CITY OF SANTA CRUZ WASTEWATER TREATMENT FACILITY

2011

Wastewater Treatment Facility
ANNUAL REPORT

CITY OF SANTA CRUZ POTW ANNUAL REPORT

2011

CONTENTS

Section I. Introduction

This document is the Annual Report of the water pollution control activities of the City of Santa Cruz Wastewater Treatment Facility for 2011. It was prepared and submitted in fulfillment of the City's obligations to the Regional Water Quality Control Board (Region III), accordance with the Standard Provisions and Reporting Requirements of the National Pollutant Discharge Elimination System Permits (NPDES), General Reporting Requirements, § 16.C.

The City of Santa Cruz treats sewage from domestic and industrial sources at the Wastewater Treatment Facility near Neary Lagoon and discharges its effluent into the Pacific Ocean under the NPDES permit No CA0048194. The area served includes the Cities of Santa Cruz and Capitola, the areas of Live Oak, Soquel, and Aptos, and the University of California at Santa Cruz. The City also provides capacity for the City of Scotts Valley to discharge its wastewater treatment system's effluent into the Pacific Ocean. However all data contained within this report relate only to the effluent of the City's wastewater treatment plant.

The estimated population served is approximately 135,000 people.

The City continuously upgrades the treatment facility to accommodate population growth, to respond to regulatory and environmental challenges, and to implement improved technologies for wastewater treatment, the most recent structural upgrades were completed in 1998. These were the addition of the trickling filter/solids contact units to the primary treatment plant; which was rebuilt in 1991, and the commissioning of a new ocean outfall in 1989.

The design treatment capacity of the Plant is 81 million gallons per day (MGD). The NPDES mandatory limit for the average dry weather (ADW)

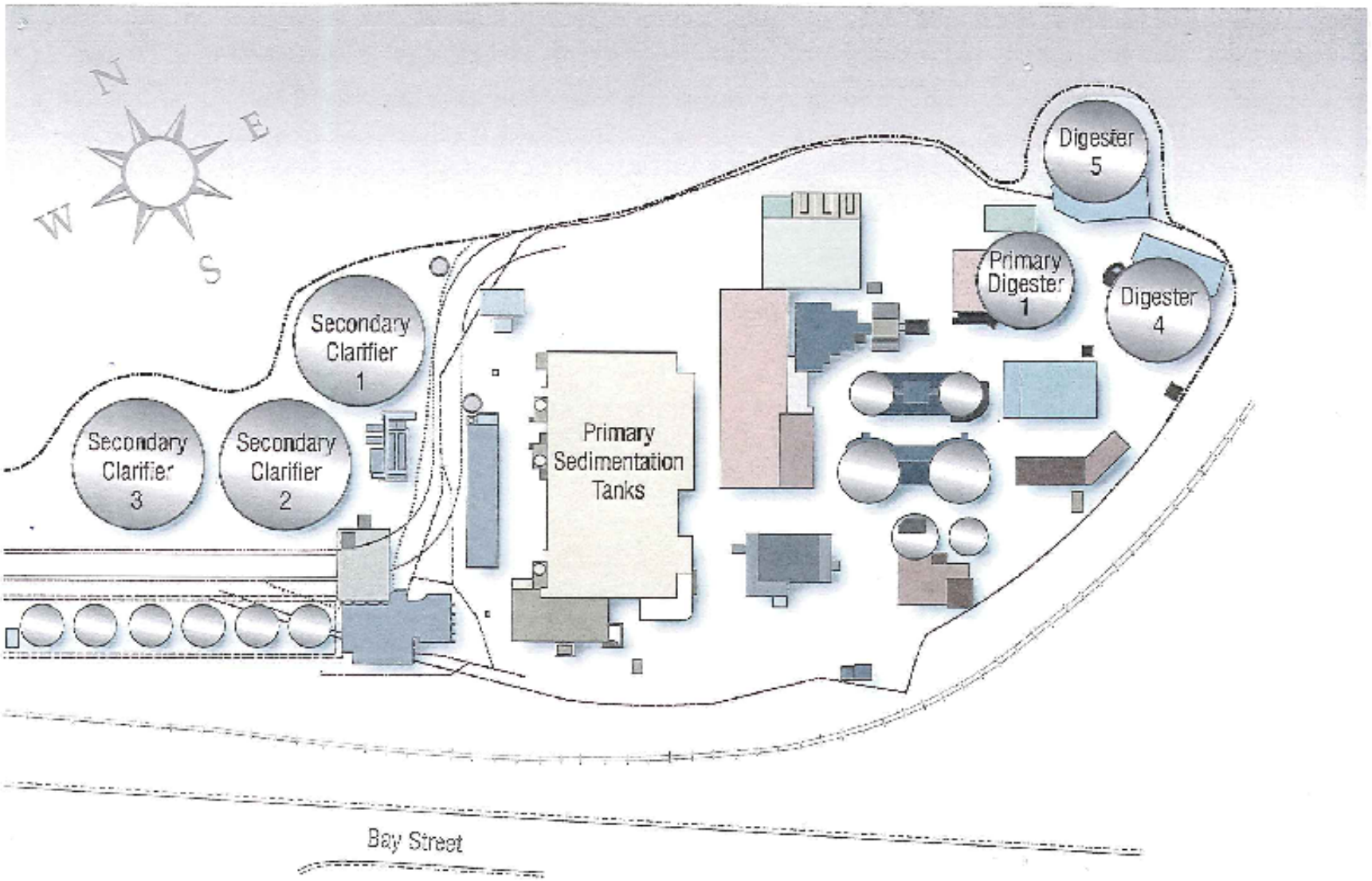
flow is 17 MGD.

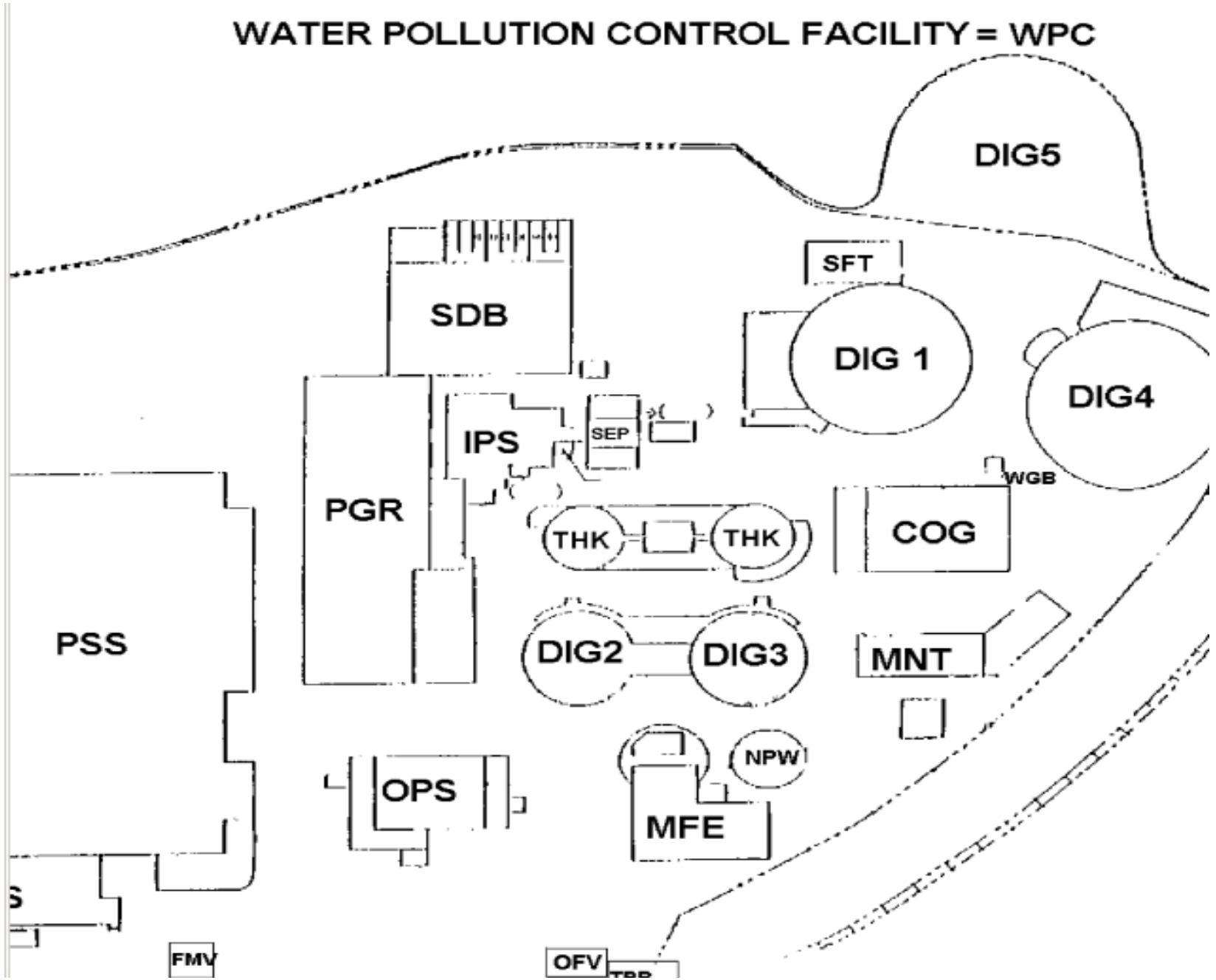
Plant performance highlights and removal efficiencies for conventional pollutants for 2011 were as follows:

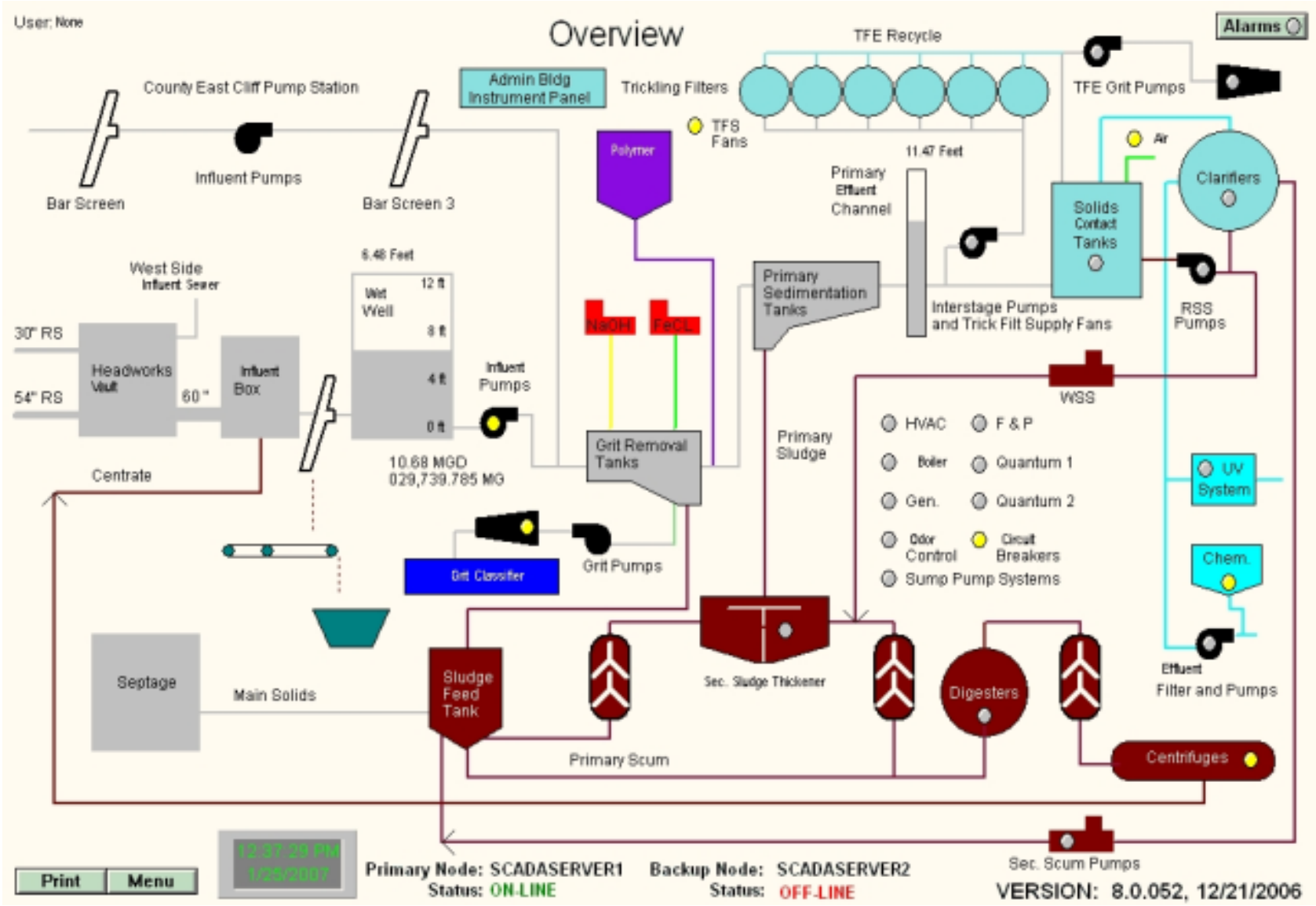
- More than three billion gallons of treated wastewater effluent (3.065 billion gallons) was discharged from the Plant at an average daily rate of approximately 8.4MGD;
- Total Suspended Solids (TSS) removal averaged 98.4**%** throughout the year;
- Total Organic Carbon (TOC) removal averaged 90.5**%** throughout the year, equivalent to the removal of Biochemical Oxygen Demand (BOD) removal at an average rate of 93.6%;
- Metals removal varied from a high of > 99.9% for Aluminum to <1% for Cadmium; Thallium; Boron and others seemingly unremoved by the processes.
- Compounds of emerging concern (CEC) included in the California Ocean Plan Table B in the influent and effluent as measured by integrative sampling techniques, were either bio-transformed or attenuated to various degrees before discharge into the waters of the outfall in 2011.

Following this introduction are pages showing respectively, the following:

1. An aerial view of the current facility and its major treatment processes;
2. A schematic of the Primary treatment processes of the facility; and
3. A screenshot of the Supervisory Control and Data Acquisition (SCADA) view of the treatment processes.


N
E
W
S
Digester 5
Primary Digester 1
Digester 4
Secondary Clarifier 1
Secondary Clarifier 3
Secondary Clarifier 2
Primary Sedimentation Tanks
Bay Street


WATER POLLUTION CONTROL FACILITY = WPC
DIG5
SFT
SDB
DIG 1
DIG4
IPS
SEP
PGR
WGB
THK
THK
COG
PSS
DIG2
DIG3
MNT
NPW
OPS
MFE
FMV
OFV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Overview
Alarms
TFE Recycle
County East Cliff Pump Station
Admin Bldg Instrument Panel
Trickling Filters
TFE Grit Pumps
TFS Fans
Air
Polymer
11.47 Feet
Primary Effluent Channel
Clarifiers
Solids Contact Tanks
Bar Screen
Influent Pumps
Bar Screen 3
6.48 Feet
West Side Influent Sewer
Wet Well
12 ft
8 ft
4 ft
0 ft
NaOH
FeCl
Primary Sedimentation Tanks
Interstage Pumps and Trick Filt Supply Fans
RSS Pumps
30" RS
54" RS
Headworks Vault
60 "
Influent Box
Influent Pumps
WSS
Primary Sludge
HVAC
F & P
Boiler
Quantum 1
Gen.
Quantum 2
Odor Control
Circuit Breakers
Sump Pump Systems
UV System
Chem.
Centrate
10.68 MGD
029,739.785 MG
Grit Removal Tanks
Grit Classifier
Grit Pumps
Septage
Main Solids
Sludge Feed Tank
Sec. Sludge Thickener
Digesters
Effluent Filter and Pumps
Primary Scum
Centrifuges
Sec. Scum Pumps
Print
Menu
12:37:29 PM
1/25/2007
Primary Node: SCADASERVER1
Status: ON-LINE
Backup Node: SCADASERVER2
Status: OFF-LINE
VERSION: 8.0.052, 12/21/2006

Section II. Summary of Monitoring Data – Tables

Introduction to Section II.

Summary of Monitoring Data – Tables of Monthly; Quarterly and Semi-Annual averages of conventional and priority pollutants in plant effluent, and of plant performance data in 2011.

The following pages contain summary tables of compliance monitoring data compiled by the City's laboratory, contract laboratories, and other wastewater treatment staff for compliance monitoring purposes in 2011.

The analytical data were derived from daily and weekly laboratory analyses and/or instrumentation readings from plant effluent and process samples through 2011.

All laboratory analyses were performed using methods specified and/or approved in the plant's NPDES permit CA 0048194 and the Code of Federal Regulations at 40 CFR 136; Table 1B.

The implementation of Integrated High Volume Water Sampling mechanisms for compounds of emerging environmental concern continued in the last year. These compounds including: trace organic compounds (TOrC) such as Dioxins; Plasticizers; Pharmaceuticals and Pesticides require the implementation of sampling methods validated by USGS, or other integrative sampling methods as approved for use by the Water Board, Region 3, under the regional monitoring program (CCLEAN) Central Coast Long-Term Environmental Assessment Network. The analytical methods deployed to derive the water concentrations are those validated by USGS or/and USEPA for environmental and regulatory purposes.

The Laboratory and Environmental Compliance programs at the WWTF implemented the Semi-Permeable Membrane Devices (SPMD) at the Influent and Effluent of the facility to perform these analyses, while the CCLEAN program implemented an approved sampling protocol developed by Axxys in the Effluent stream for the City of Santa Cruz and the City of Scotts Valley. Data from both sources are integrated int o this report to develop a comprehensive profile of treatment process efficiencies; potential impacts on the outfall, and possible source control efforts throughout the year.

Sampling and analytical data for TOrC (also widely known as Compounds of Emerging Concern (CEC)), in the influent and effluent of wastewaters are influenced by complex matrix effects in wastewater. The matrix effects usually, make it infeasible to make comparisons of influent and effluent measurements, since pollutant sampling and analyses from the influent are significantly less accessible to the best and current sampling technologies and validated analytical

techniques than in the effluent. Therefore there are data gaps, however SPMD sampling mechanisms will continue to be implemented in the Influent and Effluent streams simultaneously in 2012, because they provide the best mechanisms to achieve the monitoring goals, and they meet the NPDES requirement of the wastewater treatment facility.

Outlined below is the sequence of the presentation of the tables:

1. Monthly averages for Plant Flows; and Performance data on conventional and priority pollutants;

2. Averages for Plant performance data on priority pollutants, metals and trace organics derived from Semi-Annual Effluent and Annual Influent requirements of the NPDES permit CA0048194;

3. Biosolids monitoring data for metals and select pollutants; and

4. Nearshore bacteria monitoring at 30 foot contour depth.

Section II: Monitoring Data – WWTF Monitoring data 2011

Table 1: WWTF TREATMENT DATA FLOW - MONTHLY AVERAGES 2011

Months 2011	Influent Flow (MGD)	Peak Instantaneous Maximum Flow (MGD)	City Influent Flow (MGD)	County Influent Flow (MGD)	Effluent Flow (MGD)	Peak Effluent Instantaneous Flow (MGD)
January	11.4	40.2	6.9	4.5	11.1	33.5
February	12.6	59.5	7.7	4.9	13.5	64.1
March	16.4	22.6	10.2	6.1	15.8	14.5
April	9.7	26.4	5.4	4.2	8.0	16.9
May	9.5	32.0	5.4	4.1	6.9	14.2
June	10.0	42.0	5.7	4.2	7.0	33.7
July	9.2	26.6	5.0	4.2	6.1	15.7
August	8.7	28.0	4.6	4.1	5.9	14.6
September	8.4	27.1	4.4	4.0	5.8	14.7
October	9.2	38.4	5.2	4.0	6.6	28.9
November	9.1	53.4	5.1	4.0	6.8	43.5
December	8.0	44.8	4.1	3.8	6.1	37.5
Average of Monthly Averages	10.18	36.75	5.81	4.34	8.3	27.7
Maximum of Monthly Average	16.4	59.5	10.2	6.1	15.8	64.1
NPDES Maximum Daily Dry Weather Effluent Flow	17 MGD					
NPDES Maximum Daily Effluent Flow	81 MGD					

Section II: Monitoring Data – WWTF Monitoring data 2011

Table 2: WWTF TOTAL SUSPENDED SOLIDS (TSS) TREATMENT DATA - MONTHLY AVERAGES 2011

Months 2011	Influent TSS(mg/L)	Effluent TSS(mg/L)	% Removal Efficiency
January	252.0	6.8	97.3%
February	246.9	4.7	98.1%
March	221.5	6.7	97.0%
April	294.4	4.2	98.6%
May	307.3	3.8	98.8%
June	302.8	3.9	98.7%
July	318.4	4.2	98.7%
August	313.6	4.7	98.5%
September	371.6	3.8	99.0%
October	353.3	3.5	99.0%
November	340.9	5.8	98.3%
December	398.4	6.8	98.3%
Monthly Average	310.1	4.9	98.4%
NPDES Average Monthly Limit (mg/L)		30	
NPDES Average Weekly Limit (mg/L)		45	

Table 3: WWTF (TSS) CONCENTRATION AND LOADING DATA - MONTHLY AVERAGES 2011

Months 2011	Influent TSS(mg/L)	Effluent TSS(mg/L)	Average Monthly Effluent TSS Load (Pounds/Day)	% Removal Efficiency
January	252.0	6.8	458.3	97.3%
February	246.9	4.7	575.7	98.1%
March	221.5	6.7	1,019.8	97.0%
April	294.4	4.2	282.0	98.6%
May	307.3	3.8	215.8	98.8%
June	302.8	3.9	232.4	98.7%
July	318.4	4.2	204.7	98.7%
August	313.6	4.7	246.0	98.5%
September	371.6	3.8	185.4	99.0%
October	353.3	3.5	194.1	99.0%
November	340.9	5.8	340.1	98.3%
December	398.4	6.8	337.0	98.3%
Monthly Average	310.1	4.9	357.6	98.4%
NPDES Average Monthly Limit (Lbs/Day)			4,255	
NPDES Average Weekly Limit (Lbs/Day)			6,384	

Table 4: WWTF TOTAL ORGANIC CARBON (TOC) TREATMENT DATA - MONTHLY AVERAGES 2011

Months 2011	Influent TOC (mg/L)	Effluent TOC (mg/L)	% Removal Efficiency
January	110.0	11.9	89.2%
February	117.8	11.9	89.9%
March	104.9	10.8	89.7%
April	125.3	10.5	91.6%
May	133.5	11.3	91.6%
June	105.1	11.1	89.4%
July	104.7	11.6	88.9%
August	134.4	13.2	90.2%
September	150.3	13.3	91.2%
October	153.6	13.3	91.3%
November	142.3	12.5	91.2%
December	146.6	13.3	90.9%
Monthly Average	127.4	12.1	90.5%
NPDES Average Monthly Limit (mg/L)		17	
NPDES Average Weekly Limit (mg/L)		23	

Table 5: WWTF BIOCHEMICAL OXYGEN DEMAND (BOD) TREATMENT DATA - MONTHLY AVERAGES 2011

Months 2011	Influent BOD (mg/L)	Effluent BOD (mg/L)	% Removal Efficiency
January	246.8	18.2	92.6%
February	264.2	18.1	93.2%
March	239.7	15.2	93.6%
April	281.1	14.7	94.8%
May	223.1	14.5	93.5%
June	243.1	16.3	93.3%
July	242.3	17.4	92.8%
August	313.9	21.2	93.2%
September	352.3	21.4	93.9%
October	360.3	21.5	94.0%
November	333.0	19.7	94.1%
December	343.4	21.5	93.7%
Monthly Average	286.9	18.3	93.6%

Section II: Monitoring Data – WWTF Monitoring data 2011

Table 6: WWTF TREATMENT DATA 2011 - MONTHLY AVERAGES: PH; SETTLEABLE SOLIDS; OIL & GREASE CHLORINE

Months 2011	Influent pH (SU)	Effluent pH (SU)	Influent Oil and Grease (mg/L)	Effluent Oil and Grease (mg/L)	Influent Settleable Solids (mL/L/hr)	Effluent Settleable Solids (mL/L/hr)	Maximum Daily Chlorine Residual (ug/L)	Peak Daily Chlorine Residual (ug/L)
January	7.1	7.0	19.0	<5.0	15.1	0.1	6.1	2288.3
February	7.2	7.0	39.0	<5.0	14.0	<0.05	8.0	1538.3
March	7.1	6.9	20.4	<5.0	10.1	0.1	6.5	236.4
April	7.2	7.0	18.5	<5.0	15.9	<0.05	13.4	200.0
May	7.2	7.2	35.4	<5.0	18.5	0.1	0.0	0.0
June	7.2	7.1	15.9	<5.0	17.4	0.1	29.1	2750.0
July	7.2	7.2	55.8	<5.0	16.2	0.1	2.3	38.0
August	7.3	7.2	16.9	<5.0	14.7	<0.05	0.3	535.0
September	7.4	7.2	14.4	<5.0	17.8	0.1	0.7	629.0
October	7.4	7.1	11.1	<5.0	19.0	0.1	0.0	210.0
November	7.3	7.0	6.7	<5.0	17.1	0.1	0.1	87.0
December	7.3	7.1	18.5	<5.0	18.6	<0.05	12.3	923.0
Monthly Average	7.3	7.1	22.6	<5.0	16.2	0.1	6.6	786.3
NPDES Limit 1	6.0 to 9.0 at all times			25 (mg/L) Monthly Average Limit		1.0 (ml/L/hr) 30-Day Average	1120(ug/L) Daily Maximum	8400 (ug/L) Instantaneous Maximum
NPDES Limit 2				40 (mg/L) Monthly Maximum Limit		1.5 (ml/L/hr) 7-Day Average	280 (ug/L) 6-Month Median	
NPDES Limit 3				75 (mg/L) 7-Day Average Limit		3.0 (ml/L/hr) Maximum daily Limit		

Table 7: WWTF TREATMENT DATA 2011 - QUARTERLY: TOXICITIES (ACUTE/CHRONIC) PHENOLS; TOTAL SULFIDES.

2011 Quarterly Data	Effluent Acute Toxicity (Quarterly)	Effluent Chronic Toxicity (Quarterly)	Effluent Phenols (Quarterly)	Effluent Total Sulfides (Quarterly)
	TUa	TUc	mg/L	mg/L
January	2.1	8.0		
February				
March			0.022	<0.10
April				
May	2.7	8.0	0.0021	<0.10
June				
July	2.7	1.0		
August			0.0099	<0.10
September				
October			<0.10	
November	2.6	1.0		<0.10
December				<0.10
Averages	2.51	4.5	<0.17	<0.10
Maximum	2.7	16	0.022	<0.10
NPDES Maximum Effluent Limits	4.47	140		

Section II: Monitoring Data – WWTF Monitoring data 2011

Table 8: WWTF NPDES NUTRIENTS; TEMPERATURE; TURBIDITY; SILICATES MONTHLY SUMMARY - 2011

Monthly Averages	Effluent Turbidity (Monthly)	Effluent Temperature	Ammonia Nitrogen	Ortho-Phosphate	Urea	Nitrates	Dissolved Silicate
	NTU	°C	µg/L	mg/L	mg/L	mg/L	mg/L
January	2.1	18.5	30,675	3.0	0.09	20	30
February	3.7	18.2	23,150	6.1	0.114	27	33
March	3.4	18.2	27,200	3.6	0.13	28	33
April	2.4	20.6	24,725	8.4	0.067	34	33
May	2.4	22.3	33,250	6.9	0.163	6.4	19
June	2.1	22.8	28,800	7.7	0.051	2.4	35
July	3.8	24.2	34,225	7.5	0.113	15	37
August	4.1	24.1	36,783	7.0	0.075	16	38
September	2.4	24.7	34,520	6.6	0.092	18	38
October	2.6	23.1	32,550	5.2	0.106	25	34
November	2.4	20.7	28,375	5.5	0.100	11	35
December	2.7	19.2	30,675	5.5	0.053	11	32
Average	2.8	21.4	30,410.7	6.58	0.096	17.8	33.1
Minimum	2.1	18.2	23,150	3.0	0.051	2.4	19
NPDES Monthly Average Limit	75		840,000µg/L Instantaneous Maximum.				
NPDES Weekly Average Limit	100		336,000µg/L Daily Maximum.				
NPDES Daily Maximum Limit	225		84,000µg/L 6-Month Median.				

Table 9: WWTF Semi-Annual and Annual Influent and Effluent Metals Analyses - 2011

Semi-Annual Influent and Effluent 24 hour composites: Analyses for Metals Treatment - 2011							
Metals	Influent (February/March 2011 - Wet weather)	Influent (September 2011 - Dry weather)	Influent Metals (Annual Average)	Effluent (February/March 2011 - Wet weather)	Effluent (2011 - Dry weather)	Effluent (Annual Average)	Metals Removal Efficiency (Average)
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	%
Aluminum	1200		**1200**	80		**80**	**93.3%**
Antimony	0.92	<0.5	**0.92**	0.59	0.5	**0.55**	**40.2%**
Arsenic	3.1	1.5	**2.3**	2.9	2.0	**2.5**	**NR***
Barium	<5.0	15	**15**	35	12	**24**	**NR***
Beryllium	<0.5	<0.5	**<0.5**	<0.5	<0.5	**<0.5**	**0.0%**
Boron	210	250	**230**	200	260	**230**	**0.0%**
Cadmium	<0.25	<5.0	**<0.25**	<0.25	<0.25	**<0.25**	**NR***
Chromium	2.3	<10	**2.3**	<0.5	0.89	**0.89**	**61.3%**
Cobalt	1.1	<10	**1.1**	0.84	<0.5	**0.84**	**26%**
Copper	53	<10	**53**	6.2	<0.5	**6.2**	**88.3%**
Lead	2.1	<10	**2.1**	<0.5	<0.5	**<0.5**	**>76%**
Mercury	0.10	<0.025	**0.10**	<0.025	<0.025	**<0.025**	**>75%**
Molybdenum	4.6		**4.6**	2.9	3.5	**3.2**	**30.4%**
Nickel	4.3		**4.3**	3.5	2.5	**3.0**	**30.2%**

Potassium	15000		**15000**	2.2	<0.5	**2.2**	**99.9%**
Selenium	0.99		**0.99**	0.5	0.5	**0.5**	**49.5%**
Silver	0.5		**0.5**	<0.19	<0.19	**<0.19**	**>60.0%**
Thallium	<0.5		**<0.5**	<0.5	<0.5	**<0.5**	**NR***
Vanadium	3.3		**3.3**	1.5	0.82	**1.2**	**63.6%**
Zinc	130		**130**	28	18	**23.0**	**82.3%**

NR*: indicates data below threshold for removal analyses due to reporting limits for the analytical method.

Metals treatment data were compiled from analytical work performed by McCampbell Analytical ELAP Certificate no 1644.

Section II: Monitoring Data – WWTF Monitoring data 2011

Table 10: WWTF TRACE ORGANIC COMPOUNDS (TOrC or COMPOUNDS OF EMERGING CONCERN) in CALIFORNIA OCEAN PLAN TABLE B TREATMENT DATA - ANNUAL AVERAGES 2011

CHEMICALS	INFLUENT concentrations (pg/L)			EFFLUENT concentrations (pg/L)			%Perceived Change (influent to effluent)
	Dry Weather	Wet Weather	AVERAGE	Dry Weather	Wet Weather	AVERAGE	
Aldrin	3.36*		3.36*	9.60*		9.60*	
chlordane, cis	54.32	13.74	34.03	156.03	43.01	99.52	-192.49%
chlordane, trans	38.82	11.02	24.92	102.92	36.34	69.63	-179.40%
chlorpyrifos							
dacthal				261.00		261.00	
DDD, o,p'	6.62		6.62	10.32	3.79	7.06	-6.60%
DDD, p,p'	8.11	3.29	5.70	9.96	5.19	7.58	-32.89%
DDE, o,p'							
DDE, p,p'	24.50	14.37	19.43	45.10	20.50	32.80	-68.77%
DDT, o,p'	3.51		3.51	8.83	7.06	7.95	-126.39%
DDT, p,p'	7.02	4.02	5.52	19.17	6.34	12.75	-130.97%
diazinon							
dieldrin		31.76	31.76	1,020.00	102.88	561.44	-1667.77%
endosulfan I					1,770.21	1,770.21	
endosulfan II							
endosulfan sulfate				83.00		83.00	
endrin				21.00		21.00	
heptachlor							
heptachlor epoxide	130.28		130.28	251.42		125.71	3.51%
hexachlorobenzene	16.01	9.72	12.86	23.13	31.30	27.21	-111.57%
methoxychlor							
mirex							
nonachlor, cis				20.24	5.28	12.76	

nonachlor, trans	33.72	6.29	20.00	72.07	22.54	47.30	-136.50%
oxychlordane							
Naphthalene	861.51	4,913.86	2,887.69		1,926.32	1,926.32	33.29%
Methylnaphthalene, 2-		2,868.17	2,868.17		1,055.79	1,055.79	63.19%
Methylnaphthalene, 1-	3170.67	2065.46	2618.06		1,873.33	1,873.33	28.45%
Dimethylnaphthalene, 2,6-	1398.25	689.39	1043.82		444.19	444.19	57.45%
Trimethylnaphthalene, 2,3,5-	363.81	218.73	291.27	101.06	280.63	190.85	34.48%
Naphthalenes, C1 -	4277.03	5059.62	4668.32		3,263.34	3,263.34	30.10%
Naphthalenes, C2 -	6658.59	3101.42	4880.00	401.80	2,570.71	1,486.25	69.54%
Naphthalenes, C3 -	3689.93	1992.62	2841.27	1,599.16	2,329.51	1,964.33	30.86%
Naphthalenes, C4 -	1,255.74		1,255.74	1,047.74		1,047.74	16.56%
Biphenyl	601.18	1,089.70	845.44	51.61	580.48	316.04	62.62%
Acenaphthylene	445.14	162.66	303.90		113.84	113.84	62.54%
Acenaphthene	2,137.28	1,068.16	1,602.72	813.87	1,055.19	934.53	41.69%
Fluorene	1,794.22	1,036.90	1,415.56	817.06	1,275.86	1,046.46	26.07%
Methylfluorene, 1-	473.39	242.06	357.73	375.49	360.03	367.76	-2.80%
Fluorenes, C1 -	937.47	535.13	736.30	944.67	1,231.32	1,088.00	-47.76%
Fluorenes, C2 -	1,384.78	727.45	1,056.12	1,673.27	1,246.61	1,459.94	-38.24%
Fluorenes, C3 -		31.52	31.52	1,624.37	866.34	1,245.36	-3851.00%
Dibenzothiophene	783.66	418.31	600.99	407.90	566.93	487.42	18.90%
Dibenzothiophenes, C1 -	1,253.27	266.39	759.83	1,364.62	355.10	859.86	-13.16%
Dibenzothiophenes, C2 -	778.86	644.73	711.79	1,073.32	685.00	879.16	-23.51%
Dibenzothiophenes, C3 -	617.33	618.75	618.04	762.53	512.68	637.60	-3.17%
Phenanthrene	7,415.56	3,686.54	5,551.05	2,349.64	6,042.69	4,196.17	24.41%
Methylphenanthrene, 1-	437.71	214.54	326.12	316.70	325.73	321.21	1.51%
Phenanthrene/Anthracene, C1 -	2,029.16	1,033.04	1,531.10	1,591.19	1,653.10	1,622.14	-5.95%
Phenanthrene/Anthracene, C2 -	1,500.22	973.99	1,237.11	2,975.84	1,385.99	2,180.92	-76.29%
Phenanthrene/Anthracene, C3 -	1,236.52	574.20	905.3623116	1,600.40	825.11	1,212.76	-33.95%
Phenanthrene/Anthracene, C4 -	381.65	203.14	292.40	398.88	436.11	417.49	-42.78%
Anthracene	1,340.64	586.77	963.70	386.71	321.47	354.09	63.26%

Fluoranthene	2,124.49	1,015.87	1,570.18	2,129.27	2,169.35	2,149.31	-36.88%
Fluoranthene/Pyrenes, C1-	1,205.41	613.34	909.37	1,505.77	940.16	1,222.97	-34.48%
Pyrene	1,698.28	836.80	1,267.54	1,990.73	1,415.23	1,702.98	-34.35%
Benz(a)anthracene	297.94	148.11	223.02	306.63	246.51	276.57	-24.01%
Chrysene	266.83	156.23	211.53	293.99	239.77	266.88	-26.17%
Chrysenes, C1 -	151.68	115.46	133.57	170.74	150.48	160.61	-20.25%
Chrysenes, C2 -	126.65	91.92	109.28	107.50	75.64	91.57	16.20%
Chrysenes, C3 -		39.96	39.96		28.97	28.97	27.50%
Benzo(b)fluoranthene	122.92	39.61	81.27	92.18	87.01	89.60	-10.25%
Benzo(k)fluoranthene		17.90	17.9		39.60	39.60	-121.23%
Benzo(e)pyrene	93.38	47.98	70.68	92.74	81.51	87.13	-23.27%
Benzo(a)pyrene	99.74	34.40	67.07	78.25	51.66	64.96	3.15%
Indeno(1,2,3-c,d)pyrene					19.05	19.05	
Dibenz(a,h)anthracene							
Benzo(g,h,i)perylene		21.00	21		27.50	27.50	-30.95%
8 - PCB	2.77	4.43	3.60	5.59	6.76	6.18	-71.56%
18	4.87	5.08	4.98	8.41	9.83	9.12	-83.21%
27							
28	3.12	6.23	4.68	7.40	11.01	9.20	-96.86%
29	24.38	0.02	12.20	22.08	0.32	11.20	8.17%
31	4.32	5.96	5.14	9.46	10.39	9.92	-93.11%
33	1.90	3.04	2.47	3.48	5.03	4.25	-72.08%
44	4.59	2.40	3.49	8.72	6.18	7.45	-113.28%
49	12.63	5.74	9.18	15.12	7.77	11.44	-24.63%
52	8.71	5.09	6.90	11.29	10.57	10.93	-58.39%
56		3.35	3.35		4.17	4.17	-24.48%
60							
64							
66		2.50	2.5	13.87	4.36	9.12	-264.61%
70	3.81	3.99	3.90	9.73	6.51	8.12	-108.20%

74		4.65	4.65		6.42	6.42	-38.06%
77							
87		4.15	4.15		5.27	5.27	-26.99%
95		3.51	3.51	16.02	7.31	11.67	-232.38%
97		3.23	3.23		4.22	4.22	-30.65%
99					3.83	3.83	
101	13.33	6.97	10.15	18.38	9.92	14.15	-39.48%
105		4.91	4.91		5.12	5.12	-4.28%
110	4.60	3.84	4.22	10.78	6.81	8.80	-108.38%
114							
118	0.89	4.06	2.47	4.01	5.88	4.94	-99.99%
126							
128							
137							
138		5.84	5.84		5.07	5.07	13.18%
141							
146							
149		4.86	4.86		5.06	5.06	-4.12%
151							
153		7.57	7.57		7.33	7.33	3.17%
156							
157							
158							
169							
170							
174							
177							
180		5.30	5.30				
183							
187							

189							
194							
195							
198_199							
200							
201							
203							
206							

Notes:

1. **Values marked with asterisk* are membrane concentrations and not transferable to water concentrations. They are provided for illustrative purposes only.**

2. **Perceived changes are mathematical calculations of analytical values derived in the effluent and the effluent from integrative sampling technologies. Negative values indicate that there were apparently higher values in the effluent than in the influent. For trace compounds these derive from matrix effects which render analyses in the influent even more difficult, and recovery and calculations less certain.**

Section II: Monitoring Data – WWTF Monitoring data 2011

Table 11: WWTF BIOSOLIDS TREATMENT MONITORING DATA –2011

Bi-Monthly Sludge Monitoring ANALYTES	ANALYTICAL RESULTS IN DRY WEIGHT ONLY							Land Applied Limits (mg/Kg Dry Weight)
	January - February	March - April	May - June	July - August	September - October	November - December	Bi-Monthly Average	
Antimony (mg/kg)	2.8	24.0	2.6	<2.2	2.5	<2.3	6.0	NA
Arsenic (mg/kg)	16.0	13.0	15.0	11.0	11.0	11.0	12.8	41.0
Asbestos (%)	<0.25%	<0.25%	<0.25%	<0.25%	<0.25%	<0.25%	<0.25%	NA
Barium (mg/kg)	540	430	510	320	440	380	436.7	NA
Beryllium (mg/kg)	<2.2	<2.1	<2.1	<2.2	<2.1	<2.3	<2.2	NA
Cadmium (mg/kg)	3.0	2.6	2.8	1.9	2.4	2.0	2.5	39.0
Chromium (mg/kg)	38.0	32.0	37.0	23	50	33	35.5	NA
Cobalt (mg/kg)	5.3	4.3	4.3	4.6	5.3	3.5	4.6	NA
Copper (mg/kg)	610	570	500	470	660	540	558.3	1,500.0
Fluoride (mg/kg)	<4.4	36.0	15.0	6.0	3.0	6.0	11.7	NA
Lead (mg/kg)	24.0	24.0	21.0	20.0	24.0	17.0	21.7	300.0
Mercury (mg/kg)	1.0	1.0	1.3	1.1	0.9	0.8	1.0	17.0
Moisture (%)	77.2%	77.1%	76.6%	77.5%	77.1%	78.1%	77.3	NA
Molybdenum (mg/kg)	11.0	8.5	10.0	8.5	12.0	9.4	9.9	NA
Nickel (mg/kg)	27.0	23.0	25.0	15.0	19.0	17.0	21.0	420.0
Nitrate-N (mg/kg)	<8.7	<8.7	<8.5	12.0	9.6	9.1	9.8	NA
Nitrogen-Organic (mg/kg)	41,000	42,000	39,000	41,000	41,000	49,000	42,167	NA
Nitrogen-Total Kjeldahl (mg/kg)	51,000	53,000	49,000	51,000	51,000	50,000	50,833	NA
Nitrogen-Ammonia (mg/kg)	10,000	10,000	9,900	9,600	9,300	9,500	9,716.7	NA
Selenium (mg/kg)	8.9	6.7	8.2	5.4	6.4	5.7	6.9	100.0
Silver (mg/kg)	7.3	5.1	6.2	5.9	6.2	6.3	6.2	NA
Thallium (mg/kg)	<2.2	<2.1	<2.1	<2.2	<2.1	<2.3	<2.2	NA
Vanadium (mg/kg)	22.0	23.0	22.0	12	15	14	18.0	NA
Zinc (mg/kg)	1,400	1,100	1,400	970	1,300	1,100	1,211.7	2,800.0

Section II: Monitoring Data – WWTF Monitoring data 2011

Table 12: SPMD –MEDIATED SAMPLING AND ANALYSES OF WWTF DIOXINS AND FURANS IN 2011

COMPOUNDS	Influent (30-day Integrative samples Feb/March and September 2011)			Effluent (30-day Integrative samples Feb/March and September 2011)			AVERAGE REDUCTION (%) Negative values denote higher effluent detection, consistent with matrix effects.
	DRY SEASON (September 2011) INFLUENT (pg/L)	WET SEASON (February/March 2011) INFLUENT (pg/L)	AVERAGE INFLUENT CONCENTRATION (pg/L)	DRY SEASON (September 2011) EFFLUENT (pg/L)	WET SEASON (February/March 2011) EFFLUENT (pg/L)	AVERAGE EFFLUENT CONCENTRATION (pg/L)	
2,3,7,8-TCDD	1.11E-03	6.18E-03	3.65E-03	4.15E-03	6.18E-03	5.16E-03	-41.63%
1,2,3,7,8-PeCDD	1.67E-02	3.02E-02	2.35E-02	1.13E-02	3.02E-02	2.07E-02	11.62%
1,2,3,4,7,8-HxCDD	3.80E-02	8.70E-02	6.25E-02	1.86E-02	8.70E-02	5.28E-02	15.45%
1,2,3,6,7,8-HxCDD	4.23E-02	1.18E-01	8.02E-02	2.02E-02	1.18E-01	6.93E-02	13.54%
1,2,3,7,8,9-HxCDD	3.88E-02	9.96E-02	6.92E-02	1.89E-02	9.96E-02	5.92E-02	14.42%
1,2,3,4,6,7,8-HpCDD	3.41E-01	4.87E-01	4.14E-01	1.75E-01	4.87E-01	3.31E-01	19.98%
OCDD	1.22E+00	7.90E-01	1.01E+00	2.86E-01	7.90E-01	5.38E-01	46.46%
2,3,7,8-TCDF	2.88E-03	8.29E-03	5.59E-03	4.28E-03	8.29E-03	6.28E-03	-12.47%
1,2,3,7,8-PeCDF	4.84E-03	8.54E-03	6.69E-03	2.31E-03	8.54E-03	5.42E-03	18.93%
2,3,4,7,8-PeCDF	5.20E-03	9.11E-03	7.16E-03	2.57E-03	9.11E-03	5.84E-03	18.41%
1,2,3,4,7,8-HxCDF	7.43E-03	9.87E-03	8.65E-03	2.61E-03	9.87E-03	6.24E-03	27.85%
1,2,3,6,7,8-HxCDF	7.48E-03	9.43E-03	8.46E-03	2.66E-03	9.43E-03	6.04E-03	28.55%
2,3,4,6,7,8-HxCDF	8.23E-03	1.02E-02	9.22E-03	2.90E-03	1.02E-02	6.55E-03	28.91%
1,2,3,7,8,9-HxCDF	9.65E-03	8.80E-03	9.23E-03	3.47E-03	8.80E-03	6.13E-03	33.53%
OCDF	3.02E-02	5.39E-02	4.21E-02	1.74E-02	5.39E-02	3.56E-02	11.62%

CITY OF SANTA CRUZ RECEIVING WATER 30 FOOT CONTOURS BACTERIAL MONITORING - 2011

ANALYTICAL METHODS: TOTAL COLIFORMS by SM 9222 B; FECAL COLIFORMS by SM 9221E; ENTEROCOCCUS by EPA 1600

All sampling and analyses performed by Environmental Compliance and WWTF Laboratory ELAP Certification No 1175

DATE: 01/04/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	39	9	2
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	33	4	4
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	34	9	7
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	28	3	2
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	36	5	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	32	4	3
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	40	3	5
N 36°56'20.0" W 122°03'35.2"	Leak	39	3	3

Section II: Monitoring Data – WWTF Monitoring data 2011

DATE: 01/11/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	8	1	<1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	3	1	2
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	10	1	4
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	7	2	1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	3	1	1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	2	<1	2
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	28	8	23
N 36°56'20.0" W 122°03'35.2"	Leak	<1	<1	<1

DATE: 01/25/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	18	2	<1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	10	1	<1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	8	<1	<1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	3	<1	<1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	2	1	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	<1	<1	<1
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	4	<1	1
N 36°56'20.0" W 122°03'35.2"	Leak	3	<1	2

Section II: Monitoring Data – WWTF Monitoring data 2011

DATE: 02/01/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	2	<1	<1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	1	<1	<1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	<1	<1	<1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	1	1	<1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	1	<1	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	5	1	<1
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	1	1	<1
N 36°56'20.0" W 122°03'35.2"	Leak	5	<1	<1

DATE: 02/15/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	25	21	22
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	32	9	11
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	39	3	3
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	54	14	10
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	23	5	9
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	34	7	4
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	11	1	2
N 36°56'20.0" W 122°03'35.2"	Leak	<1	<1	<1

Section II: Monitoring Data – WWTF Monitoring data 2011

DATE: 03/01/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	15	3	3
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	11	1	1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	9	5	2
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	2	<1	<1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	1	<1	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	11	1	3
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	6	2	1
N 36°56'20.0" W 122°03'35.2"	Leak	7	<1	2

DATE: 03/08/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	42	<1	4
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	11	<1	2
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	15	1	<1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	16	2	1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	28	3	1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	31	3	1
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	37	7	4
N 36°56'20.0" W 122°03'35.2"	Leak	42	2	1

Section II: Monitoring Data – WWTF Monitoring data 2011

DATE: 03/29/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	32	10	2
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	31	23	7
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	38	22	10
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	43	22	8
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	41	25	10
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	32	9	5
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	30	5	1
N 36°56'20.0" W 122°03'35.2"	Leak	51	28	11

DATE: 04/19/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	16	9	7
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	3	1	1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	<1	<1	<1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	<1	2	<1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	1	<1	1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	1	2	<1
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	4	2	3
N 36°56'20.0" W 122°03'35.2"	Leak	<1	<1	<1

Section II: Monitoring Data – WWTF Monitoring data 2011

DATE: 04/26/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	6	7	1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	2	<1	<1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	3	<1	<1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	1	<1	<1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	<1	<1	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	<1	<1	<1
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	1	1	<1
N 36°56'20.0" W 122°03'35.2"	Leak	<1	<1	<1

DATE: 05/24/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	8	1	<1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	4	<1	<1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	3	<1	<1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	2	<1	<1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	6	1	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	2	3	<1
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	3	<1	<1
N 36°56'20.0" W 122°03'35.2"	Leak	1	1	<1

Section II: Monitoring Data – WWTF Monitoring data 2011

DATE: 06/14/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	2	<1	<1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	1	<1	<1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	1	<1	<1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	2	<1	<1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	<1	<1	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	<1	<1	<1
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	<1	<1	<1
N 36°56'20.0" W 122°03'35.2"	Leak	2	1	<1

DATE: 06/28/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	7	2	1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	2	<1	<1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	1	1	<1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	2	1	<1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	<1	<1	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	<1	<1	<1
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	2	<1	<1
N 36°56'20.0" W 122°03'35.2"	Leak	<1	<1	<1

Section II: Monitoring Data – WWTF Monitoring data 2011

DATE: 07/05/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	2	2	<1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	7	5	1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	8	<1	<1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	8	5	1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	11	1	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	1	<1	<1
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	3	<1	<1
N 36°56'20.0" W 122°03'35.2"	Leak	<1	<1	<1

DATE: 07/12/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	<1	<1	<1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	1	<1	<1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	<1	<1	<1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	2	<1	1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	2	1	1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	1	<1	<1
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	1	1	1
N 36°56'20.0" W 122°03'35.2"	Leak	1	<1	<1

Section II: Monitoring Data – WWTF Monitoring data 2011

DATE: 07/19/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	5	5	<1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	2	1	<1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	2	1	<1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	<1	<1	<1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	4	4	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	<1	<1	<1
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	2	<1	<1
N 36°56'20.0" W 122°03'35.2"	Leak	2	2	<1

DATE: 07/26/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	<1	<1	1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	<1	<1	<1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	<1	<1	<1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	<1	<1	1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	<1	<1	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	<1	<1	<1
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	<1	<1	<1
N 36°56'20.0" W 122°03'35.2"	Leak	<1	<1	<1

Section II: Monitoring Data – WWTF Monitoring data 2011

DATE: 08/02/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	13	11	<1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	<1	<1	<1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	4	1	<1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	3	<1	<1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	3	<1	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	1	<1	<1
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	1	<1	<1
N 36°56'20.0" W 122°03'35.2"	Leak	3	<1	1

DATE: 08/16/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	18	17	3
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	8	6	<1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	<1	1	<1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	<1	<1	<1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	2	1	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	<1	1	<1
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	3	<1	<1
N 36°56'20.0" W 122°03'35.2"	Leak	2	<1	<1

Section II: Monitoring Data – WWTF Monitoring data 2011

DATE: 08/23/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	<1	<1	<1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	3	<1	<1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	<1	<1	<1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	1	<1	<1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	5	1	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	<1	<1	<1
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	<1	<1	<1
N 36°56'20.0" W 122°03'35.2"	Leak	<1	1	<1

DATE: 09/13/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	1	<1	<1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	5	4	<1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	10	7	<1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	2	<1	1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	4	<1	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	4	1	2
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	<1	2	1
N 36°56'20.0" W 122°03'35.2"	Leak	1	<1	<1

Section II: Monitoring Data – WWTF Monitoring data 2011

DATE: 09/20/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	<1	<1	<1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	<1	<1	<1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	1	<1	1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	3	<1	<1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	2	<1	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	<1	<1	<1
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	3	<1	<1
N 36°56'20.0" W 122°03'35.2"	Leak	1	<1	<1

DATE:10/04/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	61	13	32
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	31	24	67
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	21	21	110
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	13	4	1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	12	8	5
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	14	1	4
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	10	3	1
N 36°56'20.0" W 122°03'35.2"	Leak	2	3	1

Section II: Monitoring Data – WWTF Monitoring data 2011

DATE: 10/11/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	16	5	1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	6	2	<1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	6	2	1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	6	2	4
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	4	1	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	37	16	13
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	CONF	35	5
N 36°56'20.0" W 122°03'35.2"	Leak	5	1	3

DATE: 10/18/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	31	9	1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	7	2	1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	14	4	<1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	8	6	3
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	24	29	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	51	21	3
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	14	9	3
N 36°56'20.0" W 122°03'35.2"	Leak	<1	<1	<1

Section II: Monitoring Data – WWTF Monitoring data 2011

DATE: 10/25/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	14	5	1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	52	20	26
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	11	1	3
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	5	1	<1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	22	1	2
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	14	4	3
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	10	4	1
N 36°56'20.0" W 122°03'35.2"	Leak	5	2	2

DATE: 11/01/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	24	13	3
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	<1	1	<1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	3	3	1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	1	2	<1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	<1	<1	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	<1	<1	<1
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	1	<1	<1
N 36°56'20.0" W 122°03'35.2"	Leak	<1	<1	<1

Section II: Monitoring Data – WWTF Monitoring data 2011

DATE: 11/08/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	14	2	2
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	11	3	1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	10	1	2
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	13	3	2
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	8	<1	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	6	2	<1
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	7	1	<1
N 36°56'20.0" W 122°03'35.2"	Leak	5	<1	<1

DATE: 12/13/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	8	4	1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	7	3	1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	3	2	1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	2	2	<1
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	7	3	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	4	3	3
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	<1	<1	<1
N 36°56'20.0" W 122°03'35.2"	Leak	1	<1	<1

Section II: Monitoring Data – WWTF Monitoring data 2011

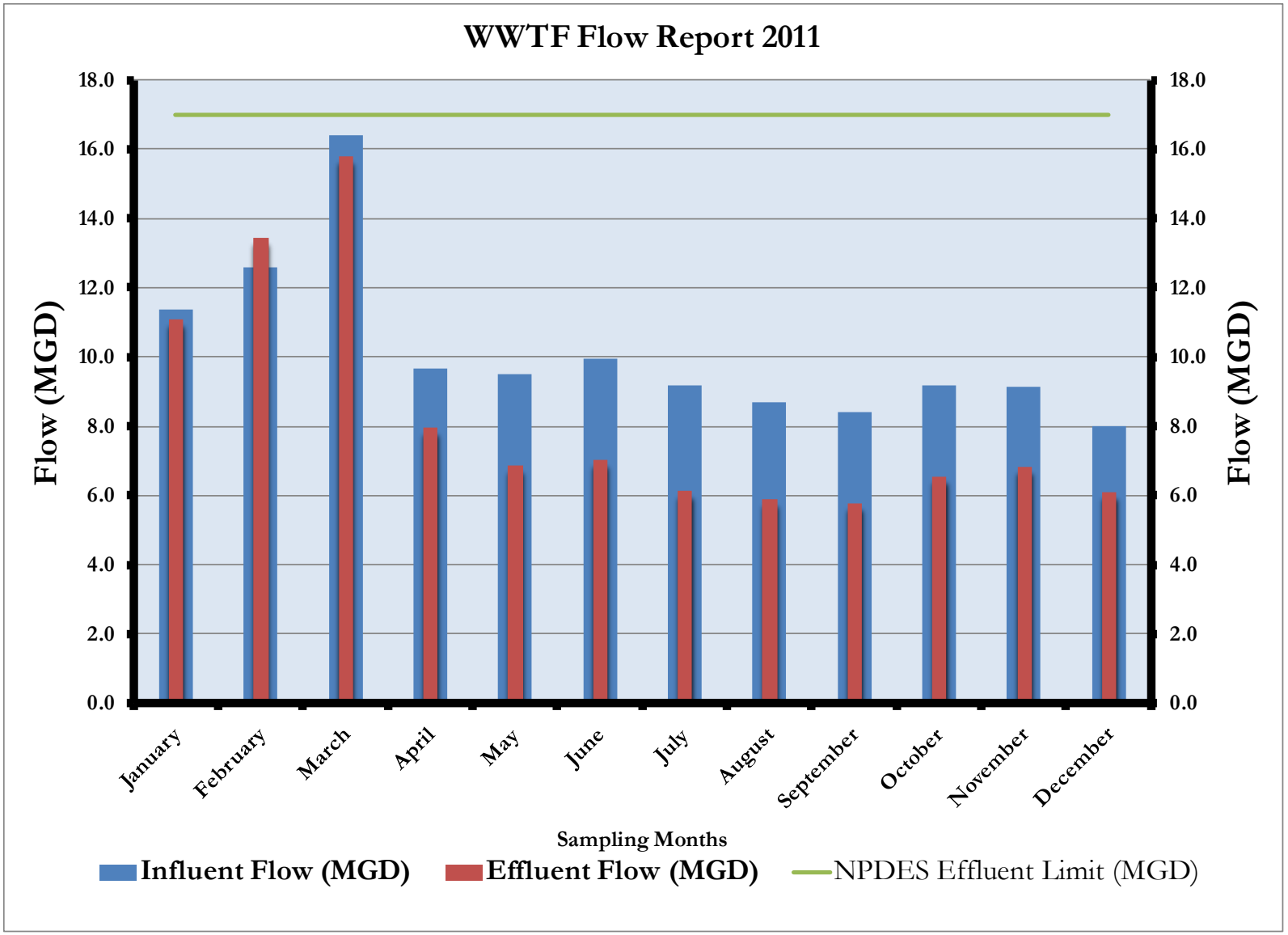
DATE: 12/20/2011				
GPS Location	Sampling Point	Total Coliforms CFU/100 mL	Fecal Coliforms CFU/100 mL	Enterococcus CFU/100 mL
N 36°56'49.3" W 122°01'45.1"	(RW)A-30'	5	<1	1
N 36°56'58.8" W 122°02'24.3"	(RW)C-30'	1	<1	<1
N 36°56'49.1" W 122°02'49.9"	(RW)E-30'	2	<1	<1
N 36°56'45.8" W 122°03'34.3"	(RW)F-30'	2	<1	2
N 36°56'46.0" W 122°04'01.2"	(RW)G-30'	3	<1	<1
N 36°56'58.4" W 122°04'53.1"	(RW)H-30'	1	2	2
N 36°56'58.7" W 122°05'16.2"	(RW)I-30'	2	1	<1
N 36°56'20.0" W 122°03'35.2"	Leak	1	<1	<1

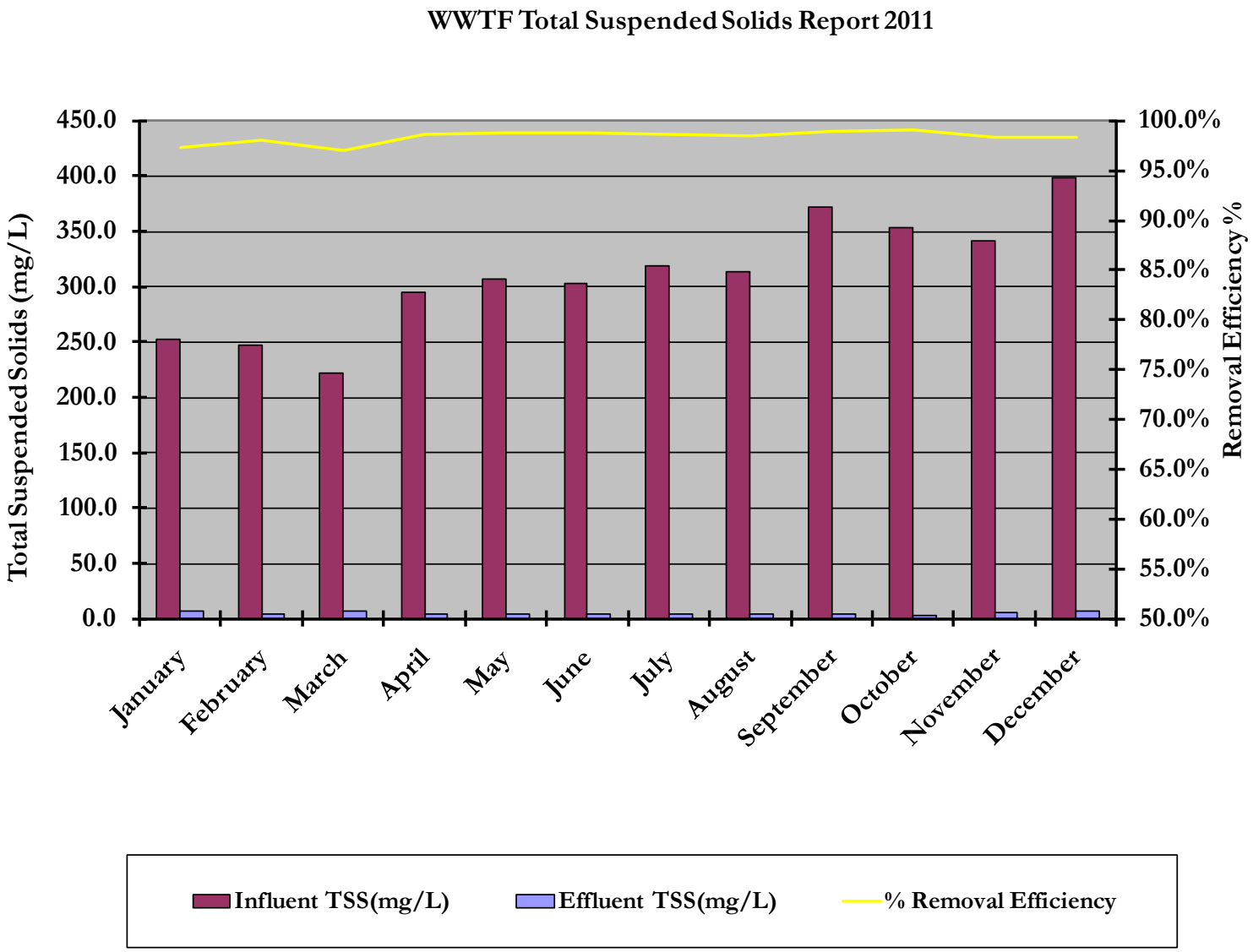
Section III. Summary of Monitoring Data – Graphs

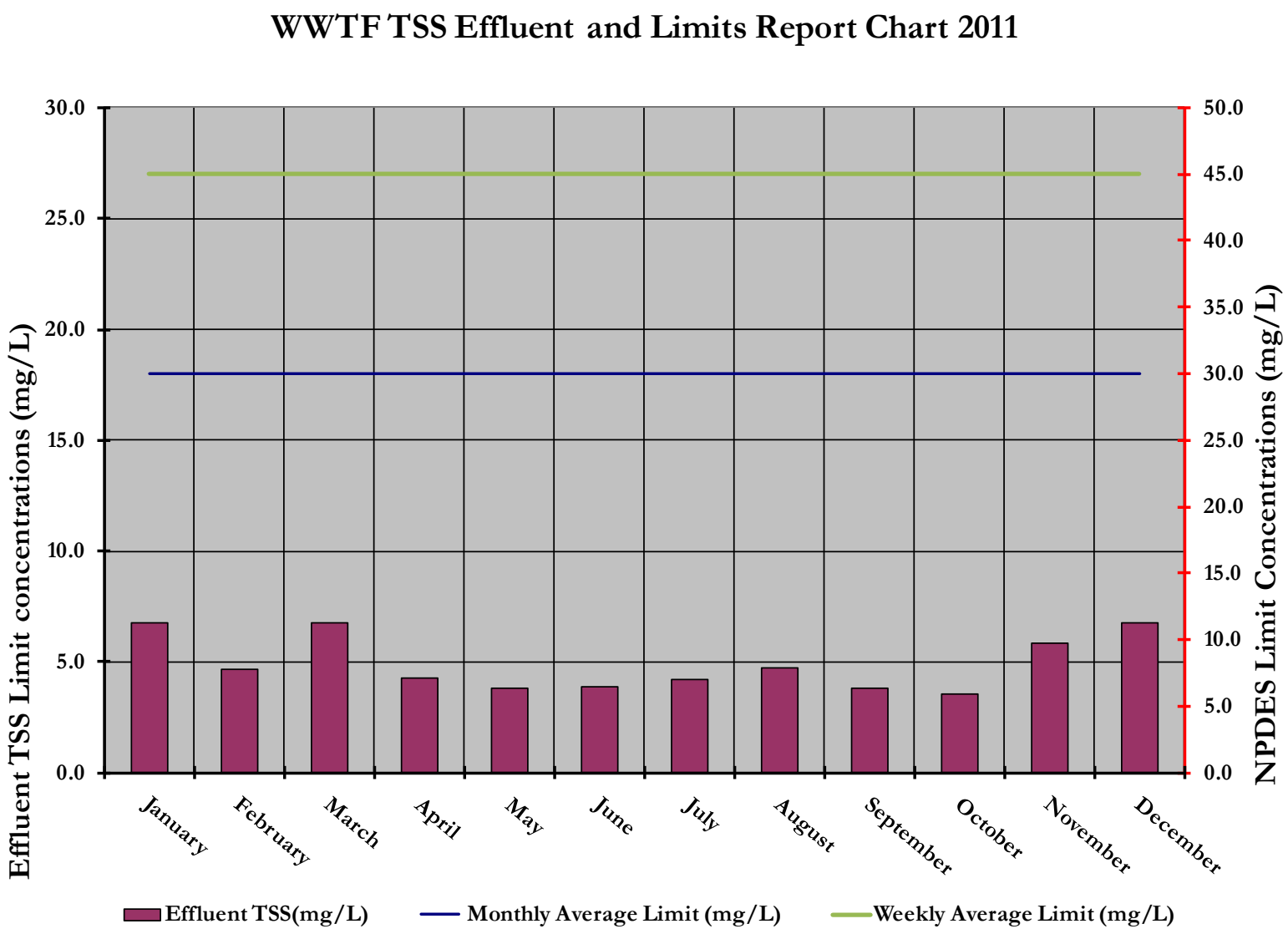
III. Summary of Monitoring Data- Graphs

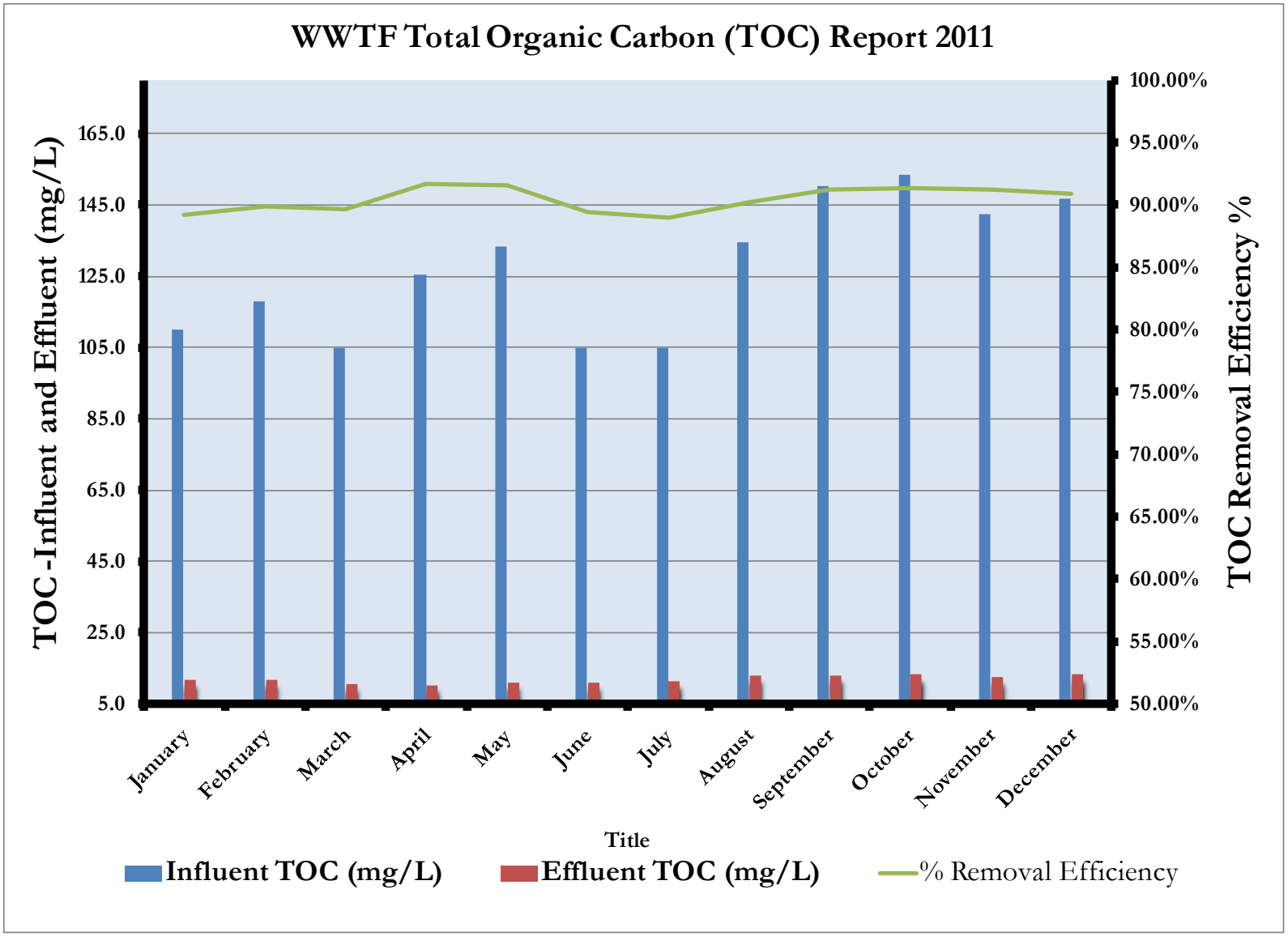
The following pages contain a sequence of graphs, and a map with brief narrative arranged in the following order:

1. WWTF Flow reports.
2. Total Suspended Solids (TSS) reports.
3. Total Organic Carbon (TOC) treatment and removal efficiency reports.
4. Biochemical Oxygen Demand (BOD) Equivalent treatment and removal reports. And
5. Biosolids Monitoring and Report.
6. Contoured Map of Outfall and Nearshore Monitoring sites.

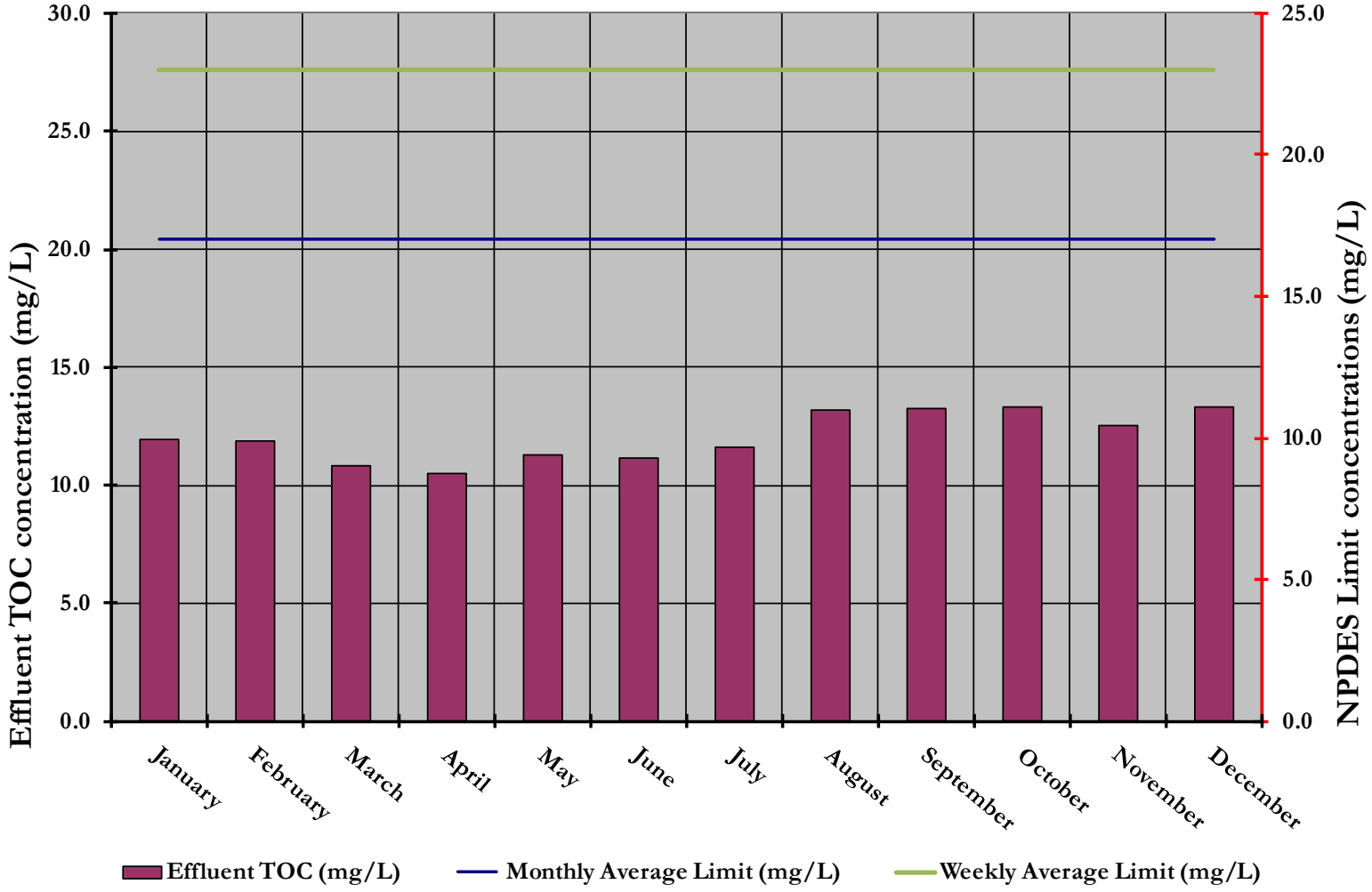

WWTF Flow Report 2011
Flow (MGD)
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
January
February
March
April
May
June
July
August
September
October
November
December
Sampling Months
Influent Flow (MGD)
Effluent Flow (MGD)
NPDES Effluent Limit (MGD)


WWTF Total Suspended Solids Report 2011
Total Suspended Solids (mg/L)
Removal Efficiency %
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
100.0%
95.0%
90.0%
85.0%
80.0%
75.0%
70.0%
65.0%
60.0%
55.0%
50.0%
January
February
March
April
May
June
July
August
September
October
November
December
Influent TSS(mg/L)
Effluent TSS(mg/L)
% Removal Efficiency

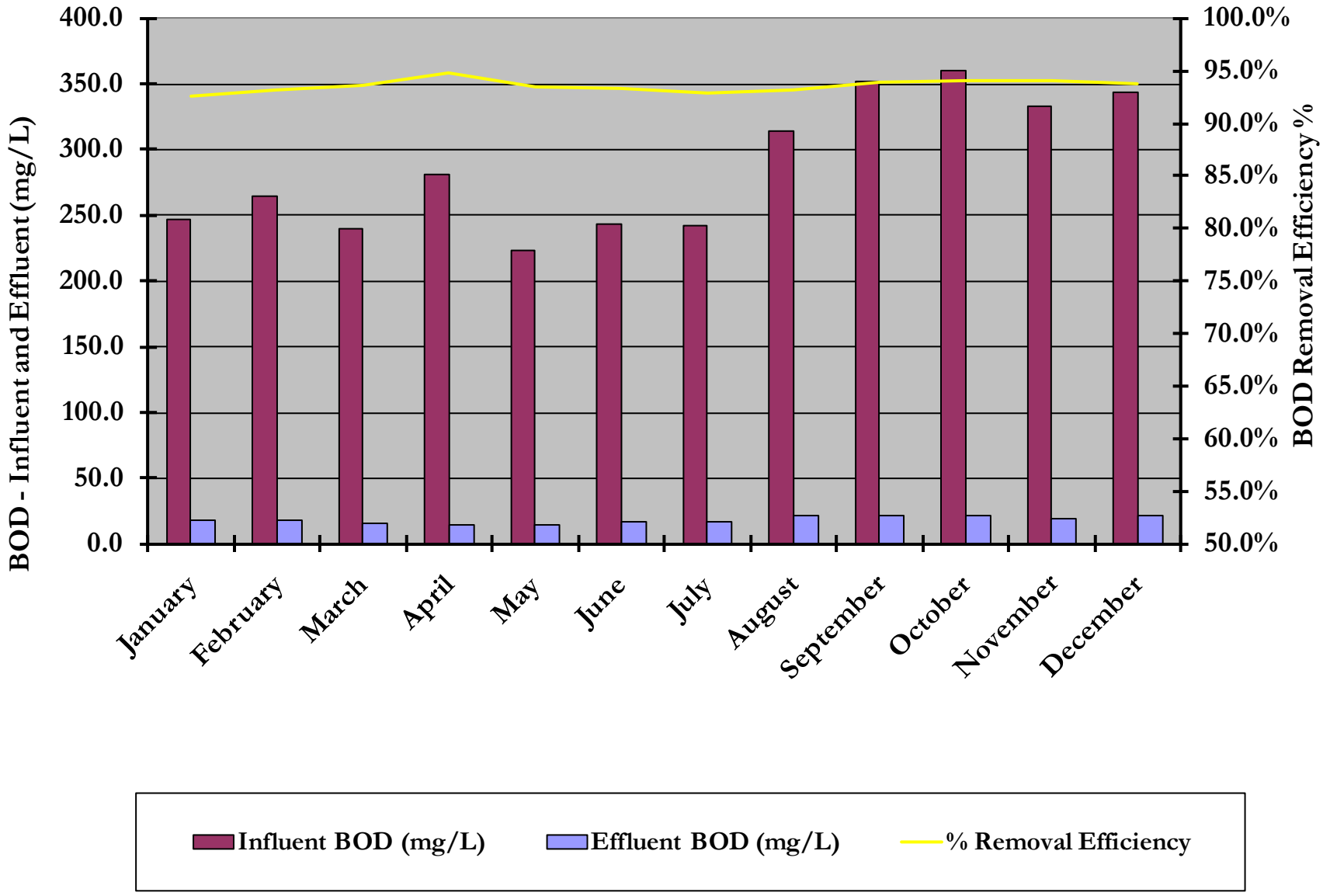

WWTF TSS Effluent and Limits Report Chart 2011
Effluent TSS Limit concentrations (mg/L)
NPDES Limit Concentrations (mg/L)
30.0
25.0
20.0
15.0
10.0
5.0
0.0
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
January
February
March
April
May
June
July
August
September
October
November
December
Effluent TSS(mg/L)
Monthly Average Limit (mg/L)
Weekly Average Limit (mg/L)


WWTF Total Organic Carbon (TOC) Report 2011
TOC -Influent and Effluent (mg/L)
TOC Removal Efficiency %
165.0
145.0
125.0
105.0
85.0
65.0
45.0
25.0
5.0
100.00%
95.00%
90.00%
85.00%
80.00%
75.00%
70.00%
65.00%
60.00%
55.00%
50.00%
January
February
March
April
May
June
July
August
September
October
November
December
Title
Influent TOC (mg/L)
Effluent TOC (mg/L)
% Removal Efficiency

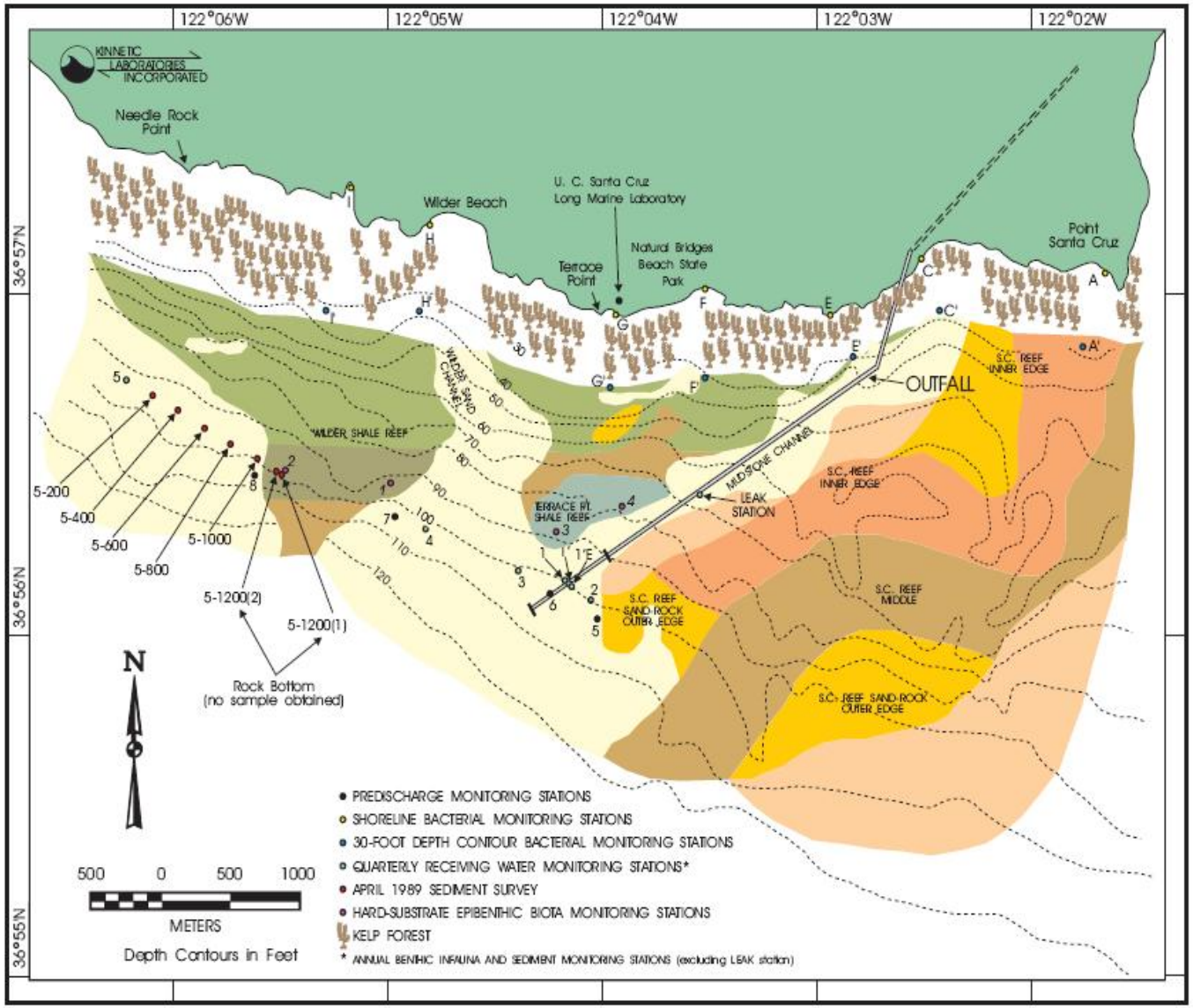
WWTF TOC Effluent and Limits Report Chart 2011



WWTF Biochemical Oxygen Demand (BOD) Report 2011



AERIAL VIEW OF NEARSHORE BACTERIAL SAMPLING LOCATIONS:



Bottom Characteristics Legend

- Sediment - Sand with a general absence of boulders or rock. Sea floor is smooth except for sand wave features
- Low Density of Boulders (5-20%) 1-4 feet in diameter on sea floor. Large areas of sandy bottom probably less than 2 feet thick.
- Moderate Density of Boulders (20-60%) 1-4 feet in diameter and isolated rock exposures on the sea floor. Local sand pockets are probably 1 foot thick or less.
- High Density of Boulders and Rock Exposures (Over 60%) with Bottom Relief 2-6 feet - Occasional localized sand pockets probably less than 1 foot thick.
- Rock - Sea floor generally flat with occasional boulders 1-3 feet in diameter. May have thin veneer of sediments overlying a more irregular rock surface than bottom features indicate.
- Rock - Discontinuous rock ledges 1-4 feet high and 10-100 feet wide. General trend of ledges is west to northwest. Localized thin sediment pockets less than 1 foot thick.
- Rock - Continuous ledges 2-4 feet high, 60-90 feet wide, and traceable for 100 to over 500 feet. Localized thin sediment pockets less than 1 foot thick. (Boundaries of this zone are approximated.)
- Rock - Resistant ridge up to 24 feet bottom relief. Rock surface is rough and irregular.

Figure 1. Location of Santa Cruz predischarge monitoring stations (5, 6, 7, and 8), outfall shoreline bacterial monitoring stations (A, C, E, F, G, H, and I), 30-foot depth contour bacterial monitoring stations (A', C', E', F', G', H', and I'), quarterly receiving water monitoring stations (1, 2, 3, 4, 5, and LEAK), benthic infauna and sediment stations locations (1, 2, 3, 4 and 5), April 1989 sediment survey (Stations 5-200 through 5-1200(2)), and hard-substrate epibenthic biota monitoring stations (Wilder Reef: *1* and *2*; and Terrace Point Reef: *3* and *4*).

Biosolids Monitoring and Reporting

Representative sampling and analyses of sludge biosolids from the last handling point at the facility, are performed on a bi-monthly basis to monitor the process and product quality. The biosolids product is hauled to a third party site under a multi-year contract between the City and the hauler. The hauler has ultimate responsibility for the appropriate reuse of the commodity.

The data generated through the City's biosolids monitoring program indicate that the processes of biosolids generation at the facility and the quality of the biosolids product remain both stable, and predictable. Additional data generated by the City's contractors provide another layer of confirmation that the biosolids product meets and exceeds the limits for hazardous waste disposal or for land application purposes for biosolids uses in California.

Following this introductory paragraph are:

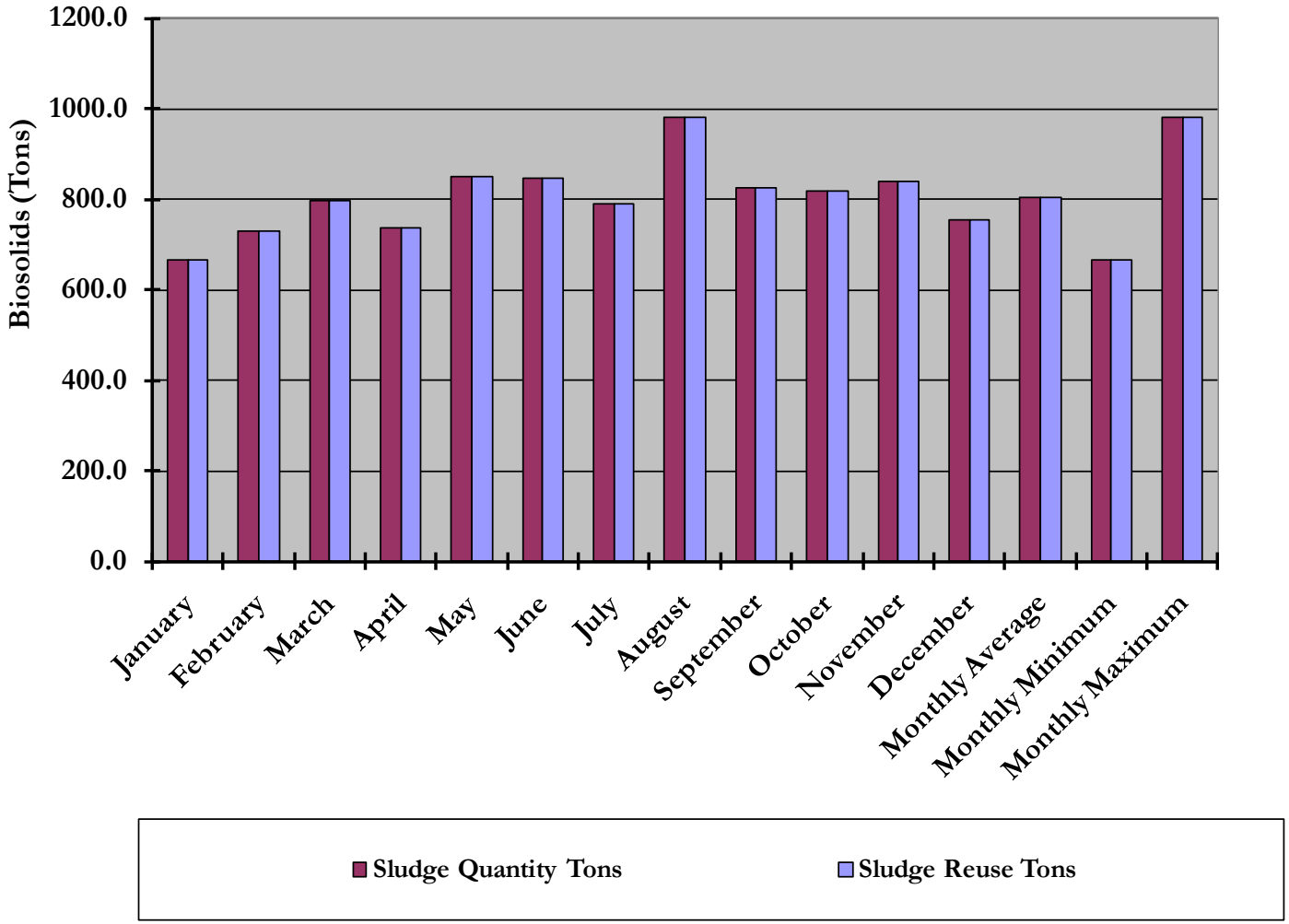
1. A table of the City's biosolids production in 2011and
2. A graph of the City's biosolids production in 2011.

Data on biosolids quality from analyses of the composite samples taken for the Bi-Monthly Sludge monitoring process in 2011 are tabulated in Section II.

Table: Monthly Biosolids Production and Disposal/Reuse 2011

2011 MONTHS	Sludge Quantity	Sludge Reuse
	Tons	Tons
January	664.8	664.8
February	729.8	729.8
March	797.9	797.9
April	736.4	736.4
May	851.3	851.3
June	846.0	846.0
July	790.7	790.7
August	981.0	981.0
September	826.2	826.2
October	818.7	818.7
November	838.8	838.8
December	753.5	753.5
Monthly Average	802.9	802.9
Monthly Minimum	664.8	664.8
Monthly Maximum	981.0	981.0
ANNUAL TOTAL	9,634.9	9,634.9

WWTF Biosolids Production 2011



Section IV. The Compliance Record and Corrective Actions

Section IV. The Compliance Record and Corrective Actions

This section contains narratives and figures relating to the compliance record in 2011 and all associated corrective actions with identifiable violations.

There was no incident of performance failure in 2011.
As indicated by the data and summarized bullets in the introduction, there were no numerical basis to assess plant removal efficiencies for trace organic compounds in 2011. This may be attributable in significant measure to the success of the pretreatment efforts to divert pharmaceutical compounds from the sewer system as well as the continued competency of operations at the facility. All of the activities and results were consistent with the aims and requirements of the NPDES permit.
The compliance record provides several highlights of an improved monitoring program including the following highlights in 2011:

1. The annual outfall report including a dye test and a dive inspection were concluded in October 2011. The results of the inspection are contained in this section.

2. The City continued subscription to the Countywide program for the safe and responsible disposal of unwanted pharmaceuticals to divert their continued introduction into the sewer system. The program was initiated by the City in October 2007, and was broadened through a State grant to include the rest of the County by December 2008.

3. Bacterial monitoring at the 30 foot contour was sustained throughout 2011, with data indicating compliance with all beneficial use standards throughout the year. And

4. The City resumed its simultaneous implementation of the integrative sampling and monitoring for compounds in the California Ocean Plan Table B list, by implementing the same at the facility's influent and effluent during wet and dry seasons. The data will allow the City and the Regional Board to develop monitoring and management strategies for these compounds, and to update the Local Limits for industrial users.

The monthly average BOD removal efficiency in 2011 was 93.6% 2011. The secondary standard for BOD removal; and the erstwhile limit for the facility was 85% BOD removal. The City's performance for the removal of wasteload is now measured in Total Organic Carbon (TOC) and Total Suspended Solids (TSS). The equivalent secondary standard for TOC removal is 70%, while plant performance for 2011 was 90.5%. Plant performance for TSS removal averaged 98.4% for 2011.

The Water Boards instructed dischargers including the City of Santa Cruz to submit all self monitoring reports (SMR) exclusively by electronic means during 2011. Although the CIWQS (California Integrated Water Quality System) and USEPA's electronic systems are still being optimized for these activities, the City continues to support the State's efforts with streamlining the reporting system, including CIWQS.

In conclusion, the data indicate that compliance with the WDR and MRP requirements has been good, and no problems are anticipated for 2012.

The remainder of this section beginning on the next page contains narratives, tables, and a photograph of the annual outfall monitoring exercise.

ANNUAL OUTFALL MONITORING REPORT

The City has conducted its annual Outfall and Diffuser Monitoring as required by DMR WDID 3 440102001 of December 19, 2010. This year's monitoring consisted of a dye test with an over flight along the entire outfall (report attached) and an underwater video survey conducted by a remotely operated vehicle (ROV) along the diffuser section (report attached). The dye study was conducted by Skywords Aerial Services on November 14, 2011. The ROV inspection was conducted on September 2, 2011 by North Coast Divers, Inc.

The underwater survey showed that the open diffuser ports are unobstructed and flowing as designed and originally constructed. The dye test showed the leaks and did as was previously detected in 1992, 1994, 2002, 2004 and 2006.

That leak occurs at an approximate depth of 70 feet below sea level and 7000 feet from the beach vault as measured along the outfall. The dye test was performed after the weather change and provided excellent visibility of dye. Dye was only observed at the diffuser location, and the leak site and nowhere else.

Kinnetic Laboratories had performed an extensive investigation of the intemittent leak in 1994 and concluded that the leak was small in volume and had an initial dilution exceeding 1000:1 and that the risks and cost to fix such a leak outweighed the benefits. The precise location of the leak was not determined due to the small size of the leak and the fact that the outfall is in a trench covered with ballast rock.

Beginning in 2005, weekly grab samples are taken from the GIS location identified as the leak at the 70 foot contour, along with the monitoring of the near shore bacteria at 30 foot contour depth. Previous grab samples were taken quarterly at the leak site from 1995 through 1998. In April 1997, elevated bacteria levels indicated that the intermittent leak was still active at times. All samples were tested, and continue to be tested for total coliform, fecal coliform and enterococci. Bacteria data from the site has shown intermittent levels of elevated indicators. This is consistent with the limited and intermittent nature of the leak. No additional impact from the leak has been documented. Details of all the test data have been included in both the annual and quarterly Ocean Outfall reports submitted to the RWCQB from 1995 through 1998.

Finally, the City uses the annual report to provide updates on observations relating to the leak. Following this page is the dye study report from the contractors engaged in 2011.

Steve Wolfman, P.E.
Associate Civil Engineer

Dye Study Report - Wastewater Treatment Effluent Ocean Outfall Overflight

On Wednesday, November 14th, 2011, the City of Santa Cruz conducted a dye test of the Wastewater Treatment effluent ocean outfall to visually search for leaks.

An overflight was performed between 11:45 am to 12:45 pm using the aerial services of Skywords Aerial Services. An on-board standard global positioning system (GPS) was used for navigation and positioning.

At approximately 11:48 am 90 gallons of yellow liquid dye were added at the Wastewater Treatment facility. The weather was clear with unrestricted visibility and the sea was calm.

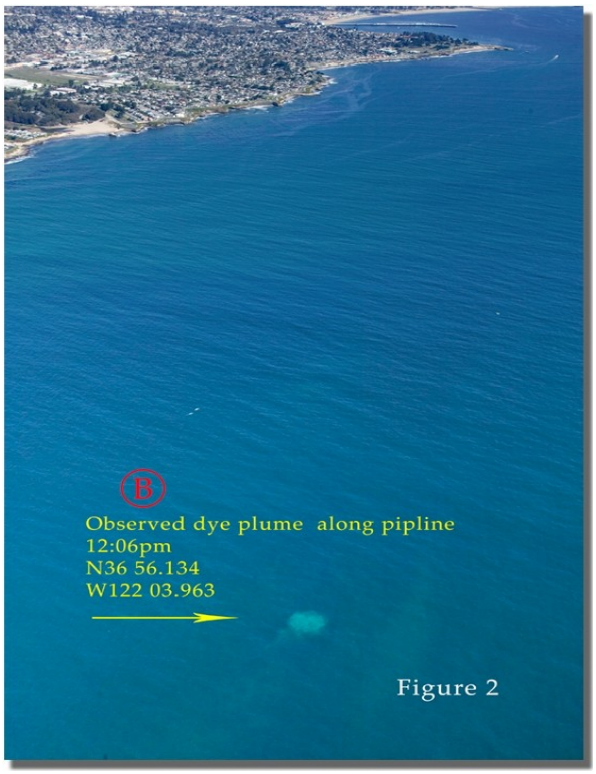
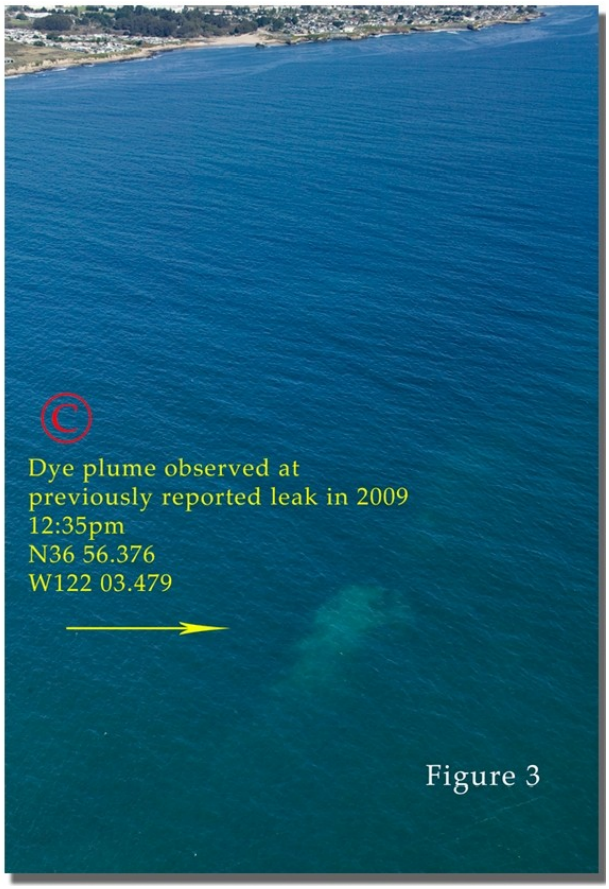


Figure 2 At 12:06 a dye plume was observed at site B approximately 9,800 linear feet from beach outfall vault.

Figure 3- At 12:35 pm a dye plume was observed at site C approximately 7,000 linear feet along the pipeline from the beach outfall vault where a small leak had been previously observed



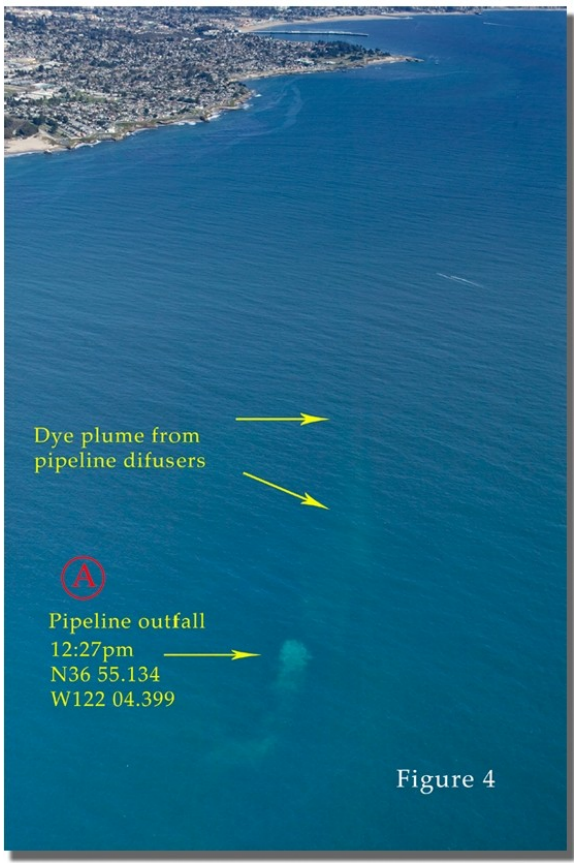


Figure 4- At 12:28 the dye plume is still visible emanating from the the end of the outfall pipe-Site A.

No other leaks or visual plumes were sighted during the remainder of the flight. The overflight concluded at 12:45 pm.
Submitted by David M. Sievert.

DRS MARINE INC.

525 CHESTNUT STREET
VALLEJO, CA 94590
BUS: 707-648-3483
FAX: 707-648-2006
drsmarine@aol.com

CITY OF SANTA CRUZ

OUTFALL DIFFUSER INSPECTION

**PREPARED FOR
THE CITY OF
SANTA CRUZ**

December 11, 2010

City of Santa Cruz
Public Works Engineering
809 Center St. RM 201
Santa Cruz, CA 95060-3862

ATTN: Steve Wolfman

RE: 2010 video survey of Outfall Diffusers

Project site:	City of Santa Cruz Outfall
Date of work:	December 11, 2010
Objective:	Video the as found conditions of the diffusers and provide a DVD and written report to the City.

INTRODUCTION

DRS MARINE, Inc. conducted an underwater inspection of the diffuser section of the Santa Cruz Outfall Pipe. The inspection was to provide a clear view of each diffuser port in order to determine if the port is open or closed and if open, is the flow unobstructed or obstructed. The inspection was conducted by the use of an ROV (Remotely Operated Vehicle)

AS FOUND CONDITIONS

All open diffusers appear to be functioning properly. Each flapper is intact and allowing effluent to flow unobstructed. All closed diffusers were intact and properly sealing the flow of any effluent.

At two locations the Rip Rap was partially covering the diffusers, #100 & #105, as noted in *TABLE A*. In both locations, the diffusers are closed.

Diffuser #46 is completely covered with a patch, which is fastened down by banding around the pipe.

Due to the rapid underwater current and the high flow of effluent, the end structure could not be inspected.

TABLE A Diffuser location and as found condition

DIFFUSER LOCATION	OPEN / CLOSED POSITION	OBSTRUCTED/ UNOBSTRUCTED	DVD TIME LOG HR : MIN : SEC	COMMENTS
1 South	OPEN	UNOBSTRUCTED	:01	
2 North	OPEN	UNOBSTRUCTED	1:05	
3 South	CLOSED		1:48	
4 North	OPEN	UNOBSTRUCTED	2:33	
5 South	CLOSED		5:27	
6 North	CLOSED		6:00	
7 South	OPEN	UNOBSTRUCTED	7:25	
8 North	OPEN	UNOBSTRUCTED	7:58	
9 South	CLOSED		9:11	
10 North	CLOSED		10:10	
11 South	OPEN	UNOBSTRUCTED	10:43	
12 North	CLOSED		11:54	
13 South	CLOSED		12:25	
14 North	OPEN	UNOBSTRUCTED	12:50	
15 South	CLOSED		13:35	
16 North	CLOSED		14:27	
17 South	OPEN	UNOBSTRUCTED	15:00	
18 North	OPEN	UNOBSTRUCTED	16:35	
19 South	CLOSED		17:43	
20 North	CLOSED		18:24	
21 South	OPEN	UNOBSTRUCTED	19:45	
22 North	CLOSED		20:45	
23 South	CLOSED		21:13	
24 North	OPEN	UNOBSTRUCTED	21:45	
25 South	CLOSED		22:35	
26 North	CLOSED		23:05	
27 South	OPEN	UNOBSTRUCTED	:24:00	
28 North	OPEN	UNOBSTRUCTED	:24:30	
29 South	CLOSED		:25:45	
30 North	CLOSED		:27:05	
31 South	OPEN	UNOBSTRUCTED	:28:31	
32 North	CLOSED		:29:19	
33 South	CLOSED		:29:51	
34 North	OPEN	UNOBSTRUCTED	:30:19	
35 South	CLOSED		:30:55	
36 North	CLOSED		:31:27	
37 South	OPEN	UNOBSTRUCTED	:32:08	
38 North	OPEN	UNOBSTRUCTED	:33:22	
39 South	CLOSED		:33:58	
40 North	CLOSED		:34:20	
41 South	OPEN	UNOBSTRUCTED	:35:00	
42 North	CLOSED		:36:29	
43 South	CLOSED		:37:09	
44 North	OPEN	UNOBSTRUCTED	:37:30	
45 South	CLOSED		:38:35	
46 North			:39:15	Diffuser is covered with a large patch which is secured to pipe with banding

DIFFUSER LOCATION	OPEN / CLOSED POSITION	OBSTRUCTED/ UNOBSTRUCTED	DVD TIME LOG HR : MIN : SEC	COMMENTS
47 South	OPEN	UNOBSTRUCTED	:40:15	
48 North	OPEN	UNOBSTRUCTED	:40:45	
49 South	CLOSED		:41:27	
50 North	CLOSED		:42:00	
51 South	CLOSED		:42:45	
52 North	CLOSED		:43:19	
53 South	OPEN	UNOBSTRUCTED	:43:45	
54 North	OPEN	UNOBSTRUCTED	:44:10	
55 South	CLOSED		:44:38	
56 North	CLOSED		:45:00	
57 South	OPEN	UNOBSTRUCTED	:45:43	
58 North	OPEN	UNOBSTRUCTED	46::11	
59 South	CLOSED		:46:30	
60 North	CLOSED		:47:10	
61 South	CLOSED		:47:45	
62 North	CLOSED		:48:10	
63 South	OPEN	UNOBSTRUCTED	:48:48	
64 North	OPEN	UNOBSTRUCTED	:52:30	
65 South	CLOSED		:52:50	
66 North	CLOSED		:53:12	
67 South	OPEN	UNOBSTRUCTED	:53:55	
68 North	OPEN	UNOBSTRUCTED	:54:43	
69 South	CLOSED		:55:35	
70 North	CLOSED		:56:10	
71 South	CLOSED		:57:10	
72 North	CLOSED		:57:30	
73 South	OPEN	UNOBSTRUCTED	:57:50	
74 North	OPEN	UNOBSTRUCTED	:58:15	
75 South	CLOSED		:58:40	
76 North	CLOSED		:59:00	
77 South	OPEN	UNOBSTRUCTED	:59:40	
78 North	OPEN	UNOBSTRUCTED	1:00:31	
79 South	CLOSED		1:00:58	
80 North	CLOSED		1:01:22	
81 South	CLOSED		1:01:45	
82 North	CLOSED		1:02:01	
83 South	OPEN	UNOBSTRUCTED	1:02:25	
84 North	CLOSED		1:02:45	
85 South	CLOSED		1:03:10	
86 North	OPEN	UNOBSTRUCTED	1:03:37	
87 South	OPEN	UNOBSTRUCTED	1:04:00	
88 North	CLOSED		1:04:20	
89 South	CLOSED		1:04:47	
90 North	CLOSED		1:05:08	
91 South	OPEN	UNOBSTRUCTED	1:05:33	
92 North	OPEN	UNOBSTRUCTED	1:06:00	
93 South	CLOSED		1:06:30	
94 North	CLOSED		1:06:54	
95 South	CLOSED		1:07:13	
96 North	CLOSED		1:07:36	

DIFFUSER LOCATION	OPEN / CLOSED POSITION	OBSTRUCTED/ UNOBSTRUCTED	DVD TIME LOG HR : MIN : SEC	COMMENTS
97 South	OPEN	UNOBSTRUCTED	1:09:22	
98 North	OPEN	UNOBSTRUCTED	1:09:45	
99 South	CLOSED		1:10:46	
100 North	CLOSED		1:12:45	The rip rap is above the crown of pipe and partially covering the diffuser flap
101 South	OPEN	UNOBSTRUCTED	1:14:20	
102 North	OPEN	UNOBSTRUCTED	1:15:30	
103 South	CLOSED		1:16:30	
104 North	CLOSED		1:16:59	
105 South	CLOSED		1:17:23	The rip rap is above the crown of pipe and partially covering the diffuser flap
106 North	CLOSED		1:17:36	
107 South	OPEN	UNOBSTRUCTED	1:18:07	
108 North	OPEN	UNOBSTRUCTED	1:18:30	
109 South	CLOSED		1:19:15	
110 North	CLOSED		1:19:39	
111 South	OPEN	UNOBSTRUCTED	1:20:18	
112 North	OPEN	UNOBSTRUCTED	1:20:38	
113 South	CLOSED		1:21:03	
114 North	CLOSED		1:21:28	
115 South	CLOSED		1:21:56	
116 North	CLOSED		1:22:12	
117 South	OPEN	UNOBSTRUCTED	1:22:35	
118 North	OPEN	UNOBSTRUCTED	1:22:55	
119 South	CLOSED		1:23:26	
120 North	CLOSED		1:23:45	
121 South	OPEN	UNOBSTRUCTED	1:24:13	
122 North	OPEN	UNOBSTRUCTED	1:24:33	
123 South	CLOSED		1:25:03	
124 North	CLOSED		1:25:30	
125 South	CLOSED		1:25:48	
126 North	CLOSED		1:26:45	
127 South	OPEN	UNOBSTRUCTED	1:27:24	
128 North	OPEN	UNOBSTRUCTED	1:27:45	
129 South	CLOSED		1:28:00	
130 North	CLOSED		1:28:32	
131 South	OPEN	UNOBSTRUCTED	1:29:16	
132 North	OPEN	UNOBSTRUCTED	1:29:30	
133 South	CLOSED		1:29:45	
134 North	CLOSED		1:30:12	
135 South	CLOSED		1:31:43	
136 North	CLOSED		1:32:05	
137 South	OPEN	UNOBSTRUCTED	1:32:22	
138 North	OPEN	UNOBSTRUCTED	1:32:43	
139 South	CLOSED		1:33:49	
140 North	CLOSED		1:34:09	
141 South	OPEN	UNOBSTRUCTED	1:34:28	
142 North	OPEN	UNOBSTRUCTED	1:34:47	
143 South	CLOSED		1:35:30	
144 North	CLOSED		1:35:45	

DIFFUSER LOCATION	OPEN / CLOSED POSITION	OBSTRUCTED/ UNOBSTRUCTED	DVD TIME LOG HR : MIN : SEC	COMMENTS
145 South	CLOSED		1:36:12	
146 North	CLOSED		1:36:30	
147 South	OPEN	UNOBSTRUCTED	1:36:59	
148 North	OPEN	UNOBSTRUCTED	1:37:20	
149 South	CLOSED		1:37:36	
150 North	CLOSED		1:37:55	
151 South	OPEN	UNOBSTRUCTED	1:38:27	
152 North	OPEN	UNOBSTRUCTED	1:38:55	
153 South	CLOSED		1:39:13	
154 North	CLOSED		1:39:39	
155 South	CLOSED		1:39:50	
156 North	CLOSED		1:41:33	
157 South	OPEN	UNOBSTRUCTED	1:42:03	
158 North	OPEN	UNOBSTRUCTED	1:42:23	
159 South	CLOSED		1:42:40	
160 North	CLOSED		1:43:17	
161 South	OPEN	UNOBSTRUCTED	1:43:51	
162 North	OPEN	UNOBSTRUCTED	1:44:13	
163 South	CLOSED		1:44:35	
164 North	CLOSED		1:44:56	
165 South	CLOSED		1:45:57	
166 North	CLOSED		1:46:19	
167 South	OPEN	UNOBSTRUCTED	1:46:41	
168 North	OPEN	UNOBSTRUCTED	1:47:00	
169 South	OPEN	UNOBSTRUCTED	1:47:30	
170 North	CLOSED		1:47:56	
171 South	OPEN	UNOBSTRUCTED	1:48:19	
172 North	OPEN	UNOBSTRUCTED	1:48:43	
173 South	OPEN	UNOBSTRUCTED	1:49:20	
174 North	CLOSED		1:50:05	

ATTACHMENTS:

DVD of the inspection

CD with report in pdf format

For questions concerning this report, please contact our office at 707/648-3483

Section V. The Operating Staff

V. The Operating Staff.

The following section summarizes the credentials and designations of staff employed at the Wastewater Treatment facility and the City's compliance with the California Water Code, the California Code of Regulations, in maintaining appropriate staffing.

The Waste Discharge Requirements, and the NPDES Permit require operators and their supervisors at municipal wastewater treatment plants to be certified at specific minimum levels of certification based upon the wastewater treatment plant processes and design flows. All of the operations personnel of the City of Santa Cruz Wastewater Treatment Facility are certified by the California State Water Resources Control Board at or above the required levels. In addition, the Superintendent of the facility maintains a wastewater operators certificate at the level of the plant rating.

The Operations and Maintenance division of the facility is staffed as follows:

- 1 (one) Wastewater Treatment Facility Operations Manager;
- 5 (five) Senior Wastewater Plant Operators;
- 2 (two) Wastewater Plant Operator III;
- 4 (four) Wastewater Operator II

The maintenance unit consists of seven mechanics and three electricians as follows:

- 1 (one) Maintenance Supervisor;
- 1 (one) Plant Maintenance Mechanic III;
- 3 (three) Plant Maintenance Mechanics II;
- 3 (three) Plant Maintenance Mechanics I.

The electrical instrumentation unit consists of seven mechanics and three electricians as follows:

- 1 (one) Electrical/Intrumentation Supervisor.
- 2 (two) Electrical Technician II.

Additional management, engineering, consultative, clerical and analytical support services are provided by:

- The Director of Public Works;
- Superintendent of Wastewater Treatment Facility and Collections System
- 1 Associate Civil Engineer; and 1 Civil Engineering Associate

- 1 Laboratory/Environmental Compliance Manager; 2 Laboratory Chemists; 1 Laboratory Technician; and 3 Environmental Compliance Inspectors;
- 1 Administrative Assistant and
- 1 Network Administrator.

Section V. The Operating Staff

Following are tables of all personnel involved in the daily operation and maintenance of the Wastewater treatment facility, their credentials, classifications and certification levels.

MANAGEMENT/ADMINISTRATION		
NAME	**DESIGNATION**	**CREDENTIALS: GRADE CERT; & EXPIRY DATE**
Seidel, Dan	Superintendent of Wastewater Collection and Treatment Facility	**SCWRCB Wastewater Operator IV 4055**; 6/30/13
Warren, Filipina	Administrative Assistant II	**AAII** BA (Psychology)
Woodhouse, Mike	Network Administrator (since August 2011)	
Babatola, Akin	Laboratory/Environmental Compliance Manager	MS (Mol. Biol); BS (Micro)
Sanders, Michael	Wastewater Treatment Facility Operations Manager	**SCWRCB Wastewater Operator IV 4753**; 12/31/12

OPERATIONS			
NAME	**DESIGNATION**	**CREDENTIALS GRADE CERTIFICATE**	**EXPIRY DATE**
Sanders, Michael	Wastewater Treatment Facility Operations Manager	WW Operator IV 4753	12/31/12
Ortega, Michael	Senior WW Operator	WW Operator V 4220	12/31/13
Gilbert, John	Senior WW Operator	WW Operator III 28079	6/30/12
Lorenson, Arthur	Senior WW Operator	WW Operator III 4867	12/31/13
Meyers, David	Senior WW Operator	WW Operator III 10986	6/30/13
Ron Frazier	Senior WW Operator	WW Operator III 7436	6/30/12
Blume, Robert	WW Operator III	WW Operator V 4776	6/30/12
Bontrager, John	WW Operator II	WW Operator II 29067	6/30/13
Seifert, Brian	WW Operator III	WW Operator III 28071	6/30/12
Barr, Jennifer	WW Operator in Training	WW OIT-Grade I	6/30/12
Lineham, Grant	WW Operator II	WW Operator II 8320	12/31/13

Quintana, Everest	WW Operator II	WW Operator II 4837	6/30/12
Barnes, John	WW Operator II	WW Operator II 5734	6/30/13

MAINTENANCE			
NAME	**DESIGNATION**	**CREDENTIALS GRADE CERTIFICATE**	**EXPIRY DATE**
Wisler, Larry	Maintenance Supervisor	CWEA Mechanical Tech III #090363007	1/31/10
Stevens, Fred	Maintenance Mechanic III	CWEA Mechanical Tech III #090363008	3/31/10
Locatelli, Albert	Maintenance Mechanic II		
Pretzer, Tom	Maintenance Mechanic II	CWEA Mechanical Tech II #599	6/31/10
Locatelli, Forrest	Maintenance Mechanic II		
Carlson, Ron	Maintenance Mechanic I		
Fambrini, Steve	Maintenance Mechanic I	CWEA Mechanical Tech I #090951004	9/30/10
Locatelli, John	Maintenance Mechanic I		

ELECTRICAL			
NAME	**DESIGNATION**	**CREDENTIALS GRADE CERTIFICATE**	**EXPIRY DATE**
Galvin, Greg	Electrical/Instrumentation Supervisor		
Sturdivant, Jim	Electrical Technician II	CWEA Elect/Inst #80772002	7/31/10
Miller, Ralph	Electrical Technician II	CWEA Elect/Inst #80172006	1/31/10

LABORATORY/ENVIRONMENTAL COMPLIANCE		
NAME	**TITLE**	**CREDENTIALS**
Babatola, Akin	Laboratory/Environmental Compliance Manager	MS (Mol. Biol); BS (Microbiology)
Birch, Anne	Chemist II/Principal Analyst	BA (Biology) BA (Cultural Anthropology) **Lab Analyst I 342;** 1/31/2013
Munster Jennie	Chemist I	Phd (Geo Sciences) MS (Earth Sciences); BS (Earth Sciences)
Courtroul, Michelle	Lab Technician	BA (Environmental Studies/Biology)

Section V. The Operating Staff

Tomlinson, Monica	Environmental Compliance Inspector	BS (Env. Science) **Env. Comp Insp. I 381;** 7/31/12 **Lab Analyst I 1017**; 1/31/13
Baker, Fred	Environmental Compliance Inspector	**Env. Comp Insp. I 314;** 7/31/12
Martin, David Charles	Environmental Compliance Inspector	PhD (Earth Sciences) BS (Earth Sciences) **Env. Comp Insp. I**

Section VI. The Operation & Maintenance Manual and Contingency Plans

VI. The Operation & Maintenance Manual and Contingency Plans.

The operation and maintenance manual was last reviewed in November 2000 and found to be complete and valid for the current facility. The facility's written Standard Operating Procedures are periodically reviewed and frequently updated to maintain documentation and direction on the operation of the facility.

The maintenance division provides routine preventative maintenance for all plant equipment. This ensures that equipment receives routine lubrication and relevant maintenance, and that standby equipment is ready for service.

Safeguards to minimize accidental discharge from the wastewater treatment plant are built into the design and operation of facility and equipment. These are also tested periodically to ensure their integrity. Scenarios for accidental discharge have been reviewed and concluded to be minimal. However, the location most vulnerable to an accidental discharge was identified as the Bar Screening room. This room is located proximate to the Pump house. A long-term power outage at peak flow may cause an overflow into the Pump house if the main sewage pumps were disabled. However, the two engines capable of driving all six main sewage pumps are diesel driven, and would provide power in case of such an outage. These diesel engines are tested for performance on a monthly schedule, and for a minimum of 1 hour each time. These engines and all equipment in the pump house are maintained with the highest priority.

Additional standby equipment has also been installed with the Plant upgrade to advanced secondary in 1998. These include power to the Sodium Hypochlorite disinfection system, which is the back up to the UV disinfection system.

Section VII. Laboratories used to Monitor Compliance

Section VII. Laboratories used to Monitor Compliance

The following section contains current information on all analytical laboratories whose services were required to maintain the compliance monitoring effort in 2011.

During the year 2011, the City of Santa Cruz operated the Wastewater Treatment Facility Laboratory certified under the CA Department of Health Services ELAP (Environmental Laboratory Accreditation Program). The Laboratory certificate number is CA 1176. A copy of the Laboratory certificate and the approved Fields of Testing are attached herewith.
The Laboratory updated its QAPP (Quality Assurance Performance Plan), and received final approval for monitoring Total Organic Carbon (TOC) in wastewater for compliance monitoring programs in 2011.
Most analytical determinations performed for Plant treatment and the NPDES permit were accomplished through the Laboratory. Staffing at the WWTF Laboratory includes:

- 1 Laboratory/Environmental Compliance Manager;
- 2 (two) Laboratory Chemists, both of whom also function as Principal Analysts in accordance with CCR Title 22; and
- 1 Laboratory Technician.

The following six (6) contract laboratories provided other analytical services:

1. **McCampbell Analytical Inc**.
   110 2nd Avenue South, #D7
   Pacheco, CA 94553-1622

2. **Alpha Analytical Laboratories Inc.**
   860 Waugh Lane, H-1,
   Ukiah, CA 95482

3. **Frontier Analytical Laboratory**
   5172 Hillsdale Circle
   El Dorado Hills, CA 95762

4. **City of Watsonville Utilities Department Laboratory**
   P O Box 50000
   Watsonville, CA 95077

5. **Toxscan Inc.**
   42 Hanger Way
   Watsonville, CA 95076

6. **Department of Fish and Game WPC Laboratory**
   2005 Nimbus Road
   Rancho Cordova, CA 95670

7. Aquatic Bioassay and Consulting Laboratory
29 North Olive Street
Carlsbad, CA 93001

All the laboratories are required to maintain current NELAC/ELAP, and these are verified by the WWTF Laboratory Manager during the monitoring period.

Additional specialized extraction and GPC clean up of integratively sampled effluents and influents were processed through:

Environmental Sampling Technologies (EST)
502 S. Fifth Street
St. Joseph, MO. 64501

WWTF Laboratory Certificate:

CALIFORNIA STATE

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM BRANCH

CERTIFICATE OF ENVIRONMENTAL ACCREDITATION

Is hereby granted to

CITY OF SANTA CRUZ WWTF LABORATORY

PUBLIC WORKS DEPARTMENT

110 CALIFORNIA STREET

SANTA CRUZ, CA 95060

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.: **1176**

Expiration Date: **5/31/2010**

Effective Date: **5/1/2008**

Richmond, California
subject to forfeiture or revocation

George C. Kulasingam, Ph.D., Chief
Environmental Laboratory Accreditation Program Branch

Section VIII. Summary of Performance Relative to Section B, General Monitoring Requirements

VIII. Summary of Performance Relative To Section B, General Monitoring Requirements.

1. Monitoring location, minimum sampling frequency and sampling methods for each parameter complies with the Monitoring and Reporting program of the NPDES permit CA0048194 – Santa Cruz Wastewater Treatment Facility, Santa Cruz County, WDID 3 440102001.

2. Although occasionally, due to errors or equipment failure or to safety warnings for ocean sampling, a monitoring and analytical event may be missed entirely, or misread, these were documented with the regional board and did not interfere with the integrity of the monitoring program.

3. Monitoring frequency may be increased as needed to verify apparent noncompliance. Additional monitoring to optimize plant performance or validate performance and/or analytical questions is performed routinely.

4. Laboratories used for the monitoring of compliance with the permit meet the standard of accreditation by the California State Department of Health Services. (See Section VI of this report for more information on the laboratories.) Bioassays are conducted in accordance with the guidelines approved by the State Department of Fish and Game and the State Water Resources Control Board.

5. Samples and measurements taken for the purpose of monitoring are collected consistent with the activity and performance being evaluated. Grab samples are collected at peak loading times. Influent samples include all incoming waste streams and exclude recycle flows. Effluent samples are collected downstream of the last treatment process and upstream of the receiving waters. Integrative samples are collected during the specified monitoring periods, and with validated sampling technologies, to optimize the opportunities available to quantify trace and ultra-trace organic compounds in the Influent and Effluent of the facility.

6. When the pollutants are monitored more frequently than required under the permit, the data are reported with the monthly monitoring reports and are included in appropriate calculations.

7. Monitoring instruments and devices used to fulfill requirements of the monitoring program are maintained and calibrated. Documentation of the

maintenance and calibration is maintained.

8. Hardcopy records of all monitoring information are maintained for at least three (3) years, and electronic copies are retained for at least five (5) years.

Section IX. Lift Station and Collection System Overflow Report

The City's Infiltration/Inflow and Spill Prevention Program continues to address the objectives set out in WDR No. R3-2010-043. The City has completed major improvements to its collection system over the last several years and has not had a sanitary sewer overflow caused by infiltration/inflow capacity since January 2, 2002. The City of Santa Cruz has implemented an improved spill response as detailed in the "Sewer System Management Plan". This response includes vacuuming up the spill and collecting all the wash down water used to clean the spill area. In most cases the spill has no contact with a waterway.

The City's Infiltration/Inflow and Spill Prevention Program continues to address the objectives set out in WDR No. R3-2010-043. The City continues to complete major annual improvements to its collection system and has not had a sanitary sewer overflow caused by infiltration/inflow or capacity deficiency since January 2, 2002. The following paragraphs contain a brief narrative of some of the major program activities undertaken by the City to improve the collection system since 2002.

In 2002, the City rehabilitated approximately 7000 feet of large diameter sanitary (16 to 24 inch) located along the San Lorenzo River.

In 2003 two major improvements completed was the Grant Street Sewer project and the Clean Beach Sewer project. These projects cost approximately $200,000 and $800,000 respectively and improved over 6,000 linear feet of sewer pipe and reconstructed over 100 service laterals. The City also completed the cleaning of three sewer siphons at a cost of over $100,000.

In 2004, the City televised the three sewer siphons and found that one had a separated joint that allowed continuous infiltration into the pipe at a rate of 50 gallons per minute. The leak has been sealed. The cost for this work was over $100,000.

In 2005, the City cleaned and televised approximately 3,000 feet of 30 inch and 3,000 feet of 54 inch sewer main. This work restored full capacity in the trunk pipelines and showed that the 30 inch should be rehabilitated. Consequently, the 30 inch line was lined in 2007 at a cost of $600,000.
In 2009, the City lined over 9000 feet of 10 and 12 inch diameter sanitary located on King and Pine Streets and along the Arroyo Seco drainage corridor. The City also replaced 350 feet of 10 inch sewer and 8 private laterals on Laurent Street. In addition the City completed the reconstruction of the Delaware Pump Station and numerous smaller improvement projects with the intent of making the collection system more reliable.

In 2010 the City lined approximately 50 feet of 15 inch and 800 feet of 6 inch diameter sanitary sewers located on Ocean and Water Streets and near Pacific Avenue. The City also replaced approximately 2200 feet of 8 and 10 inch sewers on

May and Water Streets with new inch 12 and 14 inch sanitary sewers. The City also realigned approximately 100 feet of 15 inch sewer that was deteriorated and adjacent to a small creek. The City also replaced 6 private laterals on Water and May Streets.

In 2011 the City lined approximately 2700 feet of mainline pipe sizes 6 to 15 inches. This included pipelines located on Highland Avenue where the only mainline spill occurred this year due to root intrusion. The lining should eliminate future problems with the Highland sewer. 500 feet of the lining was 15 inch pipe located next to Bethany Creek. As part of that project the City also lined 7 laterals include several that crossed under the creek. The city also replaced 400 feet of 15 inch pipe on Columbia Street that had pending structural failure thereby avoiding a potential spill. The City also replaced 100 feet of "sewer main" located in Angle alley that was previously considered private. City has taken responsibility and can now properly maintain this pipeline.

Following this brief introduction is a series of tables that provide a summary of the City's efforts undertaken since 2002 to improve the management of the Collection System including the rehabilitation of lines and concluding with a table of the spills that were recorded in 2011.

The table of spills reported within City limits indicates that there is a downward trend in the number of spills and in their ability to reach the waters of the State.

Here is the listing of the tables:
Table 1: Shows a listing of overflows caused by rain events in 2002 or before, where overflow has not occurred since City project was completed.

Table 2: Shows a listing of overflows caused by rain events in 2002 or before, that have not reoccurred although the City has not completed improvement.
And finally,
Table 3: Shows a summary of sewage spills during the last 12 months of sewage spills within the City of Santa Cruz.

Table 1: Overflows caused by rain events in 2002 or before where overflow has not occurred since City project was completed

	Location Address		Pipe Size	Project completed	Project Cost	Schedule & comments
1	Cleveland Ave.	315	6	Reduced I/I by repairing 5000 feet of main & fixing 102 private lower laterals.	$425,000	Construction complete. No overflow since project completed in 2001.
2	Forest Avenue	158	6	Manhole at overflow location has been eliminated by replacing with pipe.	$5,000	No overflows during 2001 or 2002. Still monitoring flow.
3a	California Street	Near Walnut	8	California Street sewer capacity has been increased. Project #1 above also reduced flow to this area.	$750,000	Project was completed 12/01. There have been no overflows since project was completed.
3b	Walti St.	Laurel	6			
4c	Felix St.	Laurel	6			
5a	Carl Avenue	109 & 147	6	Increase size of Parkway pipe from 6 & 8 inch to 10 & 12 inch	$300,000	Construction completed 8/00. No overflows since.
5b	Parkway	358	6			
6	San Lorenzo Blvd.	At Jessie Street	18	Completed lining of parallel pipelines in 1/03. Siphon repaired in 8/04.	$600,000	No overflows in 2003 or 2004. Plans for I/I reduction projects upstream during next 3 years. Installed smart cover in 2010 to detect high flows.
7	Broadway	133	18	Lateral hooked up to main near River siphon.	$100,000	Cleaning and repair of downstream siphon and has been completed.
8	1129 Mission	At Laurel	6	Cleared blockage. Upgraded pipe to 8 inch	$60,000	Project completed 2/02 No overflows since.
9	Morrissey Blvd.	723	6, 8 & 10	Upgraded over 3500 feet of pipe in 2005	$500,000	No overflows since project completed.
	Highland	322	6	Lined 600 feet of 6 inch pipe	$40,000	Project completed Oct. 2011.

Table 2: Overflows caused by rain events in 2002 or before, that have not reoccurred but the City has not completed improvement.

	Address	Location	Pipe Diameter (inches)	Project Completed	Project Cost	Schedule and Comments
1	High Street	Highland	6	Determine need for increased pipe size.		Investigate in 2011 installing overflow pipe connecting manholes N7-SM314 and N7-SM312.
2	Mott Avenue	At East Cliff and Logan	10 & 12	Investigate downstream 12-inch liner pipe for upgrade.	Unknown	New overflow. Still unclear of cause. TV 2005.
3	401 Dufour		6	Unknown. May need backflow devise for house.		Overflow locations that only occurred on 1/2/2002

Table 3: Summary of Sewage Spills within Santa Cruz City in 2011.

House Number	Street	Date:	City Main Spill (gallons)	Private Lateral Spill (gallons)	Weather
350	Highland Ave	2/25/2011	425		Heavy Rain
304	Walnut Ave	05/04/2011		25	Clear
104	Kaye Street	05/19/2011		25	Clear
216	Leibrant Street	07/05/2011		150	Clear
415	Ocean Street	08/06/2011		60	Clear
Total Spills: 5			**Main Lateral Spills: 425**	**Private Lateral Spills: 260**	

The only mainline spill was caused by root intrusion and the pipeline has been lined and should be root free in the future.. Detailed information for all spills is entered into the California Integrated Water Quality System (CIWQS) and can be viewed at http://ciwqs.waterboards.ca.gov/.

The City of Santa Cruz has continued to use a Computerized Maintenance Management System (CMMS) which helps the City track and schedule the maintenance of the collection system. In addition, the City utilizes a hydraulic model of the entire collection system as required by "Elements of the Sewer System Management Plan, Item IX(A). This model was implemented in 2008, and is used to determine the pipeline most susceptible to overflows caused by capacity or infiltration and inflow. The City has installed at 3 locations "smart covers" which monitoring water elevation at 3 critical locations including two remote locations to enable the City to respond to rising levels in a manhole prior to an SSO.

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