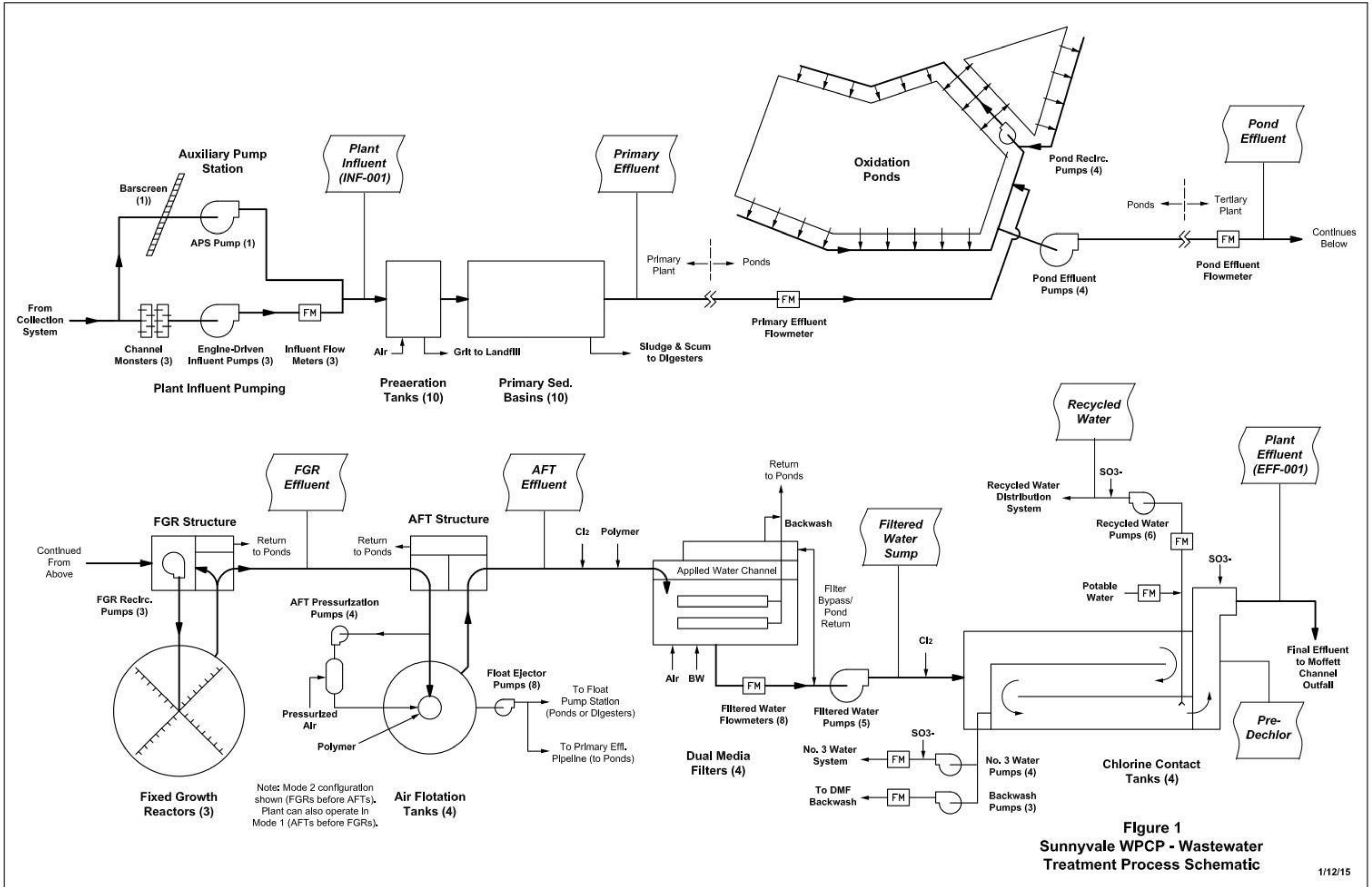

Figure 1
Sunnyvale WPCP - Wastewater Treatment Process Schematic

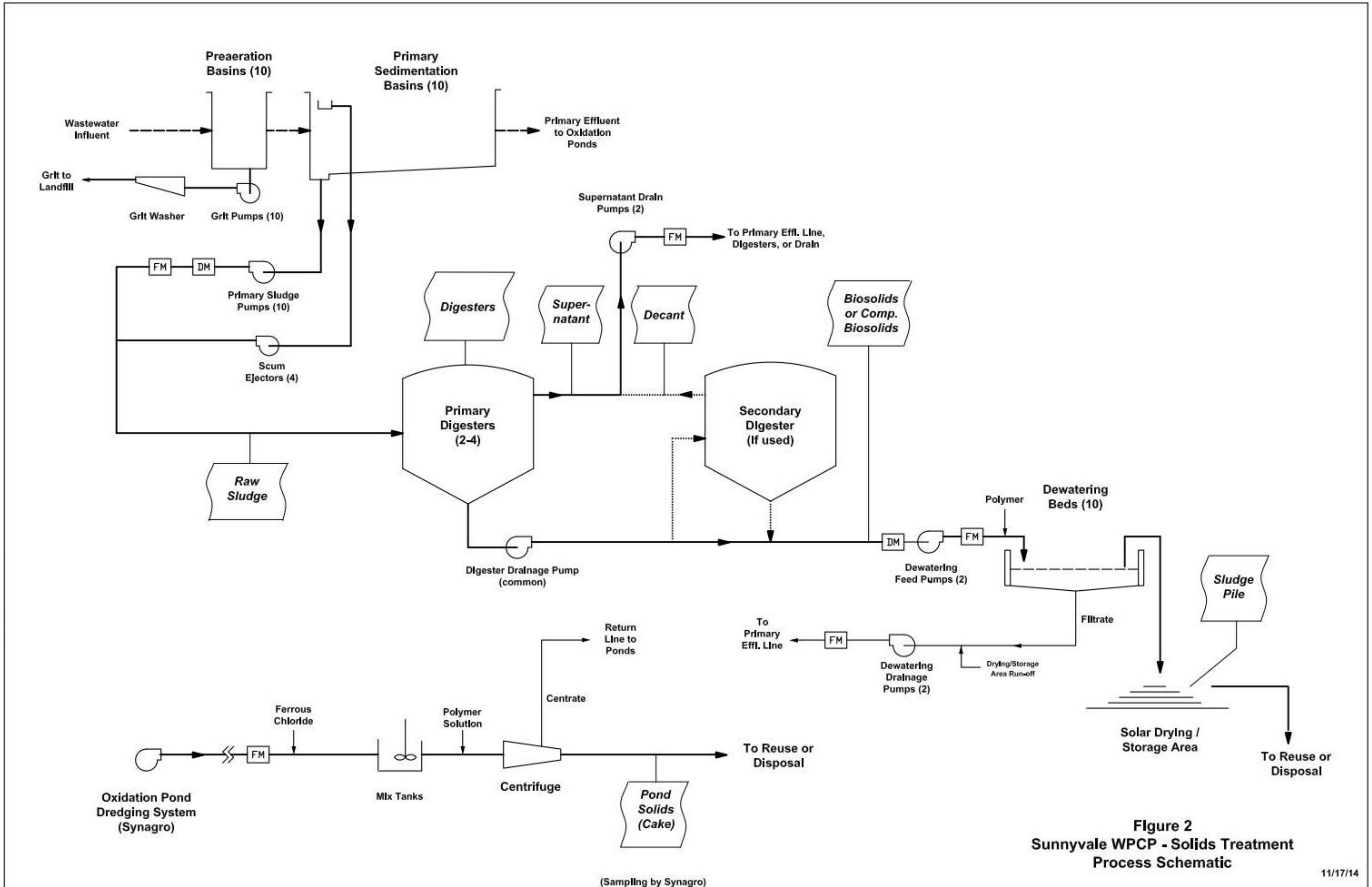

Figure 2
Sunnyvale WPCP - Solids Treatment
Process Schematic

ATTACHMENT B

WPCP Certificate of Environmental Accreditation

WPCP Approved Analyses

CALIFORNIA
Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

CALIFORNIA STATE

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

CERTIFICATE OF ENVIRONMENTAL ACCREDITATION

Is hereby granted to

City of Sunnyvale Environmental Laboratory

Environmental Services Dept., Regulatory Programs Division

1444 Borregas Avenue

Sunnyvale, CA 94088

Scope of the certificate is limited to the
"Fields of Testing"
which accompany this Certificate.

Continued accredited status depends on successful completion of on-site, proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **1340**

Expiration Date: **10/31/2016**

Effective Date: **11/01/2014**

Sacramento, California
subject to forfeiture or revocation

Christine Sotelo, Chief
Environmental Laboratory Accreditation Program

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

City of Sunnyvale Environmental Laboratory
Environmental Laboratory
1444 Borregas Avenue
Sunnyvale, CA 94089
Phone: (408) 730-7276

Certificate No.: 1340
Renew Date: 10/31/2012

Field of Testing: 101 - Microbiology of Drinking Water

101.010	001	Heterotrophic Bacteria	SM9215B
101.060	002	Total Coliform	SM9223
101.060	003	E. coli	SM9223

Field of Testing: 102 - Inorganic Chemistry of Drinking Water

102.030	003	Chloride	EPA 300.0
102.030	006	Nitrate	EPA 300.0
102.030	008	Phosphate, Ortho	EPA 300.0
102.030	010	Sulfate	EPA 300.0
102.100	001	Alkalinity	SM2320B
102.121	001	Hardness	SM2340C
102.130	001	Conductivity	SM2510B
102.163	001	Chlorine, Free and Total	SM4500-Cl G
102.200	001	Fluoride	SM4500-F C
102.500	004	Sodium	SM3111B
102.540	001	Calcium	SM3500-Ca B (20th)

Field of Testing: 103 - Toxic Chemical Elements of Drinking Water

103.010	002	Copper	SM3111B
103.010	003	Iron	SM3111B
103.010	010	Zinc	SM3111B
103.040	002	Antimony	SM3113B
103.040	003	Arsenic	SM3113B
103.040	005	Beryllium	SM3113B
103.040	006	Cadmium	SM3113B
103.040	007	Chromium	SM3113B
103.040	008	Copper	SM3113B
103.040	010	Lead	SM3113B
103.040	012	Nickel	SM3113B
103.040	013	Selenium	SM3113B
103.040	014	Silver	SM3113B

Field of Testing: 104 - Volatile Organic Chemistry of Drinking Water

104.040	000	Volatile Organic Compounds	EPA 524.2
104.040	001	Benzene	EPA 524.2
104.040	007	n-Butylbenzene	EPA 524.2
104.040	008	sec-Butylbenzene	EPA 524.2
104.040	009	tert-Butylbenzene	EPA 524.2

As of 6/11/2013 , this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

City of Sunnyvale Environmental Laboratory

Certificate No 1340
Renew Date: 10/31/2012

104.040	010	Carbon Tetrachloride	EPA 524.2
104.040	011	Chlorobenzene	EPA 524.2
104.040	015	2-Chlorotoluene	EPA 524.2
104.040	016	4-Chlorotoluene	EPA 524.2
104.040	019	1,3-Dichlorobenzene	EPA 524.2
104.040	020	1,2-Dichlorobenzene	EPA 524.2
104.040	021	1,4-Dichlorobenzene	EPA 524.2
104.040	022	Dichlorodifluoromethane	EPA 524.2
104.040	023	1,1-Dichloroethane	EPA 524.2
104.040	024	1,2-Dichloroethane	EPA 524.2
104.040	025	1,1-Dichloroethene	EPA 524.2
104.040	026	cis-1,2-Dichloroethene	EPA 524.2
104.040	027	trans-1,2-Dichloroethene	EPA 524.2
104.040	028	Dichloromethane	EPA 524.2
104.040	029	1,2-Dichloropropane	EPA 524.2
104.040	033	cis-1,3-Dichloropropene	EPA 524.2
104.040	034	trans-1,3-Dichloropropene	EPA 524.2
104.040	035	Ethylbenzene	EPA 524.2
104.040	037	Isopropylbenzene	EPA 524.2
104.040	039	Naphthalene	EPA 524.2
104.040	041	N-propylbenzene	EPA 524.2
104.040	042	Styrene	EPA 524.2
104.040	044	1,1,2,2-Tetrachloroethane	EPA 524.2
104.040	045	Tetrachloroethene	EPA 524.2
104.040	046	Toluene	EPA 524.2
104.040	048	1,2,4-Trichlorobenzene	EPA 524.2
104.040	049	1,1,1-Trichloroethane	EPA 524.2
104.040	050	1,1,2-Trichloroethane	EPA 524.2
104.040	051	Trichloroethene	EPA 524.2
104.040	052	Trichlorofluoromethane	EPA 524.2
104.040	054	1,2,4-Trimethylbenzene	EPA 524.2
104.040	055	1,3,5-Trimethylbenzene	EPA 524.2
104.040	056	Vinyl Chloride	EPA 524.2
104.040	057	Xylenes, Total	EPA 524.2
104.045	001	Bromodichloromethane	EPA 524.2
104.045	002	Bromoform	EPA 524.2
104.045	003	Chloroform	EPA 524.2
104.045	004	Dibromochloromethane	EPA 524.2
104.045	005	Trihalomethanes	EPA 524.2
104.050	002	Methyl tert-butyl Ether (MTBE)	EPA 524.2
104.050	006	Trichlorotrifluoroethane	EPA 524.2

Field of Testing: 107 - Microbiology of Wastewater

107.020	001	Total Coliform	SM9221B

As of 6/11/2013 , this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

107.242	001	Enterococci	Enterolert
Field of Testing: 108 - Inorganic Chemistry of Wastewater			
108.020	001	Conductivity	EPA 120.1
108.090	001	Residue, Volatile	EPA 160.4
108.110	001	Turbidity	EPA 180.1
108.120	002	Chloride	EPA 300.0
108.120	004	Nitrate	EPA 300.0
108.120	008	Sulfate	EPA 300.0
108.360	001	Phenols, Total	EPA 420.1
108.410	001	Alkalinity	SM2320B
108.421	001	Hardness	SM2340C
108.441	001	Residue, Filterable	SM2540C
108.442	001	Residue, Non-filterable	SM2540D
108.445	005	Sodium	SM3111B
108.461	001	Chlorine, Total	SM4500-Cl C
108.465	001	Chlorine, Total	SM4500-Cl G
108.470	001	Cyanide, Manual Distillation	SM4500-CN C
108.472	001	Cyanide, Total	SM4500-CN E
108.480	001	Fluoride	SM4500-F C
108.490	001	pH	SM4500-H+ B
108.493	001	Ammonia	SM4500-NH3 D or E (19th/20th)
108.510	001	Nitrite	SM4500-NO2 B
108.530	001	Dissolved Oxygen	SM4500-O C
108.531	001	Dissolved Oxygen	SM4500-O G
108.541	001	Phosphorus, Total	SM4500-P E
108.590	001	Biochemical Oxygen Demand	SM5210B
108.591	001	Carbonaceous BOD	SM5210B
108.610	001	Total Organic Carbon	SM5310B-2000
108.905	001	Magnesium	SM3500-Mg D
108.909	001	Calcium	SM3500-Ca B (20th)
Field of Testing: 109 - Toxic Chemical Elements of Wastewater			
109.190	001	Mercury	EPA 245.1
109.370	002	Cadmium	SM3111B
109.370	005	Cobalt	SM3111B
109.370	006	Copper	SM3111B
109.370	009	Iron	SM3111B
109.370	010	Lead	SM3111B
109.370	013	Nickel	SM3111B
109.370	019	Silver	SM3111B
109.370	023	Zinc	SM3111B
109.410	002	Antimony	SM3113B
109.410	003	Arsenic	SM3113B
109.410	005	Beryllium	SM3113B

As of 6/11/2013 , this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

109.410	006	Cadmium	SM3113B
109.410	007	Chromium	SM3113B
109.410	009	Copper	SM3113B
109.410	011	Lead	SM3113B
109.410	014	Nickel	SM3113B
109.410	015	Selenium	SM3113B
109.410	016	Silver	SM3113B
Field of Testing: 110 - Volatile Organic Chemistry of Wastewater			
110.040	040	Halogenated Hydrocarbons	EPA 624
110.040	041	Aromatic Compounds	EPA 624
Field of Testing: 113 - Whole Effluent Toxicity of Wastewater			
113.022	003	Rainbow trout (O. mykiss)	EPA-821-R-02-012
Field of Testing: 120 - Physical Properties of Hazardous Waste			
120.010	001	Ignitability	EPA 1010
Field of Testing: 126 - Microbiology of Recreational Water			
126.080	001	Enterococci	IDEXX

As of 6/11/2013 , this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

ATTACHMENT C

Effluent Characterization Study and Report Monitoring Results 2014 - 2015

Table 4: Analytical Results and Significance Determination for Priority Pollutants 2014-2015

CTR #	Priority Pollutant	Governing Water Quality Objective (ug/L)	2014 Result (ug/L)	2015 Result (ug/L)	Significant Increase (Y/N)	Comment/ Note
1	Antimony	4,300	0.355 DNQ	0.205 DNQ	N	
2	Arsenic	36	1.03 DNQ	0.893 DNQ	N	
3	Beryllium	No Criteria	ND	ND	N	
4	Cadmium	7.31	ND	ND	N	
5a	Chromium (III)	644	ND	ND	N	
5b	Chromium (VI)	180	ND	ND	N	
6	Copper	13	2.27	1.94	N	
7	Lead	135	0.406 DNQ	0.32 DNQ	N	
8	Mercury (303(d) listed) [4]	---	0.00241	0.00140	N	
9	Nickel	27	3.86	4.02	N	
10	Selenium (303(d) listed)	5	0.708 DNQ	0.605 DNQ	N	
11	Silver	2.20	ND	ND	N	
12	Thallium	6	ND	ND	N	
13	Zinc	161	7.44 DNQ	7.44 DNQ	N	
14	Cyanide	2.9	2.8	1.72	N	
15	Asbestos	No Criteria	NA	NA	N	
16	2,3,7,8-TCDD (303(d) listed)	1.40×10^{-8}	ND	ND	N	
	Dioxin-TEQ (303(d) listed)	1.40×10^{-8}	ND	ND	N	
17	Acrolein	780	ND	ND	N	
18	Acrylonitrile	0.66	ND	ND	N	
19	Benzene	71	ND	ND	N	
20	Bromoform	360	26.80	5.65	N	
21	Carbon Tetrachloride	4.4	0.18 DNQ	0.58	N	
22	Chlorobenzene	21,000	ND	ND	N	
23	Chlorodibromomethane	34	11.8	16.2	N	
24	Chloroethane	No Criteria	ND	ND	N	
25	2-Chloroethylvinyl ether	No Criteria	ND	ND	N	
26	Chloroform	No Criteria	9.15	8.45	N	
27	Dichlorobromomethane	46	8.70	16.6	N	
28	1,1-Dichloroethane	No Criteria	ND	ND	N	
29	1,2-Dichloroethane	99	ND	ND	N	
30	1,1-Dichloroethylene	3.20	ND	ND	N	
31	1,2-Dichloropropane	39	ND	ND	N	
32	1,3-Dichloropropylene	1,700	ND	ND	N	
33	Ethylbenzene	29,000	ND	ND	N	
34	Methyl Bromide	4,000	ND	ND	N	
35	Methyl Chloride	No Criteria	ND	ND	N	
36	Methylene Chloride	1,600	ND	ND	N	
37	1,1,2,2-Tetrachloroethane	11	ND	ND	N	

CTR #	Priority Pollutant	Governing Water Quality Objective (ug/L)	2014 Result (ug/L)	2015 Result (ug/L)	Significant Increase (Y/N)	Comment/ Note
38	Tetrachloroethylene	8.85	ND	ND	N	
39	Toluene	200,000	ND	ND	N	
40	1,2-Trans-Dichloroethylene	140,000	ND	ND	N	
41	1,1,1-Trichloroethane	No Criteria	ND	ND	N	
42	1,1,2-Trichloroethane	42	ND	ND	N	
43	Trichloroethylene	81	ND	ND	N	
44	Vinyl Chloride	525	ND	ND	N	
45	2-Chlorophenol	400	ND	ND	N	
46	2,4-Dichlorophenol	790	ND	ND	N	
47	2,4-Dimethylphenol	2,300	ND	ND	N	
48	2-Methyl-4,6-Dinitrophenol	765	ND	ND	N	
49	2,4-Dinitrophenol	14,000	ND	ND	N	
50	2-Nitrophenol	No Criteria	ND	ND	N	
51	4-Nitrophenol	No Criteria	ND	ND	N	
52	3-Methyl 4-Chlorophenol	No Criteria	ND	ND	N	
53	Pentachlorophenol	7.9	ND	ND	N	
54	Phenol	4,600,000	ND	ND	N	
55	2,4,6-Trichlorophenol	7	ND	ND	N	
56	Acenaphthene	2,700	ND	ND	N	
57	Acenaphthylene	No Criteria	ND	ND	N	
58	Anthracene	110,000	ND	ND	N	
59	Benzidine	0	ND	ND	N	
60	Benzo(a)Anthracene	0	ND	ND	N	
61	Benzo(a)Pyrene	0.049	ND	ND	N	
62	Benzo(b)Fluoranthene	0.05	ND	ND	N	
63	Benzo(ghi)Perylene	No Criteria	ND	ND	N	
64	Benzo(k)Fluoranthene	0	ND	ND	N	
65	Bis(2-Chloroethoxy)Methane	No Criteria	ND	ND	N	
66	Bis(2-Chloroethyl)Ether	1.40	ND	ND	N	
67	Bis(2-Chloroisopropyl)Ether	170,000	ND	ND	N	
68	Bis(2-Ethylhexyl)Phthalate	5.9	ND	ND	N	
69	4-Bromophenyl Phenyl Ether	No Criteria	ND	ND	N	
70	Butylbenzyl Phthalate	5,200	ND	ND	N	
71	2-Chloronaphthalene	4,300	ND	ND	N	
72	4-Chlorophenyl Phenyl Ether	No Criteria	ND	ND	N	
73	Chrysene	0.049	ND	ND	N	
74	Dibenzo(a,h)Anthracene	0.05	ND	ND	N	
75	1,2-Dichlorobenzene	17,000	ND	ND	N	
76	1,3-Dichlorobenzene	2,600	ND	ND	N	
77	1,4-Dichlorobenzene	2,600	ND	ND	N	

CTR #	Priority Pollutant	Governing Water Quality Objective (ug/L)	2014 Result (ug/L)	2015 Result (ug/L)	Significant Increase (Y/N)	Comment/ Note
78	3,3 Dichlorobenzidine	0.08	ND	ND	N	
79	Diethyl Phthalate	120,000	ND	ND	N	
80	Dimethyl Phthalate	2,900,000	ND	ND	N	
81	Di-n-Butyl Phthalate	12,000	ND	ND	N	
82	2,4- Dinitrotoluene	9.10	ND	ND	N	
83	2,6 - Dinitrotoluene	No Criteria	ND	ND	N	
84	Di-n-Octyl Phthalate	No Criteria	ND	0.835 DNQ	N	
85	1,2-Diphenyhydrazine	0.54	ND	ND	N	
86	Fluoranthene	370	ND	ND	N	
87	Fluorene	14,000	ND	ND	N	
88	Hexachlorobenzene	0	ND	ND	N	
89	Hexachlorobutadiene	50	ND	ND	N	
90	Hexachlorocyclopentadiene	17,000	ND	ND	N	
91	Hexachloroethane	9	ND	ND	N	
92	Indeno(1,2,3-cd)Pyrene	0	ND	ND	N	
93	Isophorone	600	ND	ND	N	
94	Naphthalene	No Criteria	ND	ND	N	
95	Nitrobenzene	1,900	ND	ND	N	
96	N-Nitrosodimethylamine	8	ND	ND	N	
97	N-Nitrosodi-n-Propylamine	1.4	ND	ND	N	
98	N-Nitrosodiphenyl	16.00	ND	ND	N	
99	Phenanthrene	No Criteria	ND	ND	N	
100	Pyrene	11,000	ND	ND	N	
101	1,2,4-Trichlorobenzene	No Criteria	ND	ND	N	
102	Aldrin	0.00	ND	ND	N	
103	Alpha-BHC	0	ND	ND	N	
104	Beta-BHC	0	ND	ND	N	
105	Gamma-BHC	0.063	ND	ND	N	
106	Delta-BHC	No Criteria	ND	ND	N	
107	Chlordane (303(d) listed)	0	ND	ND	N	
108	4,4'-DDT (303(d) listed)	0	ND	ND	N	
109	4,4'-DDE (linked to DDT)	0.00059	ND	ND	N	
110	4,4'-DDD	0	ND	ND	N	
111	Dieldrin (303d listed)	0	ND	ND	N	
112	Alpha-Endosulfan	0	ND	ND	N	
113	beta-Endosulfan	0.0087	ND	ND	N	
114	Endosulfan Sulfate	240	ND	ND	N	
115	Endrin	0	ND	ND	N	
116	Endrin Aldehyde	1	ND	ND	N	
117	Heptachlor	0.00021	ND	ND	N	

CTR #	Priority Pollutant	Governing Water Quality Objective (ug/L)	2014 Result (ug/L)	2015 Result (ug/L)	Significant Increase (Y/N)	Comment/ Note
118	Heptachlor Epoxide	0	ND	ND	N	
119-	PCBs sum (303(d) listed) [4]	---	ND	ND	N	
126	Toxaphene	0	ND	ND	N	
	Tributyltin	0.0074	ND	NA	N	

Legend:

ND: "Non-detect" – analytical result was not detected above laboratory method detection limit.

DNQ: "Does not qualify" – analytical result is less than minimum limit or reporting limit but greater than or equal to the method detection limit.