Quality Assurance Project Plan

for

BRAKE PAD PARTNERSHIP CASTRO VALLEY CREEK WATER QUALITY MONITORING

Version 1.0

March 4, 2005

Alameda Countywide Clean Water Program

GROUP A ELEMENTS: PROJECT MANAGEMENT

1. TITLE AND APPROVAL SHEETS

Quality Assurance Project Plan

For

PROJECT NAME: BPP Castro Valley Creek Water Quality Monitoring

Proposal Identification Number: _________

Date: 3/4/2005

NAME OF RESPONSIBLE ORGANIZATION : Alameda Countywide Clean Water Program

APPROVAL SIGNATURES

GRANT ORGANIZATION:

Title:	Name:	Signature:	Date:
Contractor Project Manager	Connie Liu		
Subcontractor Project Manager	Jim Scanlin		
QA Officer	Paul Salop		
Laboratory QA Officer	Phil Carpenter		

REGIONAL BOARD (SWRCB):

Title:	Name:	Signature:	Date:
Contract Manager	Richard Looker		
QA Officer	Fred Hetzel		

2. TABLE OF CONTENTS

Page:

LIST OF APPENDICES

LIST OF FIGURES

LIST OF TABLES

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3. Distribution List

Title:	Name (Affiliation):	Tel. No.:	QAPP No*:
Contractor Project Manager	Connie Liu (Sustainable Conservation)	415-977-0380	1
Subcontractor Project Manager	Jim Scanlin (ACCWP)	510-670-6548	2
Regional Board Contract Manager	Richard Looker (RWQCB)	510-622-2451	3
Regional Board QA Officer	Fred Hetzel (RWQCB)	510-622-2310	4
Laboratory QA Officer	Phil Carpenter (ToxScan)	831-724-4522	5
QA Officer	Paul Salop (AMS)	925-373-7142	6
Field Crew Leader	Steve Miller (ACCWP)	510-670-5517	7

4. PROJECT/TASK ORGANIZATION

4.1 Involved parties and roles.

Table 1. (Element 4) Personnel responsibilities.

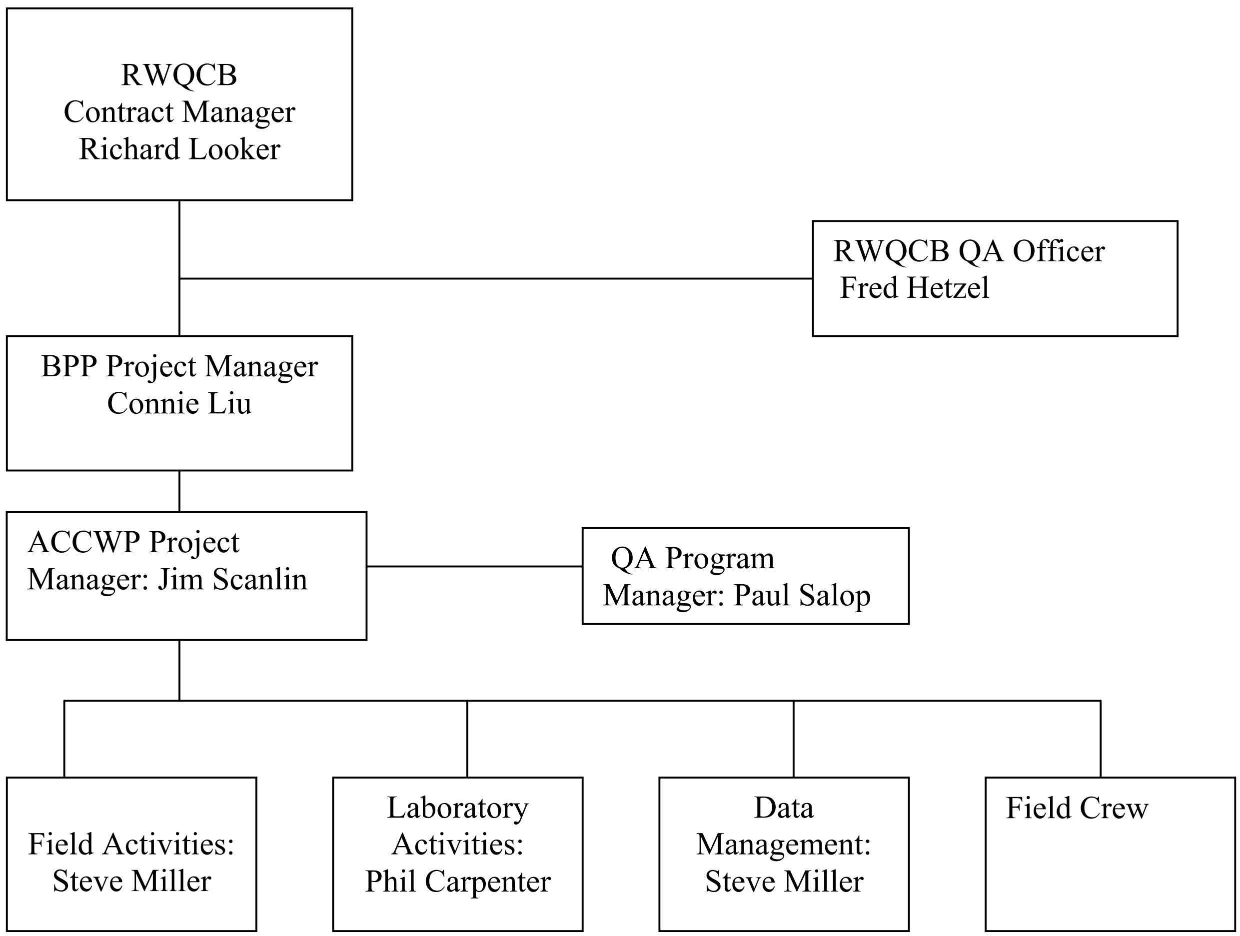
Name	Organizational Affiliation	Title	Contact Information (Telephone number, fax number, email address.)
Connie Liu	*(Sustainable Conservation)*	Contractor Project Manager	415-977-0380
Jim Scanlin	*(ACCWP)*	Subcontractor Project Manager	510-670-6548
Richard Looker	*(RWQCB)*	Regional Board Contract Manager	510-622-2451
Fred Hetzel	*(RWQCB)*	Regional Board QA Officer	510-622-2310
Phil Carpenter	*(ToxScan)*	Laboratory QA Officer	831-724-4522
Paul Salop	*(AMS)*	Project QA Officer	925-373-7142
Steve Miller	(ACCWP)	Field Crew Leader	510_670-5517

4.2 Quality Assurance Officer role
Paul Salop is an employee of Applied Marine Sciences and is under contract with the subcontractor. Mr. Salop's responsibilities include reviewing and approving the QAPP, standard operating procedures, and the draft and final project report and data submittal. Mr. Salop will work directly with Jim Scanlin and Phil Carpenter to resolve any QA related issues that arise.

4.3 Persons responsible for QAPP update and maintenance.
Jim Scanlin is responsible for maintaining and updating the QAPP.

4.4 Organizational chart and responsibilities

Figure 1. Organizational chart.



5. Problem Definition/Background

5.1 Problem statement.

Elevated levels of copper in surface waters may be harmful to aquatic life. Sources of copper to surface waters include both natural and anthropogenic sources. The Brake Pad Partnership project intends to develop a model of the discharge of copper from local streams to the San Francisco Bay. Inputs to the model will be developed based on data collected in the Castro Valley Creek watershed. Data to be collected include rainfall, stream flow, wet and dry deposition, and the concentration of copper in storm water discharges. This QAPP addresses the collection stormwater discharge samples and the analysis of those samples for total copper and total suspended solids. Rainfall and stream flow data is being collected independently from this grant project. ACCWP will provide rainfall and stream flow data to the BPP, but the collection of the data is not covered under this QAPP. Alameda County Flood Control and Water Conservation District personnel are collecting rainfall data. U. S. Geological Survey personnel are collecting stream flow data.

5.2 Decisions or outcomes.

The outcome to be achieved is a sufficient quality and quantity of rainfall, stream flow and constituent concentration data to allow for the development of a robust model.

5.3 Water quality or regulatory criteria

This project is not intended to address regulatory criteria.

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6. PROJECT/TASK DESCRIPTION

6.1 Work statement and produced products

Collect time-weighted and flow-weighted samples of storm water discharges representing from five to ten runoff events and analyze the samples for total copper (EPA Method 200.8) and total suspended solids (EPA Method 160.2). Work products will include: (1) a report summarizing the sampling effort and the analytical results; and (2) electronic data files with all the sample results and related information.

6.2. Constituents to be monitored and measurement techniques

Total copper: EPA Method 200.8
Total suspended sediment: EPA Method 160.2

Storm water discharge samples will be collected using an ISCO 6712 automated sampler.

6.3 Project schedule

Table 2. (Element 6) Project schedule timeline.

Activity	Date (MM/DD/YY)		Deliverable	Deliverable Due Date
	Anticipated Date of Initiation	Anticipated Date of Completion		
Collect samples from 5 to 10 storm events	10/01/03	05/31/04	Sampling reports	Draft 8/31/04
Analyze samples for total copper and tss	10/01/03	05/31/04	Lab reports	Draft 8/31/04
Compile rainfall and stream flow data	08/01/04	10/31/04	Data files	11/15/04
Compile and summarize sampling reports and lab reports	08/01/04	10/31/04	Draft summary report and data files	11/15/04
Review comments on draft report. Revise draft report and data files as needed.	11/15/04	12/31/04	Final report and data files	12/31/04

6.4 Geographical setting

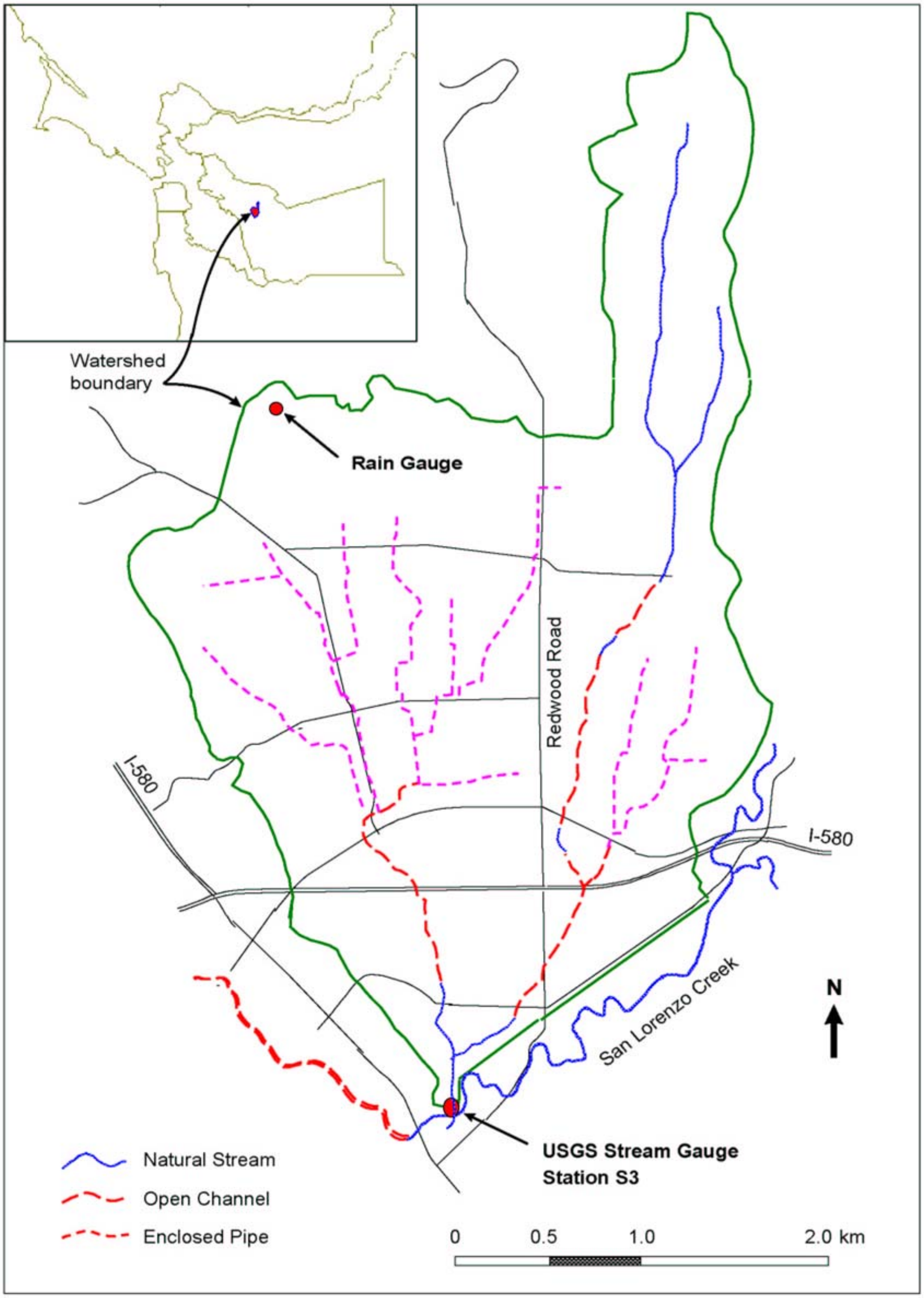
The Castro Valley Creek Watershed, a sub-watershed of the San Lorenzo Creek drainage, covers 5.5 square miles in west central Alameda County (Figure 2). The population of the watershed is approximately 35,000. The area is predominantly low-density residential development (50%), with some open space (35%), and commercial development (15%). There are 11,600 assessed parcels with single-family residential units and 3,200 with multiple family units.

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 downstream portion of the creek is still in a relatively natural state but most of the upper portions have been channelized or enclosed. 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 1999 was 2900 acre-feet.

6.5 Constraints

The sampling must be conducted during the 2003-2004 rainy season to allow the modeling project to remain on schedule.

Figure 2: Castro Valley Creek Watershed



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7. QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

Data Quality Objectives

Measurement or Analyses Type	Applicable Data Quality Objective
Field Measurement: Stream Flow	Accuracy, Precision, Completeness
Automated Sample Collection	Accuracy, Completeness
Copper Analysis	Accuracy, Precision, Completeness
Total Suspended Solids Analysis	Accuracy, Precision, Completeness

Accuracy

For laboratory analysis, 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. For sample collection, accuracy will be characterized by comparing the volume of sample that should have been collected based on setting of the automated collection device to the actual volume collected. (+/-) 100 ml will be considered acceptable.

Precision

For laboratory analysis precision will be characterized through the analysis of matrix spike duplicates. A relative percent difference of less than 20% will be considered acceptable.

Completeness

Completeness for laboratory analysis will be characterized by comparing the number of time-weighted or flow-weighted samples successfully collected and analyzed for a storm event to the number of samples that ideally would have been collected and analyzed based on the length of storm period and the total storm flow. 90% complete will be considered adequate for this project.

Field and Laboratory Measurements Data Quality Objectives Tables

Table 3. (Element 7) Data quality objectives for field measurements.

Group	Parameter	Accuracy	Precision	Recovery	Target Reporting Limit	Completeness
Field Measurment	Sample Collection	(+/-) 10%	NA	NA	NA	90%

Table 4. (Element 7) Data quality objectives for laboratory measurements.

Group	Parameter	Accuracy	Precision	Recovery	Target Reporting Limits	Completeness
Trace Metals	Copper	Standard Reference Materials (SRM) 75% to 125%	MS/MSD ± 30% RPD. Laboratory duplicate.	Matrix spike 70% - 130%.	1 ug/L	90%
Conventional	Total Suspended Solids	Standard Reference Materials (SRM) 83% to 107.8%.	Laboratory duplicate RPD limit 20	83% to 107.8%.	1 mg/L	90%

8. Special Training Needs/Certification

8.1 Specialized training or certifications.

No specialized training or certifications is required for this project.

8.2 Training and certification documentation.

NA

8.3 Training personnel.

NA

9. DOCUMENTS AND RECORDS

Alameda Countywide Clean Water Program staff will collect records for sample collection. Samples sent to ToxScan Laboratory will include a Chain of Custody form. ToxScan Laboratory will collect records for sample receipt and storage, analyses, and reporting.

All records, except lab records, generated by this project will be stored at the Alameda County Public Works Agency (ACPWA) office at 951 Turner Court in Hayward. ToxScan Laboratory records pertinent to this project will be maintained at ToxScan's main office.

Copies of this QAPP will be distributed to all parties on the distribution list. Any future amended QAPPs will be held and distributed in the same fashion. All originals of this and subsequent amended QAPPs will be held at ACPWA. Copies of versions, other than the most current, will be discarded so as not to create confusion.

Persons responsible for maintaining records for this project are as follows. Steve Miller, Field Crew Leader will maintain all sample collection, sample transport, and chain of custody forms as well as the automated sampler reports. Phil Carpenter, ToxScan Laboratory Director QA officer will maintain ToxScan's records. ACCWP Project Manager Jim Scanlin will oversee the actions of these persons and will arbitrate any issues relative to records retention and any decisions to discard records. After each sampling event a report of the flow and sampling data will be printed and stored in the project file. Hardcopies of analytical data will be maintained, electronic files are backed up weekly in the Alameda County Public Works Agency's network.

All records will be passed to the Sustainable Conservation BPP Project Manager at project completion. Copies of the records will be maintained at ACFC&WCD and ToxScan Laboratories for at least five years after project completion.

GROUP B: DATA GENERATION AND ACQUISITION

10. SAMPLING PROCESS DESIGN

This project uses a judgmental design. The area to be represented by the samples is the 5.5 square mile Castro Valley Creek watershed. 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.

The purpose of the sampling is to take representative samples of stormwater discharges from the Castro Valley Creek watershed. The samples will be analyzed for total copper and total suspended solids. Two types of samples will be taken, time-weighted and flow weighted. “Time-weighted” refers to samples that represent an equivalent period of time. “Flow-weighted” refers to samples that represent an equivalent volume of flow in the creek. Time-weighted samples will be collected either every half hour or every hour. The first sample will be taken at the initiation of storm flow. Four sequential samples will be collected in each sample container creating a composite sample representing either a two-hour or four-hour time period. Flow-weighted sampling will also be initiated at the start of storm flow in order to collect the “first flush.” Subsequent flow-weighted sample will be collected at every 3.74 millions gallons of flow. Each flow-weighted sample will be collected in a separate container.

The results of the time-weighted sampling will be used to calibrate a model of the build-up and wash-off of copper from the watershed. Time-weighted samples are being used for this purpose because these are most appropriate for input to the model as the model predicts average concentrations over a period of time. Sampling will commence at the start of a period of stormwater runoff.

Flow-weighted sampling will be used to track long-term trends in copper and total suspended solids concentrations. Analysis of flow-weighted samples has been conducted at this sampling station for many years. Continuation of the flow-weighted sampling will allow for a better comparison with previously collected data.

Samples will be collected and analyzed from a minimum of five and a maximum of ten storm events during the 2003-2004 wet season. Approximately 20 storm events per year occur in western Alameda on average. Collecting and analyzing samples from five to ten events will provide a sufficient quantity of data to develop the model. As the weather is unpredictable it is not possible to determine the magnitude or timing of the storms that will occur. However, an attempt will be made to collect samples from events with a wide range of magnitude, duration, and antecedent dry period.

11. SAMPLING METHODS

Samples will be taken using an ISCO Model 6712 automated sampling device. The sampler will be housed in a USGS gaging station. The sampler will be equipped with a Teflon intake strainer and a Teflon-lined polyethylene intake tube. The samples will be dispensed into 1-liter polyethylene bottles located in the base of the sampler and iced. A copy of the standard operating procedures is attached. A field log data sheet (attached) will be filled out each time the sampling site is accessed.

Table 5. (Element 11) Sampling locations and sampling methods.

Sampling Location	Location ID Number	Matrix	Depth (units)	Analytical Parameter	# Samples (include field duplicates)	Sampling SOP #	Sample Volume	Containers #, size, type	Preservation (chemical, temperature, light protected)	Maximum Holding Time: Preparation/ analysis
Castro Valley Creek: USGS gaging station No. 11181008	S3	Water	Approx. 1 foot above stream bottom. Depth of sample will vary with stream stage	Total copper Total suspended solids	Number of samples collected will depend upon the number of storm events sampled, their duration and magnitude	SOPs are attached	800 ml	1 L polyethyl ene	Iced/ refrigerated	

12. SAMPLE HANDLING AND CUSTODY

Sample handling procedures are described in the SOPs (attached).

Table 6. (Element 12). Sample handling and custody.

Parameter	Container	Volume	Initial Preservation	Holding Time
Total Copper	1 liter polyethylene bottle, pre-cleaned in lab in accordance with SOPs	800 ml to be used for both total copper and TSS	Cool to 4°C, dark. Acidify in lab within 72 hrs, with pre-acidified container (ultra-pure HNO_3), for pH<2.	Once sample is acidified, can store up to 6 months at room temperature
Total Suspended Solids	1 liter polyethylene bottle, pre-cleaned in lab in accordance with SOPs	800 ml to be used for both total copper and TSS	Cool to 4°C, dark.	7 days

In the field, all samples will be packed in wet ice or frozen ice packs during shipment, so that they will be kept at approximately 4˚C. Samples will be shipped in insulated containers. All caps and lids will be checked for tightness prior to shipping.

All samples will be handled, prepared, transported and stored in a manner so as to minimize bulk loss, analyte loss, contamination or biological degradation. Sample containers will be clearly labeled with an indelible marker. Water samples will be kept in polyethylene bottles and kept cool at a temperature of 4˚C until analyzed. Maximum holding times for specific analyses are listed in Tables 8 above.

Samples are placed in the ice chest with enough ice to completely fill the ice chest. Chain of Custody forms are placed in an envelope and placed in Ziploc bags inside of the ice chest. Ice chests are sealed with tape before shipping. The receiving laboratory has a sample custodian who examines the samples for correct documentation, proper preservation and holding times.

Contract laboratories will follow sample custody procedures outlined in their QA plans.

All samples remaining after successful completion of analyses will be disposed of properly. It is the responsibility of the personnel of each analytical laboratory to ensure that all applicable regulations are followed in the disposal of samples or related chemicals.

Chain-of-custody procedures require that possession of samples be traceable from the time the samples are collected until completion and submittal of analytical results. A complete chain-of-custody form is to accompany the transfer of samples to the analyzing laboratory.

A sample is considered under custody if:

- it is in actual possession;
- it is in view after in physical possession;
- it is placed in a secure area (accessible by or under the scrutiny of authorized personnel only after in possession)

Field Log

Field crews shall be required to keep a field log for each sampling event. The following items should be recorded in the field log for each sampling event:

- sample ID numbers and unique IDs for any replicate or blank samples;
- qualitative descriptions of relevant water conditions (e.g. color, flow level, clarity)
- a description of any unusual occurrences associated with the sampling event, particularly those that may affect sample or data quality.
- volume of each sample collected

The field crews shall have custody of samples during field sampling. Chain of custody forms will accompany all samples during shipment to contract laboratories. All water quality samples will be transported to the analytical laboratory directly by the field crew or by overnight courier.

Laboratory Custody Log

Laboratories shall maintain custody logs sufficient to track each sample submitted and to analyze or preserve each sample within specified holding times.

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13. Analytical Methods

Table 7. (Element 13) Field analytical methods.

Analyte	**Laboratory / Organization**	**Project Action Limit (units, wet or dry weight)**	**Project Quantification Limit (units, wet or dry weight)**	**Analytical Method**		**Achievable Laboratory Limits**	
				Analytical Method/ SOP	Modified for Method yes/no	MDLs (1)	Method (1)
NA							

(*) *Standard Methods for the Examination of Water and Wastewater*, 20th edition.

Table 8. (Element 13) Laboratory analytical methods.

Analyte	**Laboratory / Organization**	**Project Action Limit (units, wet or dry weight)**	**Project Quantitation Limit (units, wet or dry weight)**	**Analytical Method**		**Achievable Laboratory Limits**	
				Analytical Method/ SOP	Modified for Method yes/no	MDLs (1)	Method (1)
Copper	ToxScan		1.0 ug/L	EPA method 200.8	No		
Total suspended solids	ToxScan		1.0 mg/L	EPA Method 160.2	No		

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14. Quality Control

Sampling

Equipment Blank: A blank was run on the sampler intake tube prior to installation.

Field Blank: A field blank will be analyzed at least twice during the project.

As there is only one automated sampler available for the project, it will not be possible to collect field duplicates or colloctated samples.

Field Measurements

Flow: The stage reading on the sampler will be compared to the staff gage in the creek prior to each sampling event.

Lab Analyis

The laboratory will analyze the field blanks submitted. The expectd result is a non-detect.

The laboratory will run lab blanks, duplicates and matrix spike duplicates along with each batch of samples analyzed.

Table 9. (Element 14) Sampling (Field) QC.

Matrix: Water
Sampling SOP: Attached
Analytical Parameter(s): NA
Analytical Method/SOP Reference: NA
Sample locations: 1

Field QC	Frequency/Number per sampling event	Acceptance Limits
Equipment Blanks	Once prior to start of project	Non-detect
Field Blanks	Twice over project	ND

Table 10. (Element 14) Analytical QC.

Matrix: Water
Sampling SOP: Attached
Analytical Parameter(s): Total copper, TSS
Analytical Method/SOP Reference: 200.8, 160.2
Sample locations: 1

Laboratory QC	Frequency/Number		Acceptance Limits	
Method Blank	1 in 20	1 in 20	< R.L.	< R.L.
Reagent Blank	1 in 20	NA	< R.L.	NA
Storage Blank	NA	NA	NA	NA
Instrument Blank	1 in 20	NA	< R.L.	NA
Lab. Duplicate	1 in 20	1 in 20	RPD = 20%	RPD = 25%
Lab. Matrix Spike	1 in 20	NA	70-130%	NA

Matrix Spike Duplicate	1 in 20 NA	70-130, RPD = 20% NA
Lab. Control sample	1 in 20 1 in 20 (SRM)	75-125% 70-130% (SRM)
Surrogates	NA NA	NA NA
Internal Standards	Each sample NA	80-125% NA
Others: CCV	1 in 10 NA	± 10% of initial NA
CCB	1 in 10 NA	< R.L. NA

KEY: Copper parameters are on the left, TSS is on the right.
R.L. = Reporting Limit
NA = Not Applicable
RPD = Relative Percent Difference
SRM = Standard Reference Material
CCV = Continuing Calibration Verification
CCB = Continuing Calibration Blank

15. INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

Table 11. (Element 15) Testing, inspection, maintenance of sampling equipment and analytical instruments.

Equipment / Instrument	Maintenance Activity, Testing Activity or Inspection Activity	Responsible Person	Frequency	SOP Reference
ISCO 6712	Described in SOPs (attached)	Field Crew Leader	Prior to each sampling event	Attached
Laboratory Analytical Instruments	Described in ToxScan Quality Management Plan (attached)			

16. INSTRUMENT/EQUIPMENT CALIBRATION AND FREQUENCY

Field

Stream gage: The ISCO level recorder will be checked against the in stream staff gage and reset if necessary.

Sample size: The ISCO sampler has a liquid level detector and does not require calibration.

Laboratory

Laboratory equipment will be calibrated following the requirements of the specific methods of analysis. All calibration and acceptance criteia are checked for conformance with these method requirements.

Table 12. (Element 16) Testing, inspection, maintenance of sampling equipment and analytical instruments.

Equipment / Instrument	SOP reference	Calibration Description and Criteria	Frequency of Calibration	Responsible Person
ISCO 6712	SOPs attached	stream stage (+/-) 0.1 ft.	each event	field crew leader
Anal. Balance	In-house ToxScan # IN-006.01-00	Instrument self-calibration, 3 point verification ±10%	Weekly	John Barnthouse
ICP/MS	In-house ToxScan # IN-004.01-00	5 point curve; r ≤ 0.999, CCV/CCB – every 10 samples ± 10% of initial calibration verification	Prior to each run	Assaf Sadeh

17. INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

There are no consumables related to field sampling program.

The criteria for verifying the quality of and accepting consumables related to laboratory analysis is described in the ToxScan Quality Management Plan (attached).

18. NON-DIRECT MEASUREMENTS (EXISTING DATA)

Not Applicable.

19. DATA MANAGEMENT

Data will be maintained as described above in Section 9. Hard copies of field logs, chains of custody, ISCO sampler reports, and lab reports will be stored in a file cabinet at ACCWP ofices. An inventory will be maintain of all files stored. A log will be maintained of file removal and return.

Data from lab reports will be transcribed to an electronic spreadsheet. After all data has been entered, the spreadsheet will be checked for errors by the project QA officer. Once apporved by the QA officer the file will be stored on the ACPWA network as a password protected read only file.

GROUP C: ASSESSMENT AND OVERSIGHT

20. ASSESSMENTS & RESPONSE ACTIONS

The Project Manager will assess the activities of the field crew to ensure that the SOPs are followed and all required forms and reports are completed. The review of the field logs, ISCO sampling report, and chain of custody form will occur after each sampling event. The Project Manager will inform the field crew leader of any necessary corrective action.

21. REPORTS TO MANAGEMENT

Table 13. (Element 21) QA management reports.

Type of Report	Frequency (daily, weekly, monthly, quarterly, annually, etc.)	Projected Delivery Dates(s)	Person(s) Responsible for Report Preparation	Report Recipients
Interem Quaterly Progress Report	Once	10/05/04	Project Manager	Sustainable Conservation PM
Draft final report and data sets for review	Once	11/15/04	Project Manager	Sustainable Conservation PM, Project QA officer
Final report and data sets	Once	12/30/04	Project Manager	Sustainable Conservation PM
Final Quarterly Reports	Once	1/5/05	Project Manager	Sustainable Coservation PM

Group D: Data Validation and Usability

22. Data Review, Verification, and Validation Requirements

Data generated by project activities will be reviewed against the data quality objectives cited in Element 7 and the quality assurance/quality control practices cited in Elements 14, 15, 16, and 17. Data will be separated into three categories: data meeting all data quality objectives, data meeting failing precision or recovery criteria, and data failing to meet accuracy criteria. Data meeting all data quality objectives, but with failures of quality assurance/quality control practices will be set aside until the impact of the failure on data quality is determined. Once determined, the data will be moved into either the first category or the last category.

Data falling in the first category is considered usable by the project. Data falling in the last category is considered not usable. Data falling in the second category will have all aspects assessed. If sufficient evidence is found supporting data quality for use in this project, the data will be moved to the first category, but will be flagged with a “J” as per EPA specifications.

23. VERIFICATION AND VALIDATION METHODS

All data records will be checked visually and recorded as checked by initials and dates. Project QA Officer will do all reviews and ACCWP's Project Manager will perform a check of 10% of the reports. ToxScan's QA Officer will perform checks of all of its records. All checks by ToxScan will be reviewed by ACCWP.

Issues will be noted. Reconciliation and correction will be done by a committee composed of Project QA Officer, Field Crew Leader, Analyst, and Project Manager; and ToxScan Laboratory's QA Officer. Any corrections require a unanimous agreement that the correction is appropriate

24. RECONCILIATION WITH USER REQUIREMENTS

The data will be assessed for completeness as represented by the completeness data quality objective. Any limitations is the data will be reported to the Sustainable Conservation Project Manager.

APPENDIX 1. Standard Operating Procedures for Castro Valley Creek Brake Pad Partnership Water Quality Sampling Project

STANDARD OPERATING PROCEDURES FOR CASTRO VALLEY CREEK BRAKE PAD PARTNERSHIP WATER QUALITY SAMPLING PROJECT

ACFC&WCD Laboratory (pre-sampling):

Equipment and materials needed: ISCO 6700 sampler (bottom half), 24 1-liter wedge-shaped plastic ISCO bottles with caps, Alconox detergent, bottle brush, bottle or dish rack, Milli-Q water, new rubber gloves, small plastic trash bags, party ice, paper towels.

1. Rinse out the sampler bottom.
2. Unpack the cooler(s) returned from ToxScan.
3. Remove the empty ISCO bottles from their bubble-wrap envelopes and arrange in two rows of twelve on the left side of the sink.
4. Return any imitation ice packets to the freezer, any reusable packing materials to their rightful place in the lab storeroom.
5. Rinse each bottle with a blast of hot water to remove any visible sediment or debris. Empty into a large bucket so as not to clog the sink drain.
6. Fill two small glass jars (~400mL) with hot water and mix in (using the bottle brush to stir) about two teaspoonfuls of Alconox detergent in each jar.
7. When the Alconox has dissolved, set one of the jars aside. Dip the brush into the solution in the remaining jar and scrub the inside of the first bottle (the one in the row closest to you, next to the sink) vigorously for about 20 seconds, then the outside rim (just the part that comes into contact with the cap) for about 10 seconds. The entire inside and top part of the outside of the bottle should be coated with bubbly suds. If not, apply more Alconox to the scrubbing solution and repeat. Replace the sudsy bottle back in its original place in the front row.
8. Repeat step #7 with the remaining 23 bottles, working from right to left, front row first. This will allow every bottle to soak in the detergent for roughly the same amount of time.
9. Take the first bottle and blast the inside with hot water. When emptying, hold it upside-down for about 10 seconds. This allows most of the remaining suds to fall out, making repeated rinsing more effective. Give the bottle a second hot blast and empty. There shouldn't be any visible soap suds at this point. Turn the cold water on (a light enough stream so that splashing doesn't occur) and rinse the outside of the bottle until you can't feel any detergent on your hands or the bottle. Rinse the inside of the bottle twice with cold water and place on the dish rack to dry.
10. Repeat step #9 with the remaining 23 bottles, again in the same order as scrubbed.
11. Scrub each bottle cap (inside and outside) using the bottle brush and same Alconox solution. Submerge the caps in the other jar of Alconox solution beside the sink to soak.
12. Rinse each bottle with ~200 mL of Milli-Q water and place back on the dish rack.
13. Run a stream of warm water and rinse each bottle cap well on each side, placing rinsed caps upside-down on the dish rack.
14. Put on a new pair of rubber gloves. Rinse the inside and outside of each bottle cap with a small splash of Milli-Q water and place them back on the dish rack. (The bottle caps should not be touched with bare hands from this point on.)
15. When the bottles and caps are dry, put on a pair of new rubber gloves, screw the caps onto the bottles and arrange all 24 pairs inside the ISCO sampler bottom piece. Make sure the number on the cap corresponds with the number on the bottle, as well as the slot the bottle sits in. Discard the gloves. Fasten the bottles down with the plastic ring supplied. .
16. Fill the plastic trash bag with approximately 3 pounds of ice. Wipe off the bag with a paper towel, and place it in the center of the sampler bottom without touching the bottle caps. Make sure that the ice/ plastic bag level is at least as high as the plastic ring and no higher than the tops of the bottles. Tie off the bag. (A regular store-bought bag of party ice can be used instead, just make sure the ice is loose inside the bag, and wipe the bag off before insertion.)
17. Immediately depart for the sampling site.

Field (pre-sampling):

Equipment and materials needed: ISCO 6700 sampler (top and prepared bottom halves), new Ziploc sandwich bag, new rubber gloves, desiccant, new pump tube, field manual.

1. Once inside the sampling station, place the bottom half of the sampler beside the top half, which is connected to the external intake tube.
2. Make sure your hands are clean and put on two new rubber gloves.
3. Unscrew the caps from the bottles and enclose them in the new Ziploc bag, and set them aside on the work bench.
4. Immediately fasten and lock the top half of the sampler to the bottom half (there is only one way).
5. Open the pump latch on the sampler and check the pump tube. If it appears worn, or if it has been through more than 800,000 pump counts (1,000,000 pump counts is the threshold—you can access the count number on the sampler computer), replace it with a new one (see the ISCO equipment manual).
6. Check the desiccant tube attached to the flow meter module on the right hand side of the sampler computer. If the desiccant is over 75% pink, replace it. You may remove your gloves after this step.
7. Check the pump tube connections to the intake tube and the sampler top, making sure they are secure. The intake tube should be at least one half inch inside the pump tube. The other end of the pump tube should completely engulf the sampler nozzle. The sampler should be facing in the direction that will ensure proper pump flow (the pump tube should not be bent at all at the point of connection to the suction line).
8. Take the field manual down to the staff gauge and record the creek stage.
9. Return to the sampling station and program the sampler (see Sampler Programming steps). Compare the computer's stage reading with your own, and adjust as necessary.
10. Complete the requisite field manual entries.

Field (sampling):

Equipment and materials needed: bottle caps, new rubber gloves, paper towels, bag of ice, field manual.

Employ these steps only when a sampling event extends beyond 24 hours after the sampler is programmed. Repeat these steps if the sampling event extends another 24 hours after the initial ice replacement, and so on until sampling has completed.

1. Check the sampler computer to make sure the next sample will not be taken for at least ten minutes.
2. Carefully remove the sampler top so as not to create any splashing within the samples.
3. Make sure your hands are clean and put on two new rubber gloves. Open the Ziploc containing the bottle caps. Screw all of the numbered caps (1-24) onto the bottles in the corresponding numbered positions (cap #1 goes on bottle#1 in slot #1, cap #2 goes on bottle #2 in slot #2, etc.). Seal the Ziploc and replace it on the work bench. Discard the gloves.
4. Take the sampler bottom outside and unscrew the outer drain cap. Replace the cap when all the water has drained out.
5. Return the sampler bottom to its place in the station, and carefully lift the plastic bag about 6 inches over the bottles, keeping it centered, and allow most of the water clinging to it to drip off. Wrap the paper towel(s) around the bag to prevent any water from touching the bottle caps. Lift the bag out of the sampler bottom and set it aside. Repeat step #4 if needed.
6. Estimate the percentage of ice remaining in the old ice bag and record it in the field manual.
7. Wipe off the new ice bag with a paper towel and carefully insert it inside the sampler bottom so that no water touches the bottle caps.

8. Put on two new gloves.
9. Unscrew the caps from the empty bottles and replace them in the Ziploc bag. Discard the gloves. Reattach the sampler top.
10. Record the action of ice replacement in the field manual.

Field (post-sampling):

Equipment and materials needed: bottle caps, new rubber gloves, Milli-Q water, paper towels, bag of ice, field manual.

1. Check the sampler computer to make sure the sampling program has finished, or stop the program manually.
2. Carefully remove the sampler top so as not to create any splashing within the samples.
3. (If you are not going to be sending a field blank to ToxScan along with the samples, skip to #4.) Put on a new pair of gloves. Unfasten the ring holding the bottles down and select an empty bottle. Take it out carefully, handling it well below the mouth. Fill it with approximately 950 mL of Milli-Q water, screw on the corresponding cap, and place the sample in its corresponding slot. Refasten the ring assembly, and record the action in the field manual (time and bottle number).
4. If there is at least half of the ice left in the bag, put on two new rubber gloves (only if you skipped #3), screw the remaining bottle caps onto their respective bottles, and drain the sampler bottom outside. If there is no more ice in the bag, repeat step #s 4-7 of the Field (sampling) section.
5. Discard the gloves. Record the approximate volume for each bottle containing liquid, as well as how many samples are in each bottle and what type they are (flow-weighted or time-weighted) in the field manual.
6. Record any errors that have occurred during sampling, whether they were human or mechanical.
7. Record any instances of discoloration or malodorousness within the samples.
8. Check the equipment bin to make sure it is fully stocked (at least one full roll of paper towels, one full box of rubber gloves, two liters of Milli-Q water, one full jar of desiccant, two new pump tubes
9. Drive the sampler bottom and empty Ziploc bag immediately to the Clean Water Laboratory.

Laboratory (post-sampling):

Equipment and materials needed: Toxscan chain-of-custody form, new rubber gloves, Milli-Q water, medium or large-sized cooler, blue ice, new bubble-wrap envelopes, FedEx airbill.

1. Once inside the laboratory, carefully remove the ice bag from the sampler bottom making sure not to drip onto the bottle caps.
2. Drain the sampler bottom into the sink by removing the outer drain cap. Replace the cap when finished.
3. Without touching the caps, place each bottle containing sample(s) inside the refrigerator.
4. Fill out the Toxscan chain of custody form, fold it and seal it in the Ziploc bag that was used for the bottle caps.
5. Select a cooler large enough to hold the number of bottles you are sending. Arrange enough blue ice packets on the bottom so that most, if not all, of the bottles will come into contact with them.
6. Wash your hands and put on a pair of new rubber gloves. Insert one bottle into a bubble-wrap envelope, seal the envelope, and place it upright inside the cooler.
7. Repeat step #6 for all bottles to be sent, arranging them so that they cannot fall over or shuffle excessively when the cooler lid is closed. Discard the gloves.
8. Use materials such as extra blue ice packets, bubble wrap, Styrofoam, and wadded-up paper to secure the contents and fill any empty space.
9. Enclose the Ziploc bag containing the chain of custody form and shut the cooler lid. Make sure it is fully closed without having to apply additional pressure.

10. Seal the cooler by wrapping packing tape around it in a double criss-cross fashion (tape should cross the gap between the lid and cooler body in eight different places).
11. Fill out and adhere a FedEx overnight airbill to the cooler, and either schedule a pick-up for that day or drive immediately to a FedEx location in time for overnight delivery.

APPENDIX 2. Castro Valley Creek Water Quality Sampling Field Log

STORM WATER RUNOFF MONITORING
FIELD DATA LOG

Date ______________________________ **Time _____________(PST)**

Station Name ____ **Station ID _________**

Field Crew ____

Sampler Data
Sampler time (PST) _________ Official time _________ Adjusted ? (y/n) _________

Flow meter stage (ft) ________ Staff gage (ft) ________ Adjusted ? (y/n) _________

SAMPLER PROGRAMMING

One-part program:
Flow/ Sample (Mgal) _______ Volume/ Sample (mL) ______ Samples/ Bottle_____

Two-part program:
Time period/ Sample _______ Volume/ Sample (mL) ______ Samples/ Bottle _____

OBSERVATIONS/ ACTIONS TAKEN

____
____
____
____
____
____
____
____
____
____
____

BOTTLE DATA

Bottle Number	No. of Samples	Estimated Vol. (mL)	Type (flow or time)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

APPENDIX 3. ToxScan Laboratory's Quality Management Plan