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Alameda County
Flood Control and
Water Conservation
District (District)

Zone 7 of the
District

Results of the 2003-2004 Castro Valley Creek Water Quality Monitoring Project



Alameda Countywide Clean Water Program

A Consortium of Local Agencies

Prepared by:
The Alameda County Flood Control District

Prepared for:
The Brake Pad Partnership

April 7, 2005

Disclosure Statement

Funding for this project has been provided in full or in part through an Agreement with the State Water Resources Control Board (SWRCB) pursuant to the Costa-Machado Water Act of 2000 (Proposition 13) and any amendments thereto for the implementation of California's Nonpoint Source Pollution Control Program. The contents of this document do not necessarily reflect the views and policies of the SWRCB, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

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ATTACHED ELECTRONIC (Excel) FILES

- 1) USGS 5-minute Instantaneous Flow Data from Castro Valley Creek at Hayward Station
- 2) Rainfall Data from Four Gauges in the Castro Valley Creek Watershed
- 3) Analytical Results

INTRODUCTION

Background

The Brake Pad Partnership (Partnership) received a grant from the State to develop a model of the discharge of copper from local streams to the San Francisco Bay. The Alameda Countywide Clean Water Program (Program) entered into a contract with the Partnership to collect stormwater discharge samples from Castro Valley Creek and analyze the samples for total copper and total suspended solids. This report provides a summary of the stormwater quality data collected under this agreement. The scope of services also included obtaining rainfall and stream flow data. Rainfall and stream flow data collection was not funded under this agreement. Rainfall and stream flow data were collected by the Alameda County Flood Control and Water Conservation District (District) and the U.S. Geological Survey respectively.

Objective

Collect time-weighted and flow-weighted stormwater samples from five to ten runoff events during the 2003-2004 wet season and analyze the samples for total copper and total suspended solids.

Geographical Setting

The Castro Valley Creek Watershed, a sub-watershed of the San Lorenzo Creek drainage, covers 5.51 square miles in west central Alameda County (Figure 1). The population of the watershed is approximately 35,000. The area is predominantly low-density residential development (50%), with some open space (35%), and commercial development (15%). There are 11,600 assessed parcels with single-family residential units and 3,200 with multiple family units within the watershed. Mean annual rainfall in the watershed is about 21 inches, with over 95% occurring between October 1 and May 31. The soils are predominantly clays and silty clays. The elevation ranges from 200 to 500 feet (65 to 160 meters) above mean sea level.

Castro Valley Creek flows year round. Summertime flows average about 0.2 cubic feet per second (cfs). The peak flow of record was 1,550 cfs on February 2, 1998. The average annual flow for water years 1972 to 2004 was 123 million cubic feet. In the vicinity of the sampling station the channel is predominantly bedrock. Upstream of the sampling station the channels are predominantly incised or culverted.

The sampling site is located approximately 500 feet upstream of the confluence of Castro Valley Creek and San Lorenzo Creek. There are no major discharges to Castro Valley Creek downstream of the sampling station.

METHODS

Rainfall

Rainfall data were collected by District personnel at four rain gauges located within the watershed (Figure 1). All of the gauges were tipping bucket gauges. Two of the gauges (Arcadian and Bellingham) were mounted on 10 to 12-foot standpipes with a 12” diameter orifice and a tipping bucket that recorded each 0.04 inches of rainfall. The other two gauges were mounted on 2-foot standpipes with an 8-inch orifice and recorded each 0.01 inches of rainfall. Rainfall data are attached as an Excel spreadsheet.

Stream Flow

The stream gauging station is at the same location as the water quality sampling location. U. S. Geologic Survey (USGS) personnel collected the stream flow data using standard USGS methods (Geological Survey, 1982). The water level in the stream was determined using a pressure transducer. Stream level was recorded at five-minute increments. Stream level readings were converted to flow estimates using the rating curve developed for the site by USGS. A five-minute instantaneous flow record is attached as an Excel spreadsheet.

Water Quality Sample Collection

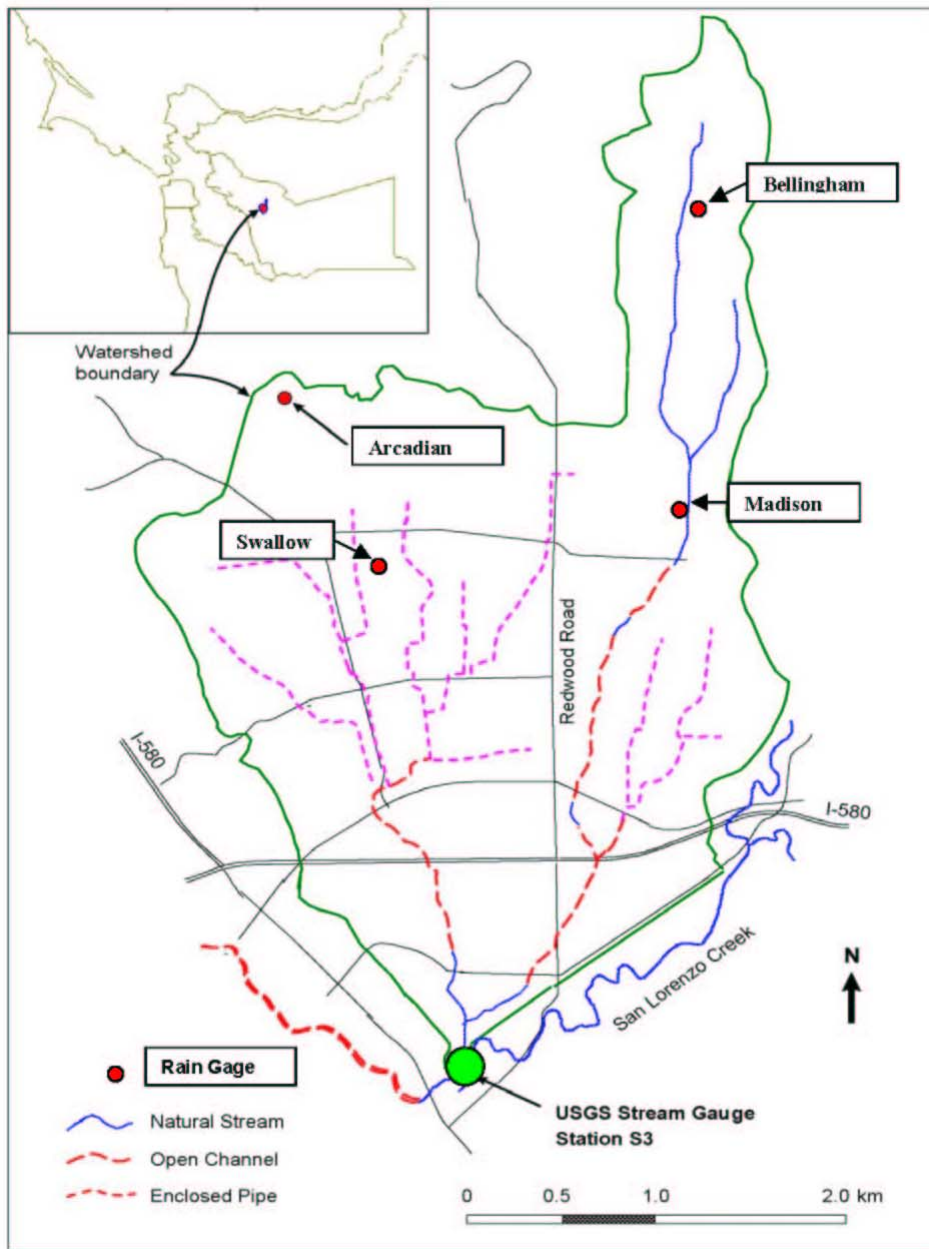
Samples were collected using an ISCO Model 6712 automated sampling device. The sampler was housed in the USGS gauging station. The sampler was equipped with a Teflon-lined intake strainer and a Teflon-lined polyethylene intake tube. The intake tube was 51 feet long. Head ranged from ten to fourteen feet depending upon creek stage. Intake velocity ranged from approximately 4 to 5 feet per second. The intake tube was rinsed prior to each sample collection and purged following each sample collection. The sampler was also equipped with a pressure transducer to determine the water level in the creek. These level readings were also converted to flow estimates using the aforementioned USGS rating curve. Samples were dispensed into 1-liter polyethylene bottles located in the base of the sampler.

Two types of samples were collected, time-weighted and flow weighted. “Time-weighted” samples represent an equivalent period of time. “Flow-weighted” samples represent an equivalent volume of flow in the creek. Time-weighted and flow-weighted sampling was initiated when the stream level rose above two feet (approximately 0.7 feet above base flow elevation). Time-weighted samples were collected every hour with the exception of the November 8th event when samples were collected every half hour. Four sequential time-weighted samples were collected in each sample container creating a composite sample representing either a two-hour or four-hour time period. Flow-weighted samples were collected at the initiation of storm flow and every 240,000 cubic feet of flow thereafter. Each flow-weighted sample was collected in a separate container.

Water Quality Sample Analysis

All water quality samples were analyzed for total copper (EPA Method 200.8) and total suspended solids (EPA Method 160.2). ToxScan Laboratories analyzed all samples. For TSS analysis the instruments used were a drying oven and an analytical balance. The samples were filtered through the standard 1.5-micron filter that was dried at 105 degrees C.

Figure 1: Castro Valley Creek Watershed



RESULTS

Rainfall

Rainfall data were collected at four rain gauges. (The hourly data from the four gauges are attached as an electronic file.) The four gauges are referred to as Madison, Bellingham, Arcadian, and Swallow. The Madison and Bellingham gauges were functional from the start of the rainy season (October 31, 2003) through the end of the rainy season (May 28, 2004). The Arcadian gage was functional from November 16, 2003 through May 28, 2004. The Swallow gage was functional from December 23, 2003 through March 5 2004. Rainfall totals from the Madison and Bellingham gauges, the two gauges that were functional during the entire season, were 17.09 inches and 19.27 inches respectively.

To derive an estimate of the rainfall, an average was calculated from the hourly rainfall totals of all the gauges that were operational during each rainfall event of over 0.10 inches (Average Storm Total in Table 1). As described above, there were always at least two gauges operating (Madison and Bellingham) and usually three or four operating. Using this approach, the estimated average rainfall for the watershed for the season was 17.21 inches. This is below the estimated long-term average rainfall of approximately 21 inches. Based upon the average of the gauges, there were 25 storm events of over 0.1 inches. These events ranged from 0.1 inches to 2.35 inches with an average rainfall of 0.69 inches. Of these 25 events, nine events were sampled for water quality. The rainfall amounts for sampled events ranged from 0.36 inches to 1.62 inches. The mean of the sampled events was 0.89 inches and the total rainfall for the sampled events was 8.03 inches.

Stream Flow

Stream flow data were collected throughout the rainy season. The mean daily flow record is attached as Appendix B. The five-minute instantaneous data covers the period from October 1, 2003 through May 31, 2004 and is attached as an electronic file. The peak flow for the season was 1,020 cfs on February 25. The total flow for the 2004 water year was 94 million cubic feet, which is below the long-term average annual flow of 123 million cubic feet.

Water Quality Sample Collection

Water quality samples were collected over the course of nine storm events (Figure 2). A total of 99 samples were collected and analyzed for total copper and total suspended solids (54 time-weighted and 45 flow-weighted). Figure 3 illustrates the storm event hydrograph and sample collection intervals for the storm event on 12/29/03. The hydrographs and sample collection intervals for all storms sampled are included in Appendix C.

Table 1: Summary of Precipitation Data

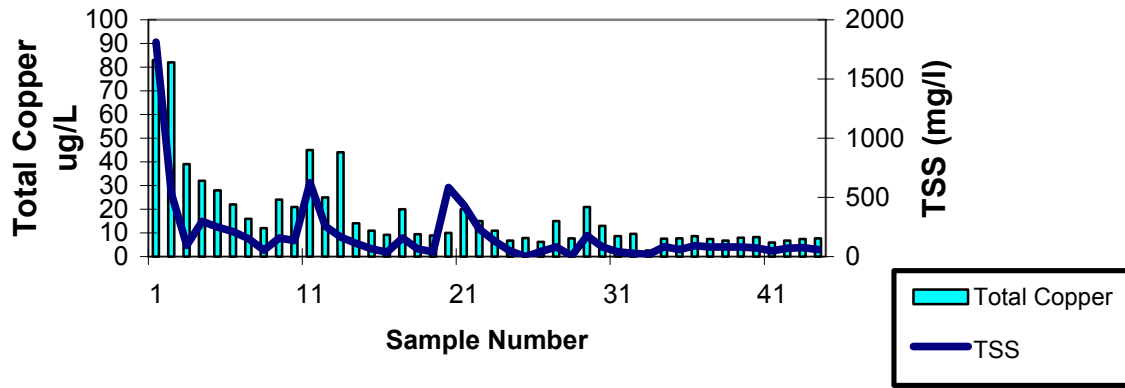
Storm date(s)	Average Storm Total (inches)	Sampled? (Yes/No)	Storm date(s)	Average Storm Total (inches)	Sampled? (Yes/No)
31-Oct	0.49	Yes	Jan 1-2	1.68	No
Nov 2&3	0.37	No	Jan 23-24	0.28	No
Nov 6&7	0.22	No	27-Jan	0.10	No
Nov 8&9	0.77	Yes	30-Jan	0.17	No
Nov 14&15	0.36	Yes	Feb 2&3	1.11	No
11/3-&12/1	0.50	No	16-Feb	0.71	No
Dec 4&5	0.22	No	Feb 17&18	1.44	Yes
Dec 6&7	0.76	Yes	22-Feb	0.18	No
Dec 9&10	0.96	Yes	Feb 25-27	2.35	No
Dec 12-14	0.88	Yes	1-Mar	0.12	No
Dec 19-21	0.42	No	Mar 25-26	0.62	No
Dec 23-24	0.73	Yes	28-May	0.12	No
Dec 29-30	1.62	Yes			

Water Quality Sample Analysis

All 99 samples collected were analyzed for total copper and total suspended solids. Copper concentrations in individual samples ranged from 2.6 ug/l to 83 ug/l. Total suspended solids (TSS) concentrations ranged from < 1mg/l to 1810 mg/l. Results of all sample analysis are in Appendix A and attached as an Excel file. Figure 4 graphs the concentration of total copper and TSS in each flow-weighted sample. Sample results are in chronological order starting with the first flow-weighted sample collected on October 31, 2003 and ending with the last flow-weighted sample collected on December 29, 2003.

Figure 4

Copper vs. TSS in Flow-Weighted Samples



QUALITY ASSURANCE/QUALITY CONTROL

Rainfall

Alameda County Flood Control District personnel collected the rainfall data using their standard operating procedures. Rainfall data collection was not part of this grant project and was not covered under the project's quality assurance project plan.

Stream Flow

The stream flow gauging station was operated and maintained by USGS personnel according to USGS standards and protocols (Geological Survey, 1982). Stream flow data collection was not part of this grant project and was not covered under the project's quality assurance project plan.

Water Quality Sample Collection

Samples were collected using an ISCO 6712 automated sampler. This sampler employs a peristaltic pump connected to a Teflon-lined polyethylene tube with a Teflon-coated intake strainer affixed to a stainless-steel trash rack approximately one foot above the creek bed. The intake tube was 51 feet long. Head ranged from ten to fourteen feet depending upon creek stage. Intake velocity ranged from approximately 4 to 5 feet per second. The intake tube was rinsed prior to each sample collection and purged following each sample collection.

Accuracy/Precision: The actual condition of the creek at the time the samples were collected is not known, so a quantitative analysis of the accuracy of the sampling method is not possible. And, as there was no co-located sampler, a quantitative assessment of the precision of the sampling method cannot be conducted. However, a qualitative assessment can be provided. Several factors suggest that a sample collected from this point in the creek channel is representative of the entire flow in the creek. First of all, Castro Valley Creek is relatively small. The channel bottom is approximately ten feet across and the depth of the water during sampling is usually in the range of two to five feet. The creek channel is steep in the vicinity of the sampling location and hence the flow is turbulent and well mixed during runoff events. Finally, the sampling location is several-hundred feet downstream of the nearest tributary. However, using a pump to collect a water sample may introduce some bias. Using a pump tube and intake strainer prevents the collection of large pebbles and rocks that are being transported during storm events. The use of a pump tube may also under-represent smaller particles, such as sand, that can fit through the intake strainer opening but, due to their relative size, may not be transported to the sample container as efficiently as smaller particles, such as silt and

clay. In addition, sand size particles are typically not evenly distributed across a channel cross section.

Contamination: Several actions were taken to prevent and detect sample contamination. A Teflon-lined intake strainer and tubing were used to prevent the contamination of the sample as it is being transported the container. Prior to installation the tubing was acid-rinsed. After cleaning a blank was run through the tube and analyzed for trace metals. Per the QAPP, an equipment blank was collected and analyzed for total copper (EPA 200.8) at the time of auto-sampler installation. Result of the equipment blank analysis was non-detect. Also, prior to each sample being collected, the intake tube was rinsed with creek water to prevent residual material from the previous sample from being introduced to the subsequent sample. The sample containers were handled as prescribed in the standard operating procedures and field blanks were analyzed for contamination. Per the QAPP, two field blanks were collected and analyzed for total copper (EPA 200.8). Results of the equipment blank analysis were non-detect.

Completeness: The project work plan called for collecting time-weighted and flow-weighted samples from five to ten storm events. Samples were collected from a total of nine storm events. Time-weighted and flow-weighted samples were collected during seven of the nine events. Only time-weighted or flow-weighted were collected during the other two events. Flow-weighted samples were collected at the start of each runoff event and every 240,000 cubic feet of flow thereafter. This resulted in a minimum of two and a maximum of twelve flow-weighted samples per event with a mean of 5.6 per event. Time-weighted samples were collected at the start of each runoff event and every hour thereafter (except for the first time-weighted collection event when samples were collected each half hour). This resulted in a minimum of 12 and a maximum of 48 samples per event (these samples were collected four samples per bottle). As described in the rainfall results section above, there were a total of 25 rainfall events of over 0.1 inches with a total precipitation of 17.21 inches and a mean precipitation of 0.69 inches. For the nine events sampled, the total precipitation was 8.03 inches with a mean precipitation of 0.89 inches and a range of from 0.36 inches to 1.62 inches. Unfortunately, the largest storm event of the season (2.65 inches) was not sampled due to sampler malfunction.

Water Quality Sample Analysis

Accuracy: As stated in the quality assurance project plan, accuracy will be characterized through the use of reference samples and laboratory matrix spikes. Reference samples and matrix spikes will be run for each batch of samples analyzed. A recovery of 75 to 125% for reference materials and 70 to 130% for matrix spikes will be considered acceptable. Reported matrix spike recoveries ranged from 84.4% to 111%.

Precision: As stated in the quality assurance project plan, precision will be characterized through the analysis of matrix spike duplicates. A relative percent difference of less than

20% will be considered acceptable. These analyses were conducted and all results were within the acceptable range.

Completeness: Per the QAPP, completeness of sample analysis will be assessed by comparing the number of samples successfully analyzed to the total number of samples submitted to the laboratory. All 99 samples sent to the laboratory were analyzed for both total copper and TSS. All analysis met the objectives outlined in the QAPP with the exception of two samples collected on 12/23/03 that were received and analyzed one day beyond the hold time for TSS.

REFERENCES

Geological Survey. (1982). Measurement and computation of stream flow (Geological Survey Water-Supply Paper 2175). Washington, DC; U.S. Government Printing Office.

Appendix A

Analytical Results

Sample ID	Date Last Sample	Time Last Sample	Sample type	samples /bottle	Aliquot Volume (ml)	Time Sample #1	Time Sample #2	Time Sample #3	Matrix (Tot. or Dis.)	Parameter	Qualifier	Test Result	Units	MRL	Method Number	Date Analyzed
S3031031e05b01d	10/31/2003	5:44	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	83	ug/L	1.0	200.8	11/10/2003
S3031031e05b01d	10/31/2003	5:44	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	1810	mg/L	1.0	160.2	11/4/2003
S3031031e05b02d	10/31/2003	6:33	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	82	ug/L	1.0	200.8	11/10/2003
S3031031e05b02d	10/31/2003	6:33	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	532	mg/L	1.0	160.2	11/4/2003
S3031031e05b03d	10/31/2003	8:18	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	39	ug/L	1.0	200.8	11/10/2003
S3031031e05b03d	10/31/2003	8:18	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	94	mg/L	1.0	160.2	11/4/2003
S3031108e06b01d	11/8/2003	17:16	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	32	ug/L	1.0	200.8	11/17/2003
S3031108e06b01d	11/8/2003	17:16	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	298	mg/L	1.0	160.2	11/13/2003
S3031108e06b02d	11/8/2003	17:53	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	28	ug/L	1.0	200.8	11/17/2003
S3031108e06b02d	11/8/2003	17:53	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	250	mg/L	1.0	160.2	11/13/2003
S3031108e06b03d	11/8/2003	18:17	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	22	ug/L	1.0	200.8	11/17/2003
S3031108e06b03d	11/8/2003	18:17	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	210	mg/L	1.0	160.2	11/13/2003
S3031108e06b04d	11/8/2003	18:44	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	16	ug/L	1.0	200.8	11/17/2003
S3031108e06b04d	11/8/2003	18:44	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	152	mg/L	1.0	160.2	11/13/2003
S3031108e06b05d	11/8/2003	20:12	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	12	ug/L	1.0	200.8	11/17/2003
S3031108e06b05d	11/8/2003	20:12	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	54	mg/L	1.0	160.2	11/13/2003
S3031108e06b13c	11/8/2003	18:46	Comp. A	4	200	17:16	17:46	18:16	Total	Cu	D	39	ug/L	1.0	200.8	11/17/2003
S3031108e06b13c	11/8/2003	18:46	Comp. A	4	200	17:16	17:46	18:16	Total	TSS	D	256	mg/L	1.0	160.2	11/13/2003
S3031108e06b14c	11/8/2003	20:46	Comp. A	4	200	19:16	19:46	20:16	Total	Cu	D	13	ug/L	1.0	200.8	11/17/2003
S3031108e06b14c	11/8/2003	20:46	Comp. A	4	200	19:16	19:46	20:16	Total	TSS	D	78	mg/L	1.0	160.2	11/13/2003
S3031108e06b15c	11/8/2003	22:46	Comp. A	4	200	21:16	21:46	22:16	Total	Cu	D	11	ug/L	1.0	200.8	11/17/2003
S3031108e06b15c	11/8/2003	22:46	Comp. A	4	200	21:16	21:46	22:16	Total	TSS	D	34	mg/L	1.0	160.2	11/13/2003
S3031109e06b16c	11/9/2003	0:46	Comp. A	4	200	23:16	23:46	0:16	Total	Cu	D	11	ug/L	1.0	200.8	11/17/2003
S3031109e06b16c	11/9/2003	0:46	Comp. A	4	200	23:16	23:46	0:16	Total	TSS	D	12	mg/L	1.0	160.2	11/13/2003
S3031109e06b17c	11/9/2003	2:46	Comp. A	4	200	1:16	1:46	2:16	Total	Cu	D	9	ug/L	1.0	200.8	11/17/2003
S3031109e06b17c	11/9/2003	2:46	Comp. A	4	200	1:16	1:46	2:16	Total	TSS	D	10	mg/L	1.0	160.2	11/13/2003
S3031109e06b18c	11/9/2003	4:46	Comp. A	4	200	3:16	3:46	4:16	Total	Cu	D	8	ug/L	1.0	200.8	11/17/2003
S3031109e06b18c	11/9/2003	4:46	Comp. A	4	200	3:16	3:46	4:16	Total	TSS	D	4	mg/L	1.0	160.2	11/13/2003
S3031109e06b19c	11/9/2003	6:46	Comp. A	4	200	5:16	5:46	6:16	Total	Cu	D	8.4	ug/L	1.0	200.8	11/17/2003
S3031109e06b19c	11/9/2003	6:46	Comp. A	4	200	5:16	5:46	6:16	Total	TSS	D	2	mg/L	1.0	160.2	11/13/2003
S3031109e06b20c	11/9/2003	8:46	Comp. A	4	200	7:16	7:46	8:16	Total	Cu	D	7.3	ug/L	1.0	200.8	11/17/2003
S3031109e06b20c	11/9/2003	8:46	Comp. A	4	200	7:16	7:46	8:16	Total	TSS	D	8	mg/L	1.0	160.2	11/13/2003
S3031109e06b21c	11/9/2003	10:46	Comp. A	4	200	9:16	9:46	10:16	Total	Cu	D	8.3	ug/L	1.0	200.8	11/17/2003
S3031109e06b21c	11/9/2003	10:46	Comp. A	4	200	9:16	9:46	10:16	Total	TSS	D	8	mg/L	1.0	160.2	11/13/2003
S3031109e06b22c	11/9/2003	12:46	Comp. A	4	200	11:16	11:46	12:16	Total	Cu	D	8.3	ug/L	1.0	200.8	11/17/2003
S3031109e06b22c	11/9/2003	12:46	Comp. A	4	200	11:16	11:46	12:16	Total	TSS	D	6	mg/L	1.0	160.2	11/13/2003
S3031109e06b23c	11/9/2003	14:46	Comp. A	4	200	13:16	13:46	14:16	Total	Cu	D	8.7	ug/L	1.0	200.8	11/17/2003
S3031109e06b23c	11/9/2003	14:46	Comp. A	4	200	13:16	13:46	14:16	Total	TSS	D	16	mg/L	1.0	160.2	11/13/2003
S3031109e06b24c	11/9/2003	16:46	Comp. A	4	200	15:16	15:46	16:16	Total	Cu	D	8.9	ug/L	1.0	200.8	11/17/2003
S3031109e06b24c	11/9/2003	16:46	Comp. A	4	200	15:16	15:46	16:16	Total	TSS	D	10	mg/L	1.0	160.2	11/13/2003
03e6 CVC-Grab	11/8/2003	15:00	Grab	1	1,000	N/A	N/A	N/A	Total	Cu	D	28	ug/L	1.0	200.8	11/17/2003
03e6 CVC-Grab	11/8/2003	15:00	Grab	1	1,000	N/A	N/A	N/A	Total	TSS	D	6	mg/L	1.0	160.2	11/13/2003
03e6 CVC-Grab	11/8/2003	15:00	Grab	1	1,000	N/A	N/A	N/A	Total	Zinc	D	36	ug/L	1.0	200.8	11/13/2003
S3031114e07b01d	11/14/2003	15:56	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	24	ug/L	1.0	200.8	11/26/2003

S3031114e07b01d	11/14/2003	15:56	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	156	mg/L	1.0	160.2	11/21/2003
S3031115e07b02d	11/15/2003	8:59	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	21	ug/L	1.0	200.8	11/26/2003
S3031115e07b02d	11/15/2003	8:59	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	136	mg/L	1.0	160.2	11/21/2003
S3031117e07b05d	11/17/2003	N/A	Fld Blnk	1	1,000	N/A	N/A	N/A	Total	Cu	ND	ND	ug/L	1.0	200.8	11/26/2003
S3031117e07b05d	11/17/2003	N/A	Fld Blnk	1	1,000	N/A	N/A	N/A	Total	TSS	ND	ND	mg/L	1.0	160.2	11/21/2003
S3031114e07b13c	11/14/2003	18:56	Comp. A	4	200	15:56	16:56	17:56	Total	Cu	D	26	ug/L	1.0	200.8	11/26/2003
S3031114e07b13c	11/14/2003	18:56	Comp. A	4	200	15:56	16:56	17:56	Total	TSS	D	116	mg/L	1.0	160.2	11/21/2003
S3031114e07b14c	11/14/2003	22:56	Comp. A	4	200	19:56	20:56	21:56	Total	Cu	D	15	ug/L	1.0	200.8	11/26/2003
S3031114e07b14c	11/14/2003	22:56	Comp. A	4	200	19:56	20:56	21:56	Total	TSS	D	28	mg/L	1.0	160.2	11/21/2003
S3031115e07b15c	11/15/2003	2:56	Comp. A	4	200	23:56	0:56	1:56	Total	Cu	D	13	ug/L	1.0	200.8	11/26/2003
S3031115e07b15c	11/15/2003	2:56	Comp. A	4	200	23:56	0:56	1:56	Total	TSS	D	12	mg/L	1.0	160.2	11/21/2003
S3031115e07b16c	11/15/2003	6:56	Comp. A	4	200	3:56	4:56	5:56	Total	Cu	D	13	ug/L	1.0	200.8	11/26/2003
S3031115e07b16c	11/15/2003	6:56	Comp. A	4	200	3:56	4:56	5:56	Total	TSS	D	28	mg/L	1.0	160.2	11/21/2003
S3031115e07b17c	11/15/2003	10:56	Comp. A	4	200	7:56	8:56	9:56	Total	Cu	D	15	ug/L	1.0	200.8	11/26/2003
S3031115e07b17c	11/15/2003	10:56	Comp. A	4	200	7:56	8:56	9:56	Total	TSS	D	66	mg/L	1.0	160.2	11/21/2003
S3031206e08b01d	12/6/2003	18:32	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	45	ug/L	1.0	200.8	12/17/2003
S3031206e08b01d	12/6/2003	18:32	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	624	mg/L	1.0	160.2	12/11/2003
S3031206e08b02d	12/6/2003	19:01	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	25	ug/L	1.0	200.8	12/17/2003
S3031206e08b02d	12/6/2003	19:01	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	258	mg/L	1.0	160.2	12/11/2003
S3031206e08b03d	12/6/2003	19:23	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	44	ug/L	1.0	200.8	12/17/2003
S3031206e08b03d	12/6/2003	19:23	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	164	mg/L	1.0	160.2	12/11/2003
S3031206e08b04d	12/6/2003	19:46	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	14	ug/L	1.0	200.8	12/17/2003
S3031206e08b04d	12/6/2003	19:46	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	112	mg/L	1.0	160.2	12/11/2003
S3031206e08b05d	12/6/2003	20:30	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	11	ug/L	1.0	200.8	12/17/2003
S3031206e08b05d	12/6/2003	20:30	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	64	mg/L	1.0	160.2	12/11/2003
S3031206e08b13c	12/6/2003	21:32	Comp. A	4	200	18:32	19:32	20:32	Total	Cu	D	27	ug/L	1.0	200.8	12/17/2003
S3031206e08b13c	12/6/2003	21:32	Comp. A	4	200	18:32	19:32	20:32	Total	TSS	D	256	mg/L	1.0	160.2	12/11/2003
S3031207e08b14c	12/7/2003	1:32	Comp. A	4	200	22:32	23:32	0:32	Total	Cu	D	8	ug/L	1.0	200.8	12/17/2003
S3031207e08b14c	12/7/2003	1:32	Comp. A	4	200	22:32	23:32	0:32	Total	TSS	D	6	mg/L	1.0	160.2	12/11/2003
S3031207e08b15c	12/7/2003	5:32	Comp. A	4	200	2:32	3:32	4:32	Total	Cu	D	9.1	ug/L	1.0	200.8	12/17/2003
S3031207e08b15c	12/7/2003	5:32	Comp. A	4	200	2:32	3:32	4:32	Total	TSS	D	18	mg/L	1.0	160.2	12/11/2003
S3031207e08b16c	12/7/2003	9:32	Comp. A	4	200	6:32	7:32	8:32	Total	Cu	D	7.6	ug/L	1.0	200.8	12/17/2003
S3031207e08b16c	12/7/2003	9:32	Comp. A	4	200	6:32	7:32	8:32	Total	TSS	D	18	mg/L	1.0	160.2	12/11/2003
S3031207e08b17c	12/7/2003	13:32	Comp. A	4	200	10:32	11:32	12:32	Total	Cu	D	8.2	ug/L	1.0	200.8	12/17/2003
S3031207e08b17c	12/7/2003	13:32	Comp. A	4	200	10:32	11:32	12:32	Total	TSS	D	24	mg/L	1.0	160.2	12/11/2003
S3031207e08b18c	12/7/2003	17:32	Comp. A	4	200	14:32	15:32	16:32	Total	Cu	D	6	ug/L	1.0	200.8	12/17/2003
S3031207e08b18c	12/7/2003	17:32	Comp. A	4	200	14:32	15:32	16:32	Total	TSS	D	ND	mg/L	1.0	160.2	12/11/2003
S3031207e08b19c	12/7/2003	21:32	Comp. A	4	200	18:32	19:32	20:32	Total	Cu	D	5.1	ug/L	1.0	200.8	12/17/2003
S3031207e08b19c	12/7/2003	21:32	Comp. A	4	200	18:32	19:32	20:32	Total	TSS	D	ND	mg/L	1.0	160.2	12/11/2003
S3031209e09b01d	12/9/2003	14:48	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	9.2	ug/L	1.0	200.8	12/16/2003
S3031209e09b01d	12/9/2003	14:48	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	38	mg/L	1.0	160.2	12/15/2003
S3031210e09b02d	12/10/2003	0:01	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	20	ug/L	1.0	200.8	12/16/2003
S3031210e09b02d	12/10/2003	0:01	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	156	mg/L	1.0	160.2	12/15/2003
S3031210e09b03d	12/10/2003	0:53	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	9.4	ug/L	1.0	200.8	12/16/2003
S3031210e09b03d	12/10/2003	0:53	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	66	mg/L	1.0	160.2	12/15/2003
S3031210e09b04d	12/10/2003	3:41	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	8.9	ug/L	1.0	200.8	12/16/2003
S3031210e09b04d	12/10/2003	3:41	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	40	mg/L	1.0	160.2	12/15/2003

S3031209e09b13c	12/9/2003	17:48	Comp. A	4	200	14:48	15:48	16:48	Total	Cu	D	15	ug/L	1.0	200.8	12/16/2003
S3031209e09b13c	12/9/2003	17:48	Comp. A	4	200	14:48	15:48	16:48	Total	TSS	D	50	mg/L	1.0	160.2	12/15/2003
S3031209e09b14c	12/9/2003	21:48	Comp. A	4	200	18:48	19:48	20:48	Total	Cu	D	11	ug/L	1.0	200.8	12/16/2003
S3031209e09b14c	12/9/2003	21:48	Comp. A	4	200	18:48	19:48	20:48	Total	TSS	D	14	mg/L	1.0	160.2	12/15/2003
S3031210e09b15c	12/10/2003	1:48	Comp. A	4	200	22:48	23:48	0:48	Total	Cu	D	13	ug/L	1.0	200.8	12/16/2003
S3031210e09b15c	12/10/2003	1:48	Comp. A	4	200	22:48	23:48	0:48	Total	TSS	D	78	mg/L	1.0	160.2	12/15/2003
S3031210e09b16c	12/10/2003	5:48	Comp. A	4	200	2:48	3:48	4:48	Total	Cu	D	7.8	ug/L	1.0	200.8	12/16/2003
S3031210e09b16c	12/10/2003	5:48	Comp. A	4	200	2:48	3:48	4:48	Total	TSS	D	32	mg/L	1.0	160.2	12/15/2003
S3031210e09b17c	12/10/2003	9:48	Comp. A	4	200	6:48	7:48	8:48	Total	Cu	D	6.8	ug/L	1.0	200.8	12/16/2003
S3031210e09b17c	12/10/2003	9:48	Comp. A	4	200	6:48	7:48	8:48	Total	TSS	D	6	mg/L	1.0	160.2	12/15/2003
S3031210e09b18c	12/10/2003	13:48	Comp. A	4	200	10:48	11:48	12:48	Total	Cu	D	5.9	ug/L	1.0	200.8	12/16/2003
S3031210e09b18c	12/10/2003	13:48	Comp. A	4	200	10:48	11:48	12:48	Total	TSS	D	6	mg/L	1.0	160.2	12/15/2003
S3031214e10b02d	12/14/2003	3:29	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	10	ug/L	1.0	200.8	12/19/2003
S3031214e10b02d	12/14/2003	3:29	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	584	mg/L	1.0	160.2	12/18/2003
S3031214e10b03d	12/14/2003	3:40	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	20	ug/L	1.0	200.8	12/19/2003
S3031214e10b03d	12/14/2003	3:40	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	436	mg/L	1.0	160.2	12/18/2003
S3031214e10b04d	12/14/2003	3:54	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	15	ug/L	1.0	200.8	12/19/2003
S3031214e10b04d	12/14/2003	3:54	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	232	mg/L	1.0	160.2	12/18/2003
S3031214e10b05d	12/14/2003	4:23	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	11	ug/L	1.0	200.8	12/19/2003
S3031214e10b05d	12/14/2003	4:23	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	130	mg/L	1.0	160.2	12/18/2003
S3031214e10b06d	12/14/2003	5:20	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	6.7	ug/L	1.0	200.8	12/19/2003
S3031214e10b06d	12/14/2003	5:20	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	46	mg/L	1.0	160.2	12/18/2003
S3031214e10b07d	12/14/2003	13:36	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	7.9	ug/L	1.0	200.8	12/19/2003
S3031214e10b07d	12/14/2003	13:36	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	ND	mg/L	1.0	160.2	12/18/2003
S3031214e10b20c	12/14/2003	6:10	Comp. A	4	200	3:10	4:10	5:10	Total	Cu	D	9.5	ug/L	1.0	200.8	12/19/2003
S3031214e10b20c	12/14/2003	6:10	Comp. A	4	200	3:10	4:10	5:10	Total	TSS	D	60	mg/L	1.0	160.2	12/18/2003
S3031214e10b21c	12/14/2003	10:10	Comp. A	4	200	7:10	8:10	9:10	Total	Cu	D	7	ug/L	1.0	200.8	12/19/2003
S3031214e10b21c	12/14/2003	10:10	Comp. A	4	200	7:10	8:10	9:10	Total	TSS	D	12	mg/L	1.0	160.2	12/18/2003
S3031214e10b22c	12/14/2003	14:10	Comp. A	4	200	11:10	12:10	13:10	Total	Cu	D	6.3	ug/L	1.0	200.8	12/19/2003
S3031214e10b22c	12/14/2003	14:10	Comp. A	4	200	11:10	12:10	13:10	Total	TSS	D	4	mg/L	1.0	160.2	12/18/2003
S3031214e10b23c	12/14/2003	18:10	Comp. A	4	200	15:10	16:10	17:10	Total	Cu	D	6.3	ug/L	1.0	200.8	12/19/2003
S3031214e10b23c	12/14/2003	18:10	Comp. A	4	200	15:10	16:10	17:10	Total	TSS	D	2	mg/L	1.0	160.2	12/18/2003
S3031214e10b24c	12/14/2003	22:10	Comp. A	4	200	19:10	20:10	21:10	Total	Cu	D	8.7	ug/L	1.0	200.8	12/19/2003
S3031214e10b24c	12/14/2003	22:10	Comp. A	4	200	19:10	20:10	21:10	Total	TSS	D	10	mg/L	1.0	160.2	12/18/2003
S3031223e11b01d	12/23/2003	5:30	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	6.2	ug/L	1.0	200.8	1/26/2004
S3031223e11b01d	12/23/2003	5:30	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D, J	44	mg/L	1.0	160.2	12/31/2003
S3031223e11b02d	12/23/2003	11:07	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	15	ug/L	1.0	200.8	1/26/2004
S3031223e11b02d	12/23/2003	11:07	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	80	mg/L	1.0	160.2	12/31/2003
S3031224e11b03d	12/24/2003	9:02	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	7.7	ug/L	1.0	200.8	1/26/2004
S3031224e11b03d	12/24/2003	9:02	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	6	mg/L	1.0	160.2	12/31/2003
S3031224e11b04d	12/24/2003	10:23	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	21	ug/L	1.0	200.8	1/26/2004
S3031224e11b04d	12/24/2003	10:23	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	176	mg/L	1.0	160.2	12/31/2003
S3031224e11b05d	12/24/2003	10:53	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	13	ug/L	1.0	200.8	1/26/2004
S3031224e11b05d	12/24/2003	10:53	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	82	mg/L	1.0	160.2	12/31/2003
S3031224e11b06d	12/24/2003	12:13	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	8.7	ug/L	1.0	200.8	1/26/2004
S3031224e11b06d	12/24/2003	12:13	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	40	mg/L	1.0	160.2	12/31/2003
S3031225e11b07d	12/25/2003	11:28	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	9.6	ug/L	1.0	200.8	1/26/2004

S3031225e11b07d	12/25/2003	11:28	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	26	mg/L	1.0	160.2	12/31/2003
S3031223e11b13c	12/23/2003	8:30	Comp. A	4	200	5:30	6:30	7:30	Total	Cu	D	8.9	ug/L	1.0	200.8	1/26/2004
S3031223e11b13c	12/23/2003	8:30	Comp. A	4	200	5:30	6:30	7:30	Total	TSS	D, J	42	mg/L	1.0	160.2	12/31/2003
S3031223e11b14c	12/23/2003	12:30	Comp. A	4	200	9:30	10:30	11:30	Total	Cu	D	10	ug/L	1.0	200.8	1/26/2004
S3031223e11b14c	12/23/2003	12:30	Comp. A	4	200	9:30	10:30	11:30	Total	TSS	D	34	mg/L	1.0	160.2	12/31/2003
S3031223e11b15c	12/23/2003	16:30	Comp. A	4	200	13:30	14:30	15:30	Total	Cu	D	8.5	ug/L	1.0	200.8	1/26/2004
S3031223e11b15c	12/23/2003	16:30	Comp. A	4	200	13:30	14:30	15:30	Total	TSS	D	20	mg/L	1.0	160.2	12/31/2003
S3031223e11b16c	12/23/2003	20:30	Comp. A	4	200	17:30	18:30	19:30	Total	Cu	D	8.5	ug/L	1.0	200.8	1/26/2004
S3031223e11b16c	12/23/2003	20:30	Comp. A	4	200	17:30	18:30	19:30	Total	TSS	D	6	mg/L	1.0	160.2	12/31/2003
S3031224e11b17c	12/24/2003	0:30	Comp. A	4	200	21:30	22:30	23:30	Total	Cu	D	6.2	ug/L	1.0	200.8	1/26/2004
S3031224e11b17c	12/24/2003	0:30	Comp. A	4	200	21:30	22:30	23:30	Total	TSS	D	4	mg/L	1.0	160.2	12/31/2003
S3031224e11b18c	12/24/2003	4:30	Comp. A	4	200	1:30	2:30	3:30	Total	Cu	D	5.5	ug/L	1.0	200.8	1/26/2004
S3031224e11b18c	12/24/2003	4:30	Comp. A	4	200	1:30	2:30	3:30	Total	TSS	D	6	mg/L	1.0	160.2	12/31/2003
S3031224e11b19c	12/24/2003	8:30	Comp. A	4	200	5:30	6:30	7:30	Total	Cu	D	7.3	ug/L	1.0	200.8	1/26/2004
S3031224e11b19c	12/24/2003	8:30	Comp. A	4	200	5:30	6:30	7:30	Total	TSS	D	12	mg/L	1.0	160.2	12/31/2003
S3031224e11b20c	12/24/2003	12:30	Comp. A	4	200	9:30	10:30	11:30	Total	Cu	D	12	ug/L	1.0	200.8	1/26/2004
S3031224e11b20c	12/24/2003	12:30	Comp. A	4	200	9:30	10:30	11:30	Total	TSS	D	68	mg/L	1.0	160.2	12/31/2003
S3031224e11b21c	12/24/2003	16:30	Comp. A	4	200	13:30	14:30	15:30	Total	Cu	D	8.7	ug/L	1.0	200.8	1/26/2004
S3031224e11b21c	12/24/2003	16:30	Comp. A	4	200	13:30	14:30	15:30	Total	TSS	D	14	mg/L	1.0	160.2	12/31/2003
S3031224e11b22c	12/24/2003	20:30	Comp. A	4	200	17:30	18:30	19:30	Total	Cu	D	7.5	ug/L	1.0	200.8	1/26/2004
S3031224e11b22c	12/24/2003	20:30	Comp. A	4	200	17:30	18:30	19:30	Total	TSS	D	14	mg/L	1.0	160.2	12/31/2003
S3031225e11b23c	12/25/2003	0:30	Comp. A	4	200	21:30	22:30	23:30	Total	Cu	D	5.8	ug/L	1.0	200.8	1/26/2004
S3031225e11b23c	12/25/2003	0:30	Comp. A	4	200	21:30	22:30	23:30	Total	TSS	D	2	mg/L	1.0	160.2	12/31/2003
S3031225e11b24c	12/25/2003	4:30	Comp. A	4	200	1:30	2:30	3:30	Total	Cu	D	7.1	ug/L	1.0	200.8	1/26/2004
S3031225e11b24c	12/25/2003	4:30	Comp. A	4	200	1:30	2:30	3:30	Total	TSS	D	ND	mg/L	1.0	160.2	12/31/2003
S3031229e12b01d	12/29/2003	9:23	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	2.6	ug/L	1.0	200.8	1/24/2004
S3031229e12b01d	12/29/2003	9:23	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	20	mg/L	1.0	160.2	1/6/2004
S3031229e12b02d	12/29/2003	10:48	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	7.6	ug/L	1.0	200.8	1/24/2004
S3031229e12b02d	12/29/2003	10:48	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	84	mg/L	1.0	160.2	1/6/2004
S3031229e12b03d	12/29/2003	11:44	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	7.7	ug/L	1.0	200.8	1/24/2004
S3031229e12b03d	12/29/2003	11:44	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	60	mg/L	1.0	160.2	1/6/2004
S3031229e12b04d	12/29/2003	12:21	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	8.6	ug/L	1.0	200.8	1/24/2004
S3031229e12b04d	12/29/2003	12:21	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	92	mg/L	1.0	160.2	1/6/2004
S3031229e12b05d	12/29/2003	13:02	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	7.4	ug/L	1.0	200.8	1/24/2004
S3031229e12b05d	12/29/2003	13:02	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	80	mg/L	1.0	160.2	1/6/2004
S3031229e12b06d	12/29/2003	13:30	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	6.8	ug/L	1.0	200.8	1/24/2004
S3031229e12b06d	12/29/2003	13:30	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	82	mg/L	1.0	160.2	1/6/2004
S3031229e12b07d	12/29/2003	13:59	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	8	ug/L	1.0	200.8	1/24/2004
S3031229e12b07d	12/29/2003	13:59	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	80	mg/L	1.0	160.2	1/6/2004
S3031229e12b08d	12/29/2003	14:27	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	8.2	ug/L	1.0	200.8	1/24/2004
S3031229e12b08d	12/29/2003	14:27	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	74	mg/L	1.0	160.2	1/6/2004
S3031229e12b09d	12/29/2003	15:09	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	5.9	ug/L	1.0	200.8	1/24/2004
S3031229e12b09d	12/29/2003	15:09	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	50	mg/L	1.0	160.2	1/6/2004
S3031229e12b10d	12/29/2003	16:21	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	6.8	ug/L	1.0	200.8	1/24/2004
S3031229e12b10d	12/29/2003	16:21	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	70	mg/L	1.0	160.2	1/6/2004
S3031229e12b11d	12/29/2003	16:47	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	7.5	ug/L	1.0	200.8	1/24/2004
S3031229e12b11d	12/29/2003	16:47	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	76	mg/L	1.0	160.2	1/6/2004

S3031229e12b12d	12/29/2003	17:13	Disc. A	1	950	N/A	N/A	N/A	Total	Cu	D	7.7	ug/L	1.0	200.8	1/24/2004
S3031229e12b12d	12/29/2003	17:13	Disc. A	1	950	N/A	N/A	N/A	Total	TSS	D	60	mg/L	1.0	160.2	1/6/2004
S3031229e12b13c	12/29/2003	12:24	Comp. A	4	200	9:24	10:24	11:24	Total	Cu	D	5.6	ug/L	1.0	200.8	1/24/2004
S3031229e12b13c	12/29/2003	12:24	Comp. A	4	200	9:24	10:24	11:24	Total	TSS	D	66	mg/L	1.0	160.2	1/6/2004
S3031229e12b14c	12/29/2003	16:24	Comp. A	4	200	13:24	14:24	15:24	Total	Cu	D	8.4	ug/L	1.0	200.8	1/24/2004
S3031229e12b14c	12/29/2003	16:24	Comp. A	4	200	13:24	14:24	15:24	Total	TSS	D	68	mg/L	1.0	160.2	1/6/2004
S3031229e12b15c	12/29/2003	20:24	Comp. A	4	200	17:24	18:24	19:24	Total	Cu	D	7.3	ug/L	1.0	200.8	1/24/2004
S3031229e12b15c	12/29/2003	20:24	Comp. A	4	200	17:24	18:24	19:24	Total	TSS	D	32	mg/L	1.0	160.2	1/6/2004
S3031230 fld blink	12/30/2003	NA	Fld Blink	1	1,000	NA	NA	NA	Total	Cu	ND	ND	ug/l	1.0	200.8	1/24/2004
S3031230 fld blink	12/30/2003	NA	Fld Blink	1	1,000	NA	NA	NA	Total	TSS	ND	ND	mg/l	1.0	160.2	1/6/2004
S3040217e01b13c	2/17/2004	20:01	Comp. A	4	200	17:01	18:01	19:01	Total	Cu	D	12	ug/L	1.0	200.8	2/27/2004
S3040217e01b13c	2/17/2004	20:01	Comp. A	4	200	17:01	18:01	19:01	Total	TSS	D	112	mg/L	1.0	160.2	2/23/2004
S3040218e01b14c	2/18/2004	0:01	Comp. A	4	200	21:01	22:01	23:01	Total	Cu	D	9.1	ug/L	1.0	200.8	2/27/2004
S3040218e01b14c	2/18/2004	0:01	Comp. A	4	200	21:01	22:01	23:01	Total	TSS	D	48	mg/L	1.0	160.2	2/23/2004
S3040218e01b15c	2/18/2004	4:01	Comp. A	4	200	1:01	2:01	3:01	Total	Cu	D	13	ug/L	1.0	200.8	2/27/2004
S3040218e01b15c	2/18/2004	4:01	Comp. A	4	200	1:01	2:01	3:01	Total	TSS	D	182	mg/L	1.0	160.2	2/23/2004
S3040218e01b16c	2/18/2004	8:01	Comp. A	4	200	5:01	6:01	7:01	Total	Cu	D	36	ug/L	1.0	200.8	2/27/2004
S3040218e01b16c	2/18/2004	8:01	Comp. A	4	200	5:01	6:01	7:01	Total	TSS	D	900	mg/L	1.0	160.2	2/23/2004

Appendix B

Mean Daily Discharge

Appendix B: Mean Daily Discharge

U.S. DEPARTMENT OF THE INTERIOR U.S. GEOLOGICAL SURVEY- WATER RESOURCES

STATION NUMBER 11181008 CASTRO VALLEY C A HAYWARD CA
 LATITUDE 374048 LONGITUDE 1220446 NAD27 DRAINAGE AREA 5.51

WATER YEAR OCTOBER 2003 SEPTEMBER 2004
 DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.49	0.5	4.9	103	0.91	5.2	0.88	0.62	0.65	0.46	0.39	0.43
2	0.5	4.5	0.9	11	33	2.4	0.95	0.62	0.66	0.44	0.4	0.47
3	0.5	5.6	0.54	3.5	17	2	0.86	0.65	0.58	0.46	0.41	0.38
4	0.49	0.51	2.2	2.2	3.4	1.8	0.88	0.62	0.54	0.44	0.5	0.43
5	0.46	0.46	3.2	1.8	1.8	1.6	0.84	0.62	0.53	0.46	0.42	0.42
6	0.46	1.4	27	2.1	2.6	1.5	0.81	0.62	0.52	0.43	0.49	0.42
7	0.46	3	6.3	3	1.5	1.4	0.79	0.63	0.5	0.45	0.42	0.42
8	0.46	25	0.95	1.4	1.3	1.4	0.81	0.58	0.53	0.41	0.49	0.42
9	0.43	1.7	5.7	1.3	1.2	1.3	0.81	0.58	0.51	0.42	0.48	0.35
10	0.42	0.66	23	1.2	1.1	1.3	0.77	0.57	0.5	0.41	0.44	0.36
11	0.41	0.56	3.1	1.1	1	1.2	0.84	0.57	0.47	0.5	0.44	0.33
12	0.42	0.52	1.6	1	0.96	1.2	0.75	0.6	0.47	0.47	0.56	0.34
13	0.44	0.49	3	0.96	2	1.1	0.72	0.58	0.48	0.43	0.42	0.34
14	0.43	2.6	33	0.95	1.1	1.1	0.73	0.59	0.49	0.49	0.41	0.36
15	0.41	7.2	1.4	0.94	1	1.1	0.71	0.59	0.52	0.47	0.4	0.41
16	0.42	0.8	1	0.91	25	1.1	0.68	0.58	0.5	0.45	0.42	0.35
17	0.43	1.5	0.89	0.85	25	1	0.67	0.56	0.48	0.45	0.42	0.24
18	0.41	0.53	0.78	0.81	65	1	0.71	0.57	0.47	0.45	0.44	0.25
19	0.46	0.46	7.2	0.8	4.5	0.97	0.73	0.59	0.49	0.45	0.42	9.6
20	0.43	0.44	1.5	0.8	2.8	0.96	1.6	0.58	0.47	0.47	0.42	0.3
21	0.45	0.41	4.6	0.75	2.1	0.96	0.79	0.59	0.5	0.47	0.41	0.25
22	0.94	0.39	0.91	0.76	6	0.96	0.71	0.59	0.48	0.53	0.43	0.26
23	0.39	0.38	8.9	0.89	1.8	0.93	0.68	0.59	0.46	0.47	0.44	0.24

Appendix B: Mean Daily Discharge

24	0.37	0.39	22	9.2	3.9	0.88	0.69	0.6	0.45	0.46	0.46	0.23
25	0.35	0.41	4.6	0.96	117	24	0.68	0.56	0.49	0.44	0.49	0.23
26	0.37	0.38	1.5	0.85	49	1.6	0.67	0.58	0.45	0.53	0.41	0.23
27	0.36	0.37	1.1	3.4	11	1.2	0.65	0.63	0.46	0.44	0.39	0.25
28	0.4	0.38	0.96	0.9	5	1.1	0.67	3	0.5	0.4	0.53	0.24
29	0.37	0.39	82	0.82	3.4	1	0.66	0.62	0.44	0.4	0.4	0.23
30	0.38	6.2	8.9	4.9 ---		0.96	0.61	0.61	0.48	0.43	0.39	0.25
31	14 ---		2.3	0.96 ---		0.92 ---		0.62 ---		0.37	0.4 ---	

Appendix C

Graphs of Sampling Intervals

