City of Santa Rosa
Utilities Department

Storm Water & Creeks Section

# National Pollutant Discharge Elimination System Storm Water Sampling Plan

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Revisions

| Date | Author | Notes |
|---|---|---|
| 2/4/2015 | KLH | Corrected typos and remove names |
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# SECTION 1

## *Storm Water & Creeks Sampling Program*

**Description**

The City of Santa Rosa's Storm Water & Creeks Section (City) conducts annual monitoring of creeks and storm drains to measure water quality and direct resources toward local pollutants of concern. This monitoring is required as part of Monitoring and Reporting Program No. R1-2009-0050 within National Pollutant Discharge Elimination System Permit No. CA0025054. Monitoring assesses the chemical, physical, and biological conditions present within creeks and storm drains. Monitoring data helps staff evaluate trends in conditions and shift our program to address water quality concerns. Annual City monitoring includes bioassay testing (using live organisms to measure water quality) and performing chemical analysis of water collected in creeks and the storm drain system.

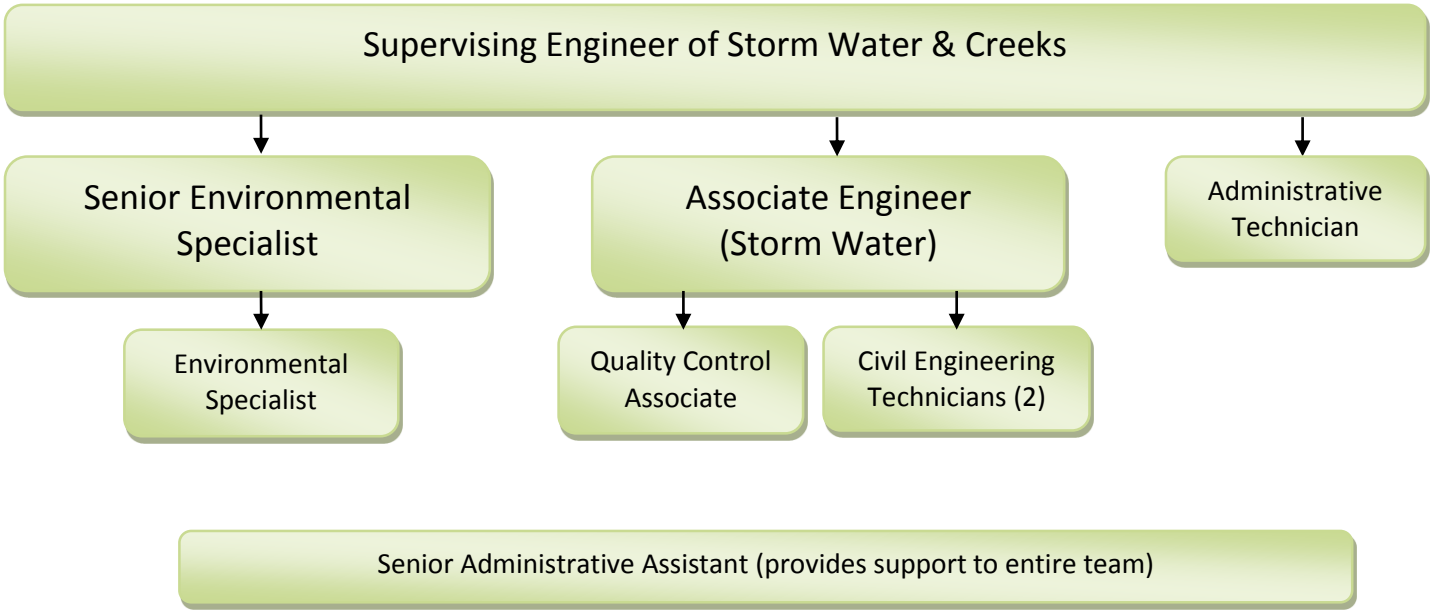
**Goals**

The goals of the monitoring program are to:

- Assess receiving water quality;
- Assist in gathering data for development of Total Maximum Daily Loads (TMDLs);
- Direct resources towards local pollutants of concern;
- Other possible beneficial uses of the monitoring data include: (1) assessing the chemical, physical, and biological impacts to receiving waters resulting from urban runoff; (2) assessing the overall health and evaluating long-term trends in receiving water quality; (3) measuring and improving the effectiveness of the BMPs; and (4) identifying sources of pollutants.

# SECTION 2

***Storm Water & Creeks Team Organization Chart***



## Responsibilities of Staff

### Supervising Engineer

The following duties are considered essential for this job classification and are applicable to all sections:

- Supervise, select, train and evaluate professional and technical staff in an assigned section of Engineering Services or Building and Code Compliance Division;
- supervise and participate in the development of plans, specifications, estimates and work orders for the construction of public works and City projects;
- initiate and conduct engineering planning studies to identify infrastructure needs; manage construction contract administration;
- review and make recommendations on technical reports and studies;
- check computations and specified materials for accuracy and conformance with regulations;
- inspect project sites to assist in solution of difficult problems;
- coordinate engineering related activities with other City departments, divisions and sections and with outside agencies;
- research, interpret and apply the City code, and State and Federal laws and regulations related to City infrastructure projects;
- interpret specifications and City policy and make change orders;
- participate in the selection and supervision of private professional engineers for the development of plans and specifications, studies and reports;
- supervise, review and participate in the preparation of environmental assessments, studies and reports;
- serve as staff and make presentations to the City Council, Planning Commission, Board of Public Utilities, other boards and commissions, committees, outside agencies, and property owners on City infrastructure systems and building construction engineering matters; develop and manage section annual budgets;
- sign and stamp civil engineering documents including studies, reports, plans and specifications;
- in the absence of the incumbent, act as City Engineer, Deputy Director or Chief Building Official depending upon area of assignment;
- and perform related duties as assigned.

In addition to the duties listed above, the following duties are considered essential for positions in the following divisions:

Asset Management

- Supervise the planning and preparation of the capital improvement plan and budget, workflow and benchmark analysis, asset identification and condition assessment, oversee the development of system planning mapping and data analysis, asset management principles including asset valuation, depreciation, preventive maintenance scheduling, triple bottom line assessment, development of department Level of Service indicators, analyze data for cost and staffing projections, assist in resource allocation and risk mitigation decisions, promote sound asset management principles throughout

the department and city. Supervise the storm water program, providing direction and guidance on creek and storm water issues throughout the city, oversee biological and environmental support for City projects, and development and administration of the storm water management plan and discharge permit. Supervise the materials engineering section including development and analysis of pavement condition/rehabilitation goals, ensure the quality and responsiveness of testing and materials support for city and development projects, coordinate with various city departments on regulations and testing requirements.

**Senior Environmental Specialist**

Essential Duties:

- Coordinate, plan, organize, direct and review the work of environmental specialist staff;
- monitor work load of environmental specialist staff and coordinate with other professional and technical staff requesting environmental specialist services;
- and manage work assignments to meet critical deadlines.
- Interview applicants, make recommendations for their employment and assure their training;
- evaluate the performance of subordinates and make appropriate recommendations;
- ensure that safe working conditions are maintained.
- Represent environmental specialist staff at staff meetings or at public gatherings;
- act as liaison to other agency or city departments;
- prepare requested administrative reports and associated correspondence.
- Estimate costs of environmental specialist services;
- assist in the preparation of team budget.
- Develop and implement biological monitoring programs required by the City's NPDES permit;
- develop curricula and coordinate the program's educational efforts with high school teachers;
- provide classroom and field instruction to high school students related to stream health;
- prepare required reports on biological monitoring programs for the Regional Water Quality Control Board.
- Assess biological degradation resulting from creek pollution incidents;
- develop and implement associated monitoring programs as appropriate;
- provide related information to the responsible enforcement agencies.
- Prepare requisitions for laboratories to perform analyses of biological monitoring samples;
- coordinate shipping of samples to maintain safety and chain of custody requirements;
- monitor and evaluate laboratory work products.
- Plan and carry out field work associated with the City-wide Creek Restoration Program;
- gather information regarding the health of the City's creeks;
- provide guidance to technical staff assisting with information gathering activities;
- prepare related reports on creek reaches;
- develop a prioritized list of creeks needing restoration for the consideration of the Waterways Advisory Committee and City Council.
- Plan and carry out creek stewardship activities including:
- coordination with Sonoma County Water Agency;

- recruitment and training of volunteer creek stewards;
- promotion of the creek stewardship program;
- development of recreational and educational opportunities for the community;
- follow up on reports regarding trash, water pollution, natural habitat, trail maintenance and neighborhood safety;
- and facilitation of communication and cooperation among government agencies and other organizations.
- Coordinate biological monitoring and creek restoration efforts with outside agencies;
- coordinate creek enhancement activities with neighborhood and community groups.
- Provide biological expertise to design teams developing creek restoration projects;
- establish and implement monitoring programs to track the effectiveness of creek restoration projects;
- make adaptive management recommendations as needed.
- Review and analyze the details of public constructions projects to determine the permitting and environmental review processes required to comply with federal, state or local laws and ordinances.
- Where permits are required for public projects, contact and work closely with various federal, state, regional, and local agencies involved with environmental permitting;
- confer and maintain relationships with the staff of other departments to develop project descriptions and perform preliminary environmental reviews.
- Develop and recommend mitigation measures to be followed that will eliminate, minimize or mitigate the environmental effects of projects;
- monitor public project construction to ensure the implementation of mitigation measures and legal compliance, and resolve problems that may occur during construction.
- Conduct field inspections of proposed project sites to gather information in order to analyze potential effects a project may have on the environment, and to photograph, videotape, or prepare other graphic materials for inclusion in various environment permits and reports.
- Prepare environmental documents, including environmental assessments, initial studies, negative declarations, and notices of exemption;
- prepare and/or coordinate the preparation of detailed written and graphic materials, charts, maps, and visual displays necessary to obtain various environmental permits for presentations.
- Prepare or oversee the preparation of specifications and designs for revegetation projects and oversee the monitoring of mitigation measures, including native plant revegetation, wetland creation, and habitat enhancement projects.
- Prepare Requests for Proposals for environmental documents, permits, and special studies, e.g., historic property and biological survey reports, location hydraulic studies, and botanical, wetland, air quality, traffic and noise studies;
- prepare scopes of work for and manage consultant contracts for environmental and special studies for projects;
- review proposals and recommend selection of consultants;
- monitor and evaluate consultant work products and make related recommendations.
- Make presentations to the Waterways Advisory Committee, Planning Commission, City Council, other agencies or governing bodies, and the general public.
- Prepare or coordinate preparation of resolutions and supporting documentation for the City Council, Planning Commission, Waterways Advisory Committee, and other agencies or governing bodies.

- Track and research grant opportunities related to the storm water management, creek restoration and creek stewardship programs;
- scope and estimate costs of projects for grant applications;
- prepare or participate in the preparation of grant applications and submit by deadline;
- and follow up with granting agencies as required.
- Perform complex, specialized and detailed research and analysis of short term, long term, and cumulative environmental impacts resulting from the construction of projects;
- develop and implement public outreach and information activities;
- and perform related duties as required.

**Associate Civil Engineer (Storm Water)**

Essential Duties:

The following duties are considered essential for this job classification:

- Assist in the solution of complex technical problems;
- review work completed by assigned staff;
- review reports and check plans for conformance with design standards, codes and regulations;
- investigate field conditions affecting property owners, contractors and maintenance operations;
- respond to inquiries and complaints from the public by mail, over the telephone, and/or at a public counter;
- and make field inspections of buildings and/or utility, drainage, and street infrastructure under construction to insure proper execution of critical structural phases as designed and shown on the approved plans or otherwise required by applicable special provisions, design standards, codes and ordinances;
- sign and stamp civil engineering documents including studies, reports, plans and specifications.

In addition to the above, the duties listed below are also considered essential for positions in the following division or section assignments:

Storm Water & Creeks:

- Serve as primary coordinator for compliance activities as required by the Santa Rosa Area NDPES Storm Water Permit through implementation of City Storm Water Management Program with various City departments and outside agencies;
- provide technical analysis of RWQCB and SWQCB regulatory policies and procedures including TMDL studies;
- participate in the development and implementation of TMDL requirements;
- assist in development of City Storm Water Management Program annual budget;
- coordinate the preparation and submittal of the Annual Storm Water Permit Compliance Report including development of annual Storm Water Management Program Work Plan;

- attend and represent the City at NPDES Storm Water Permit Committee meetings, CASQA meetings, local and regional watershed meetings and other stakeholder meetings;
- make presentations to the City Council, the Board of Public Utilities and to various other boards and commissions;
- prepare scope of work and request for proposals, and administer consultant services contracts for permit compliance, storm water/watershed management and creek restoration related services;
- perform complex calculations;
- prepare special engineering studies and reports;
- make field inspections of existing infrastructure and prepare reports based on findings;
- manage various technical studies;
- utilize asset management system for infrastructure analysis and condition assessment;
- oversee and perform technical and regulatory work involving data collection and analysis, report preparation, public contact, project administration, staff supervision, and perform duties related to storm water permit compliance, creek restoration and storm water/watershed management within the City;
- assist in development, review and revision of division objectives, programs and standards;
- supervise, train and evaluate technical staff;
- perform related duties as assigned

**Environmental Specialist**

Essential Duties:

- Develop and implement biological monitoring programs required by the City's NPDES permit;
- develop curricula and coordinate the program's educational efforts with high school teachers;
- provide classroom and field instruction to high school students related to stream health;
- prepare required reports on biological monitoring programs for the Regional Water Quality Control Board.
- Assess biological degradation resulting from creek pollution incidents;
- develop and implement associated monitoring programs as appropriate;
- provide related information to the responsible enforcement agencies.
- Prepare requisitions for laboratories to perform analyses of biological monitoring samples;
- coordinate shipping of samples to maintain safety and chain of custody requirements;
- monitor and evaluate laboratory work products.
- Plan and carry out field work associated with the City-wide Creek Restoration Program;
- gather information regarding the health of the City's creeks;
- provide guidance to technical staff assisting with information gathering activities;
- prepare related reports on creek reaches;
- develop a prioritized list of creeks needing restoration for the consideration of the Waterways Advisory Committee and City Council.
- Plan and carry out creek stewardship activities including: coordination with Sonoma County Water Agency;
- recruitment and training of volunteer creek stewards;

- promotion of the creek stewardship program;
- development of recreational and educational opportunities for the community;
- follow up on reports regarding trash, water pollution, natural habitat, trail maintenance and neighborhood safety;
- and facilitation of communication and cooperation among government agencies and other organizations.
- Coordinate biological monitoring and creek restoration efforts with outside agencies;
- coordinate creek enhancement activities with neighborhood and community groups.
- Provide biological expertise to design teams developing creek restoration projects;
- establish and implement monitoring programs to track the effectiveness of creek restoration projects;
- make adaptive management recommendations as needed.
- Review and analyze the details of public construction projects to determine the permitting and environmental review processes required to comply with federal, state or local laws and ordinances.
- Where permits are required for public projects, contact and work closely with various federal, state, regional, and local agencies involved with environmental permitting;
- confer and maintain relationships with the staff of other departments to develop project descriptions and perform preliminary environmental reviews.
- Develop and recommend mitigation measures to be followed that will eliminate, minimize or mitigate the environmental effects of projects;
- monitor public project construction to ensure the implementation of mitigation measures and legal compliance, and resolve problems that may occur during construction.
- Conduct field inspections of proposed project sites to gather information in order to analyze potential effects a project may have on the environment, and to photograph, videotape, or prepare other graphic materials for inclusion in various environmental permits and reports.
- Prepare environmental documents, including environmental assessments, initial studies, negative declarations, and notices of exemption;
- prepare and/or coordinate the preparation of detailed written and graphic materials, charts, maps, and visual displays necessary to obtain various environmental permits and for presentations.
- Prepare or oversee the preparation of specifications and designs for revegetation projects and oversee the monitoring of mitigation measures, including native plant revegetation, wetland creation, and habitat enhancement projects.
- Prepare Requests for Proposals for environmental documents, permits, and special studies, e.g., historic property and biological survey reports, location hydraulic studies, and botanical, wetland, air quality, traffic and noise studies;
- prepare scopes of work for and manage consultant contracts for environmental and special studies for projects;
- review proposals and recommend selection of consultants;
- monitor and evaluate consultant work products and make related recommendations.
- Make presentations to the Waterways Advisory Committee, Planning Commission, City Council, other agencies or governing bodies, and the general public.
- Prepare or coordinate preparation of resolutions and supporting documentation for the City Council, Planning Commission, Waterways Advisory Committee, and other agencies or governing bodies.

**Quality Control Associate**

Essential Duties (all assignments)
The following duties are considered essential for this job classification:

- Provide complex, paraprofessional engineering guidance to City staff and/or external organizations, agencies and businesses related to area of assignment;
- plan, organize, assign and coordinate field and office paraprofessional engineering work;
- oversee overall processes within specialized area(s);
- identify training needs and provide training opportunities in area of assignment;
- research and stay current on laws, technology, practices and procedures in area of assignment;
- recommend changes to procedures;
- develop and maintain procedure manuals for section of assignment;
- research, organize, and disseminate information to staff;
- provide timely, accurate service in response to customer requests;
- serve as liaison to other City departments and to professionals in the field;
- anticipate workload trends;
- serve as advocate to management on behalf of the assigned area's issues and needs;
- and identify and communicate industry changes.

Additional Duties (all assignments)
In addition to the essential duties listed above that are applicable to all assigned areas, each employee assigned to this classification may perform the additional essential duties listed below, in the assigned section. Any single position may not be assigned all duties listed for an assigned department, nor do the examples cover all duties which may be assigned:

Storm Water:
Provide specialized department expertise in area of storm water management which requires the maintenance and information management of the storm drain maps and associated database system, the training and oversight of student aides for map and database updates, and the ability to perform compliance inspections, train staff and prepare the annual report as part of compliance with the NPDES General Permit for Industrial Activities for the Municipal Services Center. In addition, this position requires general knowledge of chemical, physical and biological water quality monitoring procedures, storm water pollution prevention techniques, and storm water pollution regulations.

**Civil Engineering Technician III** (I of 2)

Essential Duties:
The following duties are considered essential for this job classification:

- Research, file, retrieve, review and/or prepare a variety of engineering maps, documents, records, reports, and correspondence;
- operate computer-aided design, modeling and/or other application programs;
- respond to complaints and inquiries from other departments, outside agencies, and the public concerning engineering activities;
- locate utilities, easements, property lines, and/or other information on plans;

- perform and check mathematical, computer, and/or statistical calculations used in engineering tasks;
- perform field investigations and/or inspections of existing conditions and new construction;
- collect, compile, and/or analyze data and/or field samples;
- notify contractors of discrepancies between work performed and the approved plans, specifications, and standards;
- review drawings and improvement plans for conformance with established engineering standards;
- provide technical direction to less experienced staff;
- prepare program and project schedules.

In addition to the duties listed above, the following duties are considered essential for positions in the following divisions:

Storm Water & Creeks:

- Perform field investigations/tests on storm water;
- assist in the preparation and administration of engineering contracts and professional service agreements;
- work with Environmental Specialist staff to prepare information and exhibits as needed for storm water and creek restoration projects.

**Civil Engineering Technician III** (2 of 2)

Essential Duties:

The following duties are considered essential for this job classification:

- Research, file, retrieve, review and/or prepare a variety of engineering maps, documents, records, reports, and correspondence;
- operate computer-aided design, modeling and/or other application programs;
- respond to complaints and inquiries from other departments, outside agencies, and the public concerning engineering activities;
- locate utilities, easements, property lines, and/or other information on plans;
- perform mathematical, computer, and/or statistical calculations used in engineering tasks;
- perform field investigations and/or inspections of existing conditions and new construction;
- collect, compile and/or analyze data and/or field samples;
- assist in the preparation of program and project schedules;
- provide technical direction to less experienced staff;
- notify contractors of discrepancies between work performed and the approved plans, specifications, and standards;
- review drawings and improvement plans for conformance with established engineering standards.

In addition to the above, the duties listed below are also considered essential for positions in the following divisions:

Storm Water & Creeks:

- Perform field investigations/tests on storm water;
- prepare and administer engineering contracts and professional service agreements;
- work with Environmental Specialist staff to prepare information and exhibits as needed for storm water and creek restoration projects;
- input, maintain and develop databases for Storm Water BMP SUSMP tracking and inspections;
- technical resource for sampling equipment (flow meters, samplers).

**Administrative Technician**

Essential Duties:

The following duties are considered essential for this job classification:

- Assist in budget preparation and review;
- conduct surveys and perform research to track and analyze administrative, fiscal, personnel and operational performance;
- make recommendations for the revision on departmental procedures and policies;
- interpret department and City policies, procedures, rules, regulations and MOUs;
- represent the City in interdepartmental, community, and professional meetings as required;
- respond to questions and requests for assistance and information from employees, departments and the general public;
- participate in special projects as needed;
- prepare recommendations on a variety of municipally-related subjects;
- prepare City Council reports, resolutions and ordinances and make presentations to governmental and community bodies;
- develop control and reporting procedures and forms;
- assist with the preparation of and monitor federal grants to ensure compliance with established regulations;
- coordinate activities with other City departments and divisions, and with outside agencies including the media;
- compose letters and memos using information provided by management staff;
- testify in court regarding the authenticity of copies of written and audio City records;
- administer programs providing specialized services;
- track and monitor completion of administrative procedures relating to industrial injuries;
- coordinate and track the processing, review and appeal of permits;
- administer section data processing systems;
- determine training needs for individual employees in accordance with statutory requirements and legally mandated training;
- identify external technical training resources related to the department of assignment;
- maintain a master technical training plan for department positions;
- schedule and coordinate departmental new employee orientation;
- schedule department employees for training programs;
- assist professional staff in recruitment and examination activities;
- screen applications for selected recruitments;
- notify applicants as to their status and the timing of the selection process;
- contact potential raters for oral boards and coordinate scheduling of oral boards;
- administer written and performance examinations and monitor oral examinations;

- coordinate and monitor certification, selection, medical examinations and start dates;
- review a variety of documents for accuracy and completeness;
- provide orientation for new employees;
- and may administer examinations on weekends and evenings.

**Senior Administrative Assistant**

Essential Duties:

The following duties are considered essential for the job classification:

- Perform a wide variety of difficult and complex office support duties;
- use a computer with word processing software to produce and edit letters, memoranda, reports, or other materials from rough draft, or notes;
- operate modern office equipment;
- input and retrieve information using a personal computer or computer terminal;
- answer and direct a large number of calls, using business telephone systems;
- understand, interpret and provide specific information regarding department services or policies to the public or other City employees, in person, over the telephone or by mail;
- prepare documents, such as agendas, memoranda, bid specifications, permits, legal notices, Personnel Action Forms, purchasing requisitions, payment requests, evaluations and other materials;
- examine documents, records, and forms for accuracy, completeness, and conformance with applicable rules and regulations;
- proofread, code, check and record information;
- establish and maintain alphabetical, numerical, index, and cross-reference files;
- compose routine correspondence and reports on behalf of managerial and professional staff;
- process and distribute incoming mail;
- create, modify and revise forms, computer applications, and other related material and processes;
- establish and maintain systematic filing of data related to word processing;
- maintain and order supplies and equipment;
- prepare sensitive personnel documents;
- receive and record fees for bid specifications, permits, and other City charges;
- perform arithmetical calculations and prepare statistical reports;
- schedule and coordinate meetings, classes, travel arrangements and interviews;
- gather, tabulate and interpret financial information;
- may operate a two-way radio to maintain communication between office and field staff;
- produce and edit documents from transcribing machine recordings.

# SECTION 3

## *Sampling Plan Objectives*

Sampling objectives for the Storm Water & Creeks storm water sampling program:

- Data generated by will be representative of the sites being sampled. Sampling sites and collection methods will be chosen that maximize representativeness.

- Every effort will be made to ensure that samples collected will be uncontaminated by the sampling environment or equipment. Sampling procedure blanks will be used to control contamination.

- A sufficient number and type of samples will be collected to ensure the completeness of the sampling program. The number and type of analyses will be periodically reviewed to ensure compliance with the NPDES storm water permit.

- Samples will be collected and handled in a consistent, prescribed manner to ensure comparable integrity between samples.

- Analysis results will be reviewed at several levels (lab staff review and Storm Water & Creeks staff review) to ensure results are recorded and reported accurately.

- Field Analysis will be accurate to the limit of the method. Field equipment will be calibrated routinely before use.

- Sample integrity will be ensured through consistent sample collection, handling, recordkeeping, and documentation adequate to support enforcement action.

- Sample containers and equipment will be kept in a secure area. Vehicles in the field containing sample containers, preservatives, calibration standards and equipment will be in a locked and secure area when the sampler is not in visible line of sight of said items.

Table 3:1 – QA Objectives

| **Objective** | **Controls** |
|---|---|
| **Samples will be:** | |
| Representative | Annual review of samples sites and collection methods |
| Uncontaminated Equipment | Environmental Compliance Equipment Maintenance Log / Environmental Compliance<br>Q.A.P. May 2010, Section 9 |
| Comparable | Standard collection method |
| Complete | Periodic review of Chain of Custodies and corresponding lab results |
| Field Analyses will be accurate | Standard procedures, calibration of equipment, confirmation of results |
| Results will be recorded accurately | Review of results by lab, Storm Water & Creeks staff and Associate Civil Engineer before release |
| Data will be legally defensible | Standard operating practices, collection documentation, Chain of Custody |

# SECTION 4

## *Sampling Procedures*

### Collection Techniques

Storm Water & Creeks personnel take two types of samples: flow weighted composites and individual grabs.

**Individual Grab Sample:** Provides a measurement of pollutant concentrations or toxicity (bioassays) in the storm water at a particular point in time. This type of sampling is utilized for a bioassay and outfall (constituents with holds time 6 hours or less) sampling. Grab samples are used almost exclusively for the following parameters: total coliforms, fecal coliforms, *Enterococcus*, *E. coli*, hardness ($CaCO_3$), and bioassays.

**Composite Sample:** Samples are taken using an automated Sampler/Flow Meter combination and measure the quality of the storm water within the storm drain system over a specific period of time. Monitoring data will be composited on time basis. Storm water flow is measured while the sample is taken in 15 minutes intervals while the depth exceeds a predefined level. Each sample will consist of two 1000 ml samples (two bottles). Compositing will be done in the lab using the flow meter data.

EPA policy on appropriate compliance sampling types has articulated that control authorities should use composite methods for their compliance sampling.

**General:** Grabs will be taken with cleaned sample containers, dippers, small beaker cups on ropes, or battery operated pumps. Care is taken to ensure that samples are collected without disturbing the sides or bottom of the sample structure or creek. For all samples, the sample equipment is rinsed with sample water before the sample is collected.

### Selecting Sample Locations

Bioassays

Four sites were selected to measure receiving water conditions upstream of the urban area, downstream of the urban area, and downstream of selected storm drain outfalls. Three locations will be sampled during each event and sampling locations include the following:

Santa Rosa Creek at Piner Creek

Santa Rosa Creek at Highway 12

Downstream of Hearn Avenue outfall to Colgan Creek (once per year)

Downstream of Gabriel Court outfall to Piner Creek (once per year)

See appendix 4A for overall and detailed maps of bioassay sampling sites.

Outfalls

Wet Weather:

- Colgan Creek: Commercial Court manhole # 27289, 54" pipe.
- Santa Rosa Creek: Intersection D St. & 1 St. manhole #17510, 36" pipe.
- Piner Creek: Gabriel Court manhole #8881, 36" pipe.

Dry Weather:

- Colgan Creek: Outfall # 27434
- Santa Rosa Creek: Outfall # 13554
- Paulin Creek: Outfall # 10623

See appendix 4B for detailed map and descriptions of outfall sampling sites.

**Preparation for Sampling**

Prior to a sampling visit, Environmental Specialist/Civil Engineering Technician duties are to:

- Determine exact location to be sampled
- Review the Site Specific Plan for each sample location including the traffic control plan
- Obtain the appropriate equipment, containers and preservatives per type of sample
- Label all bottles
- Notify the laboratory what samples will be brought in for the week
- Log all sampling sites/events into the Storm Water & Creeks Sampling log book
- Make sure sampling vehicle is equipped with necessary equipment (See Appendix 4C: Vehicle Inventory)
- Obtain all necessary forms pertinent to the sampling event (Field Data/Chain of Custody Sheet – Appendix 4D)
- Set up the automated samplers/flow meters to be used (Equipment setup Appendix 4E)
- Calibrate dissolved oxygen and pH meter per operating manual (Yellow Springs Instruments 556 multiprobe) or equivalent.

Sampling equipment must be examined to be sure of cleanliness and proper operation. Staff must be familiar with equipment check out procedures and operation. All paperwork must be filled out as completely as possible. Arrangements should be made in advance with the laboratory performing needed analysis.

**Containers and Preservatives**

Bioassays

Composite 20 L carboys are used for sample collection without the use of any preservative. Immediately after sample collection samples are kept in ice chest. Samples are delivered to the laboratory within 36 hours.

Outfalls

When sampling for conventional pollutants (i.e., BOD, TSS, TKN), automatic samplers are used and samples are cooled immediately after collection in an ice chest or refrigerator until delivery to the lab. Samples are delivered to the laboratory within 40 hours of the first automated sample taken.

**Standard Operating Procedures**

See Appendix 4E for standard operating procedures for bioassay and chemical outfall sampling.

**Sample Frequency**

Bioassay Sampling

Twice per year during periods of storm runoff. Storms events shall be separated by a minimum of seven days of dry weather (< 0.1 inches).

Outfall Sampling

Four times per year during periods of storm runoff and dry weather. Two events shall be during dry weather and two events shall be during wet weather.

# SECTION 5

## *Sample Custody*

**Introduction**

The objective of custody procedures is to create an accurate written record which can be used to trace the possession and handling of each sample from collection through analysis. Sample custody procedures will be followed through sample collection, transfer, analysis, and disposal. The purpose of these procedures is to assure that the integrity of samples are maintained during their collection, transportation, and storage prior to analysis.

A sample is in someone's "custody" if:

- It is in one's actual physical possession.
- It is in one's view, after being in one's physical possession.
- It is in one's possession and then locked in a vehicle, refrigerator, or cabinet.
- It is in a secured area, restricted to authorized personnel only.

**Sample Collection and Identification**

The sampler is personally responsible for the care and custody of the collected samples until custody of the samples is properly transferred. After collection samples are placed in an ice chest. Vehicles are locked whenever staff is away and there are samples stored inside.

Automatic samplers are suspended inside manholes and are not accessible without special tools. When samplers are set above ground they are secured against tampering with locks and chains.

Sample identification documents are carefully prepared so that identification and chain of custody records can be maintained and ample disposition can be controlled.

**Field Data/Chain of Custody Sheet**

The collection of every sample or record of attempted sampling event will be recorded on the Field Sheet form. Forms will be filled out with waterproof ink. A Blank Field Data/Chain of Custody Sheet is included in Appendix 4D.

The Field Data/Chain of Custody form must accompany every sample to the lab, including collection system samples. Samples in a secured area remain in custody of the responsible person until custody is either transferred to laboratory personnel or a

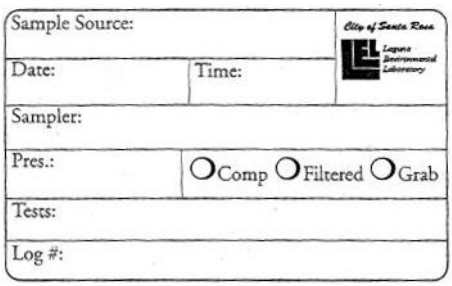
laboratory courier. When transferring custody of samples, the individuals relinquishing and receiving the samples will sign, date, and note the time on the Chain of Custody.

The following information is included on the Storm Water & Creeks Field Data/Chain of Custody:

1. Date
2. SW Sample #
3. SW Permit # (if applicable)
4. Sampler's name
5. Sample Description (Company name, map book #, and/or manhole #)
6. Number and types of bottles
7. Sample method
8. The type(s) of preservative(s) used or added
9. Grab or composite sample
10. Requested analyses
11. Inclusive dates of sample collection are recorded
12. Inclusive times of sample collection are recorded
13. Field pH and temperature of the Grab sample
14. A signature, date and time that the sample was relinquished to the laboratory
15. A signature, date and time that the same was received by the laboratory
16. Unusual sample conditions, containers, etc should be explained under the "Remarks/Comments" section.
17. Equipment(s) number(s)

**Sample Labels**

Sample labels must have the proper sample site ID, date and time of collection, Sampler Person(s) name, sample equipment IDs, bottle configuration (single 1 of X, pairs 1 of A, single), sample method and sample preservation printed on them. An example of the sample collection and custody label is below.




Label will include Equipment ID numbers, Bottle ID number, bottle/sample configuration (single, pair, set numbers).

## Laboratory Receipt and Custody Procedures

It is the responsibility of the Laboratory personnel to review the Field Data/Chain of Custody and bottles prior to signing it indicating that the samples were received. The laboratory retains all copies until the samples are properly logged in. After logging in samples the white copy (original) is kept with the laboratory. The yellow copy is retained by Storm Water & Creeks staff for filing.

If samples are going to be subbed out to a contract laboratory, it is the responsibility of primary laboratory to relinquish the appropriate samples to the subcontract lab. All samples sent to a contract lab are under the primary laboratory protocol for sample handling.

# SECTION 6

*Analytical Procedures*

## Field Tests

Storm Water & Creeks staff will perform the field tests for temperature, conductivity, dissolved oxygen, pH, and turbidity.

See Appendix 6A for Equipment List

## Laboratory Procedures

Bioassays

The City has hired Pacific EcoRisk, Inc. of Fairfield, CA to analyze bioassay samples. Three species chronic static testing is performed in 100% sample water. Tests performed include the following:

Fathead minnow survival & growth test – EPA Method 1000.0
Ceriodaphnia dubia survival and reproduction test – EPA Method 1002.0
Selenastrum algal growth test – EPA Method 1003.0

Outfalls

The City has hired Alpha Analytical Laboratories, Inc. of Ukiah, CA. to analyze samples. See Appendix 6B for Alpha Laboratory's ELAP list of accredited analyses and reporting limits.

The City may also use the Laguna Treatment Lab to analyze samples.

# SECTION 7

*Equipment Maintenance*

## Preventative Maintenance

Automated samplers and other sampling equipment are maintained in working order to ensure availability for sampling. Spare parts (hoses, clamps, bases, bottles, etc) are kept in the EC storage room and lab. Samplers are cleaned and inspected after each sampling event which includes the replacement of all sample tubing. Samplers are sent to the vendor for calibration, electronic checks and basic maintenance as recommended by manufacture specifications. A maintenance log is kept after each sampler is returned from the vendor.

## Decontamination

### Bioassays

Composite carboys and dippers or other equipment are washed with Alconox, Inc., an anionic detergent. Carboys and other equipment are then rinsed multiple times with tap water and then rinsed with sample water prior to sample collection.

### Outfalls

Bottles: Composite Polyethylene are washed in the LEL dishwasher. The dishwashing cycle utilizes a lab grade cleaner and acetic acid rinse. The final rinse is done with DI water. All other collection bottles are supplied pre-cleaned and pre-preserved from LEL or the contract lab.

Automated samplers: Are maintained by the Environmental Compliance Section Quality Assurance Plan (May, 2010). Samplers are washed before and after each sampling event. All tubing is removed and replaced. The sampler body is washed with soap, followed by a tap water rinse, followed by a DI rinse.

Miscellaneous field equipment: Dippers and other equipment are washed in the LEL.

# SECTION 8

*Data Reduction and Validation*

## Laboratory

Data from all analyses are recorded either in bound notebooks or in electronic notebooks by the analyst performing the test. QC data for each analysis is evaluated by the analyst for precision and accuracy according to method and internal control limits. After QC data is determined to be "in control", results are calculated.

All data is subjected to 100% Peer Review and 10-100% QA review before being released for reporting. Lab Reports include analytical method, target analyte, sample result, reporting Limit and analysis data. QC results are available upon request.

## Storm Water & Creeks

All laboratory results are reviewed for completeness by the Associate Civil Engineer (Storm Water) and the assigned Environmental Specialist or Civil Engineering Technician. Results are compared to the North Coast Regional Water Quality Control Board's Basin Plan to determine whether any water quality objectives are not attained.

Results are entered into an electronic spreadsheet by staff. Original laboratory results are filed according to sampling type and fiscal year. Results are reviewed to insure that data is reproduced accurately. Laboratory results are retained for at least 5 years.

# SECTION 9

## *Quality Assurance*

Quality control procedures were established to ensure that the sampling process, equipment maintenance, sample integrity, and personal safety are maintained. Sampling procedures to be reviewed and audited once a year before sampling is done. Safety protocols (the use of gloves, safety glasses, safe lifting practices, etc.) to be review and updated by the Safety Coordinator.

All field staff must be familiar with standard operating procedures for water quality sampling and/or trained to collect representative environmental samples. This practice will insure the sampling event is completed efficiently and cross-training on all aspects of sampling will have been completed. Staff must demonstrate a competency for sample collection using appropriate sampling equipment and techniques.

To maintain a high level of confidence in the collection and test results of the sampled storm water, two areas will have on going reviews for OA; Equipment maintenance and sample collection techniques;

- Review of the Equipment Log to determined calibration cycle, cleaning date and service date of all instrumentation before used.
- Review operational understanding of the equipment used.
- Staff peer review on sample collection techniques includes personal safety protocols in the field, proper chemical safety protection, sample contamination, field measurement, and data record keeping.

Additionally, the following measures will be performed to ensure quality assurance:

### Bioassays

- Clean bottles and equipment before use
- Wear gloves for sampling
- Follow chain of custody procedures

### Chemical Outfall Monitoring

- Clean samplers before use.
- Clean bottles before use.
- Sample preservative added by the lab
- Use new intake tubing
- Wear safety protection gear (reflective vest, work shoes, hard hat, face/eye protection).
- Keep lids (preservative and non- preservative) separate.

- Sampler safe lifting techniques to avoid spillage
- Establish safe and clean work area
- Wear gloves while placing lids on sample bottles.

## Grab Samples

- Clean equipment before use
- Verify Calibration of equipment
- Check equipment batteries
- Wear safety protection gear (reflective vest, work shoes, hard hat, face/eye protection, etc.)
- Wear gloves
- Establish safe and clean work area

Additional Quality will be accessed by Storm Water & Creeks staff;

- Review test results
- Perform periodic audits

In addition, quality will be assessed on an ongoing basis during all routine sampling. When opportunities for improving the quality of the sampling program are identified, they will be incorporated into the Sampling plan.

## Performance Audits

Annually, an audit of QA procedures will be performed by the Associate Storm Water Engineer. Based on the results of the audit the Associate Storm Water Engineer will report on the effectiveness of the program and make recommendations for corrective action as required.

The audits will examine whether:

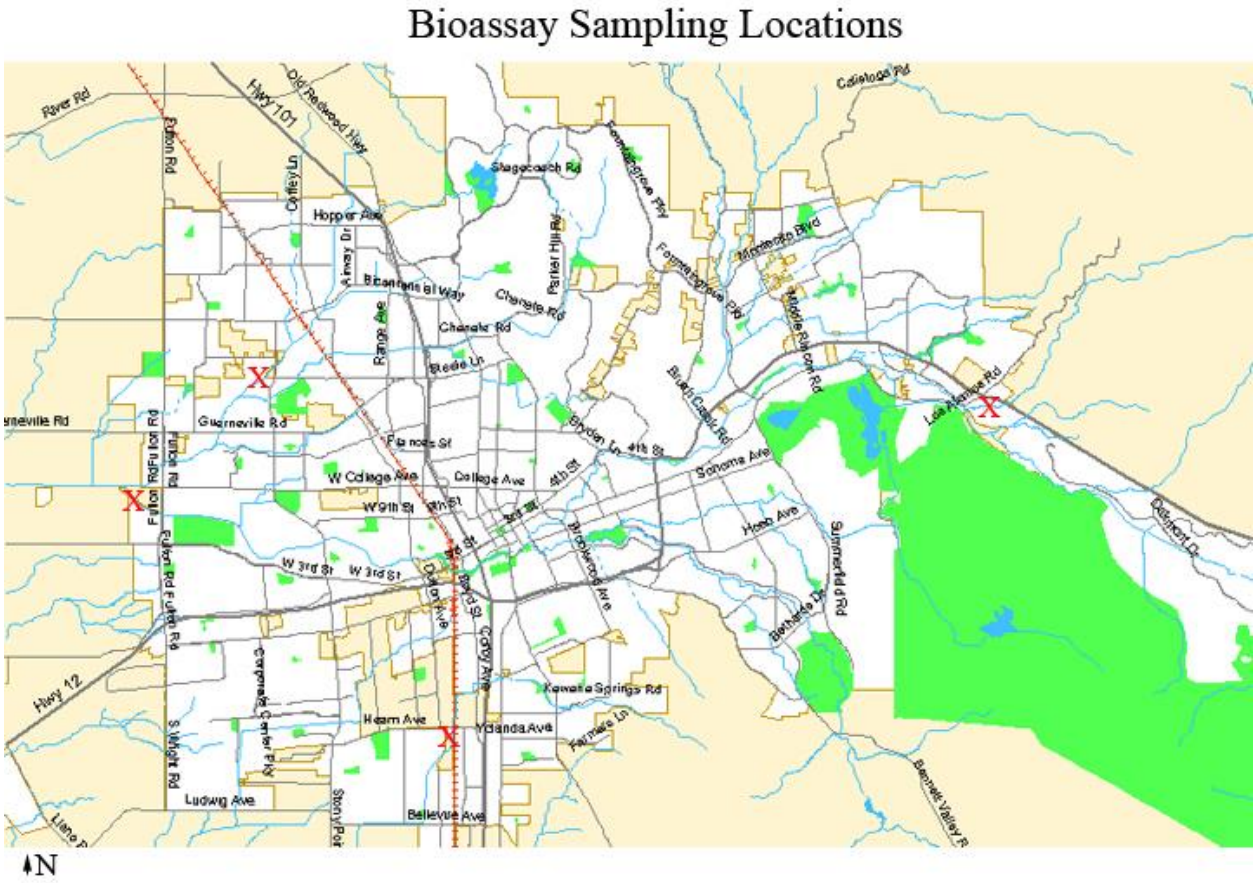
- QA procedures are being followed consistently
- Procedures are consistent with objectives and program goals
- Documentation procedures are adequate
- Assessment procedures are effective
- Change to goals, objectives, and procedures have been approved by the Quality Control Coordinator and are being incorporated into the written QA Plan

Audits will be documented using a checklist (See Appendix 9A)

# Appendices

# Appendix 4A

## *Bioassay Sampling Site Maps*



Santa Rosa Creek at Piner Creek

N

Santa Rosa Creek at State Highway 12

N

# Hearn Avenue Outfall to Colgan Creek

Gabriel Court Outfall to Piner Creek

N

# Appendix 4B

## *Chemical Sampling Site Maps*

**Piner Creek**

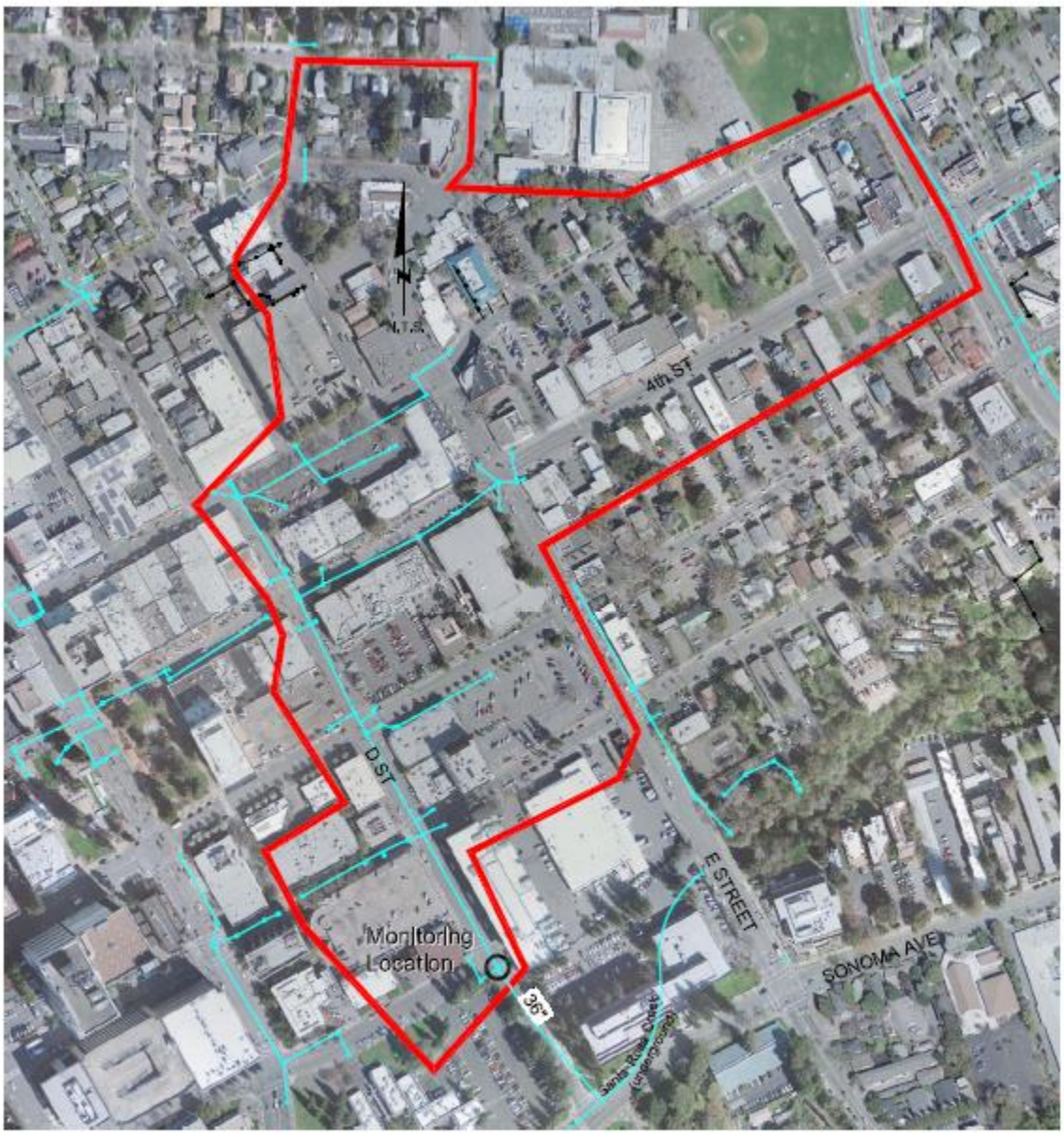
Location: Gabriel Court
Watershed: Piner Creek
Manhole ID#: 8881
Pipe Size: 36 inches

This outfall drains approximately 22 acres of a residential land in northwest Santa Rosa. The line was built in 1985 and the sampling site is located in the planter strip off the street. During Term II outfall monitoring occurred at a different location along Piner Creek. The location was moved to limit backwater impacts from the creek and still collect data from a typical residential area in northwest Santa Rosa.

**Santa Rosa Creek**

Location: Intersection of D Street and 1 Street.
Watershed: Santa Rosa Creek
Manhole ID#: 17510
Pipe Size: 36 inches

This outfall drains approximately 42 acres of commercial area in downtown Santa Rosa. The line was built in 1992 and drains into Santa Rosa Creek with in the downtown culvert beneath Sonoma Avenue. This D Street location was selected to acquire data from the urban downtown area and to have a Santa Rosa Creek location as it is listed as an impaired water body for pathogens.




D ST MONITORING SITE — APPROXIMATE DRAINAGE AREA - 42 ACRES

Colgan Creek

Location: Commercial Court
Watershed: Colgan Creek
Manhole ID#: 27289
Pipe Size: 54 inches

This outfall drains an area of approximately 40 acres containing commercial and industrial land uses along Santa Rosa Avenue. The line was built in 1983 and is the same one monitored during the Term II permit. The location was moved upstream on Commercial Court to minimize backwater impacts from the creek and limit the drainage area to exclude county areas.

# Appendix 4C

## *Vehicle Inventory List*

### Bioassay Sampling

Item

Rags
Towels
Sampling Containers
Sampling bucket w/rope
Powder Free Latex Gloves
Cooler
Ice
Hard Hats
First Aid Kit
Manhole Lid Lifter
Catch Basin Lid Lifter
Sledge Hammer
Fire Extinguisher

### Chemical Sampling

**Item**

Rags
Gloves
Paper Towels
Sampling Containers
Sampling bucket w/rope
Powder Free Latex Gloves
Cooler
Ice
YSI 556 Multimeter Probe
Hach 2100P Turbidimeter
Hard Hats
First Aid Kit
Manhole Lid Lifter
Catch Basin Lid Lifter
Sledge Hammer
Fire Extinguisher

* Inventory is checked prior to sampling. Items are replaced immediately after being removed.

**Grab Kit:**

**Sampler Kit:**

# Appendix 4D

## *Field Data/Chain of Custody Sheet*

CITY OF SANTA ROSA

**CITY OF SANTA ROSA**
**UTILITIES DEPARTMENT**
**STORM WATER SECTION**

69 Stony Circle
Santa Rosa Ca. 95401
(707) 543-3200

S.W. Sample # _____ Lab Log # _____

**SAMPLE IDENTIFICATION**

Sample Source: _____

Reason For Sampling: _____

Monitoring Requested By: _____ Sample To Be Saved After Analysis? _____

Laboratory: _____ Notes To Analysis: _____

**SAMPLE COLLECTION INFORMATION**

Sample Taken From:
- ☐ Catch Basin
- ☐ Manhole
- ☐ Outfall
- ☐ Other _____

Sample Method:
- ☐ Grab
- ☐ Composite-Timed With _____ minute intervals.
- ☐ Composite-Flow With _____ liter/intervals.

Sample Grab or Composite Times:
At/Or From _____ Hr. Min. ☐A.M. ☐P.M. _____ Date
To _____ Hr. Min. ☐A.M. ☐P.M. _____ Date

Type of sample: ☐Soil ☐Storm Runoff ☐ Non Storm Runoff

Sample Preservation Used: _____

**FIELD TEST RESULTS / VISUAL OBSERVATION**

pH: _____ Temperature: _____ Color: _____

Conductivity: _____ umhos/cm Dissolved Oxygen: _____ mg/l Turbidity: _____ NTU

Weather: _____ Odor: _____

**LABORATORY TESTS**

| | CONSTITUENT | METHOD |
|---|---|---|
| | B.O.D. (5 day) | |
| | Methyl Blue Active Substances | |
| | Fecal Coliform (6X dilution) | |
| | Total Coliform (6X dilution) | |
| | Bioassay (96 hour) Trout | Static |
| | Bioassay (48 hour) Daphnia | Static |
| | Cadmium – total & dissolved | |
| | Chromium – total & dissolved | |
| | Copper – total & dissolved | |
| | Lead – total & dissolved | |
| | Mercury – total & dissolved | |
| | Nickel – total & dissolved | |
| | Silver – total & dissolved | |
| | Zinc – total & dissolved | |
| | Bioassay 3 species chronic (fathead minnow, water flea, algae) | 100% sample |

| | CONSTITUENT | METHOD |
|---|---|---|
| | Total Organic Carbon | |
| | Phosphorus (ortho) | |
| | Phosphorus (total) | |
| | Oil & Grease (IR, TRPH) | |
| | TPH – Gas | |
| | TPH – Diesel & Motor Oil | |
| | | |
| | Hardness (CaCO3) | |
| | Conductivity | |
| | Total Suspended Solids | |
| | Nitrite/Nitrate as Nitrogen | |
| | Ammonia as Nitrogen | |
| | Total Kjeldahl Nitrogen | |
| | | |
| | | |
| | | |

Additional Comments:

**CHAIN OF CUSTODY INFORMATION:**

Sampler's Name: (print) _____ Sampler's Signature: _____

Relinquished By: _____ Time: _____
Print
_____ Date: _____
Signature

Relinquished By: _____ Time: _____
Print
_____ Date: _____
Signature

Recieved By: _____ Time: _____
Print
_____ Date: _____
Signature

Recieved By: _____ Time: _____
Print
_____ Date: _____
Signature

D:\NPDES\MP-4 c_of_c.DWG, Layout1

**CHAIN OF CUSTODY – FORM MP-4** white – lab yellow – sampler

## Bioassay Sampling Procedures
## City of Santa Rosa - Storm Water & Creeks

### 1.0 Scope and Application

Bioassay sampling is performed to characterize receiving water conditions upstream of the urban area (City of Santa Rosa), downstream of the urban area, and downstream of storm drain outfalls on Colgan and Piner Creeks. Chronic static testing is performed with 100% sample water collected during two rain events each year. Rain events shall be separated by a minimum of 7 days of dry (<0.1 inches) weather. Five gallon samples will be collected during normal working hours (7:30 am – 4 pm).

This procedure describes the protocol for collecting bioassay samples and analyzing 100% sample water for the following:

Fathead minnow survival & growth test – EPA Method 1000.0
Ceriodaphnia dubia survival and reproduction test – EPA Method 1002.0
Selenastrum algal growth test – EPA Method 1003.0

### 2.0 Summary of Method

Grab samples are collected manually within receiving waters. Once the samples are collected, the bottles are secured and place on ice in a cooler and transferred to an analytical laboratory for analysis within 36 hours.

### 3.0 Safety

- Wear appropriate personal protective equipment such as safety glasses, and gloves.
- Wear vests, set up cones and use proper traffic control anytime working in the street.
- Follow all City of Santa Rosa as well as the Business safety rules and guidelines.
- Read the MSDS and become familiar with all the chemicals used in this procedure.

### 4.0 Equipment and Supplies

- 5 gal/20L composite carboys
- Intermediate sampling bucket (if needed)
- Sonoma County Water Agency (SCWA) #4 gate key

### 5.0 Equipment Preparation

Composite carboys and dippers or other equipment are washed with Alconox, Inc., an anionic detergent. Carboys and other equipment are then rinsed multiple times with tap water and then rinsed with sample water prior to sample collection. Sample ID numbers are logged into the Storm Water Sampling Logbook for each sample. Field data/chain of custody forms and container labels are filled out as much as possible for each site prior to sampling.

**Sampling Locations**

Three locations will be sampled during each event and sampling locations include the following (see attached maps):

Santa Rosa Creek at Piner Creek (C1)

Santa Rosa Creek at Highway 12 (C2)

Downstream of Hearn Avenue outfall to Colgan Creek (CC1 -once per year)

Downstream of Gabriel Court outfall to Piner Creek (PC1 - once per year)

### 5.1 Site Location Details

Santa Rosa Creek at Piner Creek

1. Access via Santa Rosa Creek maintenance road on the north side of the creek at Fulton Road.
2. Use SCWA #4 gate key and travel west approximately 2,300 feet to the confluence with Piner Creek.
3. Park near bridge and SCWA sampling station.
4. Follow trail down to creek near the sampling station just upstream of Piner Creek confluence.
5. Be sure to lock SCWA lock when leaving the access road.

Santa Rosa Creek at Highway 12

1. Site is accessed from the Villa Los Alamos condominium complex off Los Alamos Road just west of State Highway 12.
2. Immediately after entering the complex turn left and drive to the end of the parking area (~1,200 feet).
3. Walk to the creek (~300 feet) using the fire access road between the fence and complex.
4. Collect sample in first pool downstream for State Highway 12.

Downstream of Hearn Avenue outfall to Colgan Creek

1. Access the site from David Lee Court off of Victoria Drive south of Hearn Avenue.
2. Walk north on SCWA maintenance road to 50 feet below 54" outfall on east side of the channel adjacent to Mead Clark.

Downstream of Gabriel Court outfall to Piner Creek

1. Access SCWA maintenance road on the north side of Piner Creek at Valdes Drive.
2. Use SCWA #4 key and travel ~1,000 feet to 50 feet below 36" outfall from Gabriel Court.
3. Be sure to lock SCWA lock when leaving the access road.

## 6.0 Collection of the samples

7.1 Samples must be collected during normal working hours (7:30 am – 4 pm), with events separated by 7 days of dry (<0.1 inches) weather at the City's Municipal Service Center South Rain

gauge (http://ci.santa-rosa.ca.us/departments/utilities/stormwatercreeks/weather/Pages/default.aspx 69 Stony Circle, Santa Rosa, CA 95401).

7.2 Staff must call Pacific EcoRisk, Inc. (or another certified lab) to ensure test specimens are ordered prior to 12 pm on the day of sampling.

7.3 Powder free latex gloves are used at each location and sample carboys are rinsed with creek water prior to filling.

7.4 Samplers collect the sample in the deepest area of the creek that can safely be accessed. While facing upstream samplers remove the lid and submerge the carboy several inches beneath the water surface and fill them without disrupting the creek bottom (if feasible). Alternatively, a cleaned immediate sampling bucket may be used if the water level is insufficient for the 20 L carboy.

7.5 Samples are labeled and placed on ice in coolers or bags in preparation for transport to the laboratory.

7.6 Field data/chain of custody sheets are completed for each sample.

# Chemical Outfall Monitoring Procedures

**City of Santa Rosa - Storm Water & Creeks**

## 1.0 Scope and Application

Sampling results provide feedback to help to determine the effectiveness of the City's Storm Water Program, specifically the outreach and public education components. The MS4 storm water Permit No. R1-2009-0050 requires flow weighted composite sampling from a total of six outfalls. Per the CoPermittees MOU, the City of Santa Rosa is responsible for 3 outfalls. Sampling will be conducted in the storm drain manhole immediately upstream of the outfall to allow the use of automated samplers.

This procedure describes the protocol for collecting Storm Water Flow Weighted Composite for analyses for the following chemical constituents:

| | | |
|---|---|---|
| TSS | BOD | TKN |
| Nitrate as N | Nitrite as N | Ammonia |
| Total Phosphorus | Orthophosphate | Total Hardness |

## 2.0 Summary of Method

Samples are collected automatically using a Sigma sampler and flow meter with an ultrasonic probe to detect liquid level. The flow meter read flow depth and at a predetermined water level will trigger the sampler to begin to collect samples at a preprogrammed sample rate and amount. The flow meter will record the associated flow rate in the pipe at the time each sample is collected to allow for compositing by the lab. The sampler will consist of 24 - 1 liter plastic bottles arranged in 12 pairs; 1 bottle of the pair containing sulfuric acid for preservation as required. Each sample collected will consist of a filled pair of bottles. Once the 12 pairs have been filled, the bottles are collected from the site, packed on ice, and transferred to an analytical lab along with the flow meter data for flow weight compositing and analysis.

## 3.0 Definitions/Abbreviations

- **H2SO4 -** sulfuric acid.
- **MSDS -** Material Safety Data Sheet.
- **Sigma Sampler -** An automatic programmable liquid collection apparatus (models #800, #900, and #900 Max).
- **TKN –** Total Kjeldahl Nitrogen (the sum of organic nitrogen and ammonia nitrogen).
- **TSS -** Total Suspended Solids
- **BOD -** Biochemical Oxygen Demand
- **Flow Meter –** Instrumentation to measure and record liquid flow information when used in conjunction with a sensor probe, to control external devices such as Samplers.

## 4.0 Safety

- Wear appropriate personal protective equipment such as safety glasses, and gloves.
- Wear vests, set up cones and use proper traffic control anytime working in the street.
- Follow all City of Santa Rosa as well as the business safety rules and guidelines.
- Read the MSDS and become familiar with all the chemicals used in this procedure.

## 5.0 Equipment and Supplies

- Sigma 950 Ultrasonic Flow Meter
- Sigma 900 Max Sampler
- 50kHz or 75kHz Ultrasonic Probe

- Cables and batteries
- 12 – 1 liter poly bottle with sampling label
- 12 – 1 liter poly bottle with preservative (H2SO4) and with sampling label
- Intake Tubing

## 6.0 Reagents and Standards

- Concentrated H2SO4 (supplied by lab in the 1000 ml sample bottle)

## 7.0 Site Preparation

Each sampling site shall have mounting brackets installed in the manhole to hang the equipment. The installation shall be completed to insure that a) mounting the equipment does not require entering into the manhole, b) sampler intake tubing placement shall not interfere with the ultrasonic probe, and c) the ultrasonic probe is firmly secured at the correct height and placement relative to the flow.

## 8.0 Equipment Setup

### 8.1 Equipment Pairing

**8.1.1** The Flow Meters model versions do not work with all the different Ultrasonic probes. Be sure to match the compatible Ultrasonic probe frequency to the correct Flow Meter as indicated on the Flow Meter.

### 8.2 Sampler Setup/Calibration

Prior to use, the sampler shall be clean per lab standard, all external tubing shall be discarded and new tubing installed.

**8.2.1** Attach the following intake tubing length to the designate site Sampler:

**8.2.1.1** Gabriel Ct: 12 ft
**8.2.1.2** 1st & D Street: 11 ft
**8.2.1.3** Commercial Ct.: 11 ft

**8.2.2 Volume Calibration**

**8.2.2.1** Calibrate the sample volume per the procedure "Volume Calibration" outline in the Sigma 900 MAX Portable Sampler instrument manual.

**8.2.3 Sample Bottles**

**8.2.3.1** Bottles (24) shall be sent to the lab for cleaning.
**8.2.3.2** 12 bottles will have preservative (H2SO4) added.
**8.2.3.3** Bottles shall be labeled as match pairs (12 matched pairs).
**8.2.3.4** Each pair shall consist of one unpreserved and one preserved bottle.
**8.2.3.5** Bottles shall be 1 liter in size.

**8.2.4 Loading the Bottles in the sampler**

***Caution!***
***Sulfuric Acid Present***
***Operator must be wearing gloves and eye protection!***

**8.2.4.1** Install bottles into sampler per section 2.5 "Setting Up the Bottles" of the Sigma 900 MAX Portable Sampler instrument manual.

**8.2.4.2** Bottle lids shall not be removed until the sampler is on site.

*Note: Verify that the order and pair number of the bottles are placed in the correct order before sealing the sampler.*

### 8.3 Sampler Battery Cleaning / Installation

**8.3.1** Before installing a freshly charge battery, gently wipe down the battery's surface and cord with a disinfectant wipe.
**8.3.2** Wipe down again with a clean cloth dampened with tab water.
**8.3.3** Rise again a clean damp cloth dampen with deionized water.
**8.3.4** Repeat two more times with a new clean cloth dampen with deionized water.
**8.3.5** Dry with a clean cloth.
**8.3.6** Install battery.

***Caution!***
***Do not use green scrub pad on the battery!***
***Do not pour water onto battery!***
***Do not allow liquid to enter into battery's power connector!***

**8.4 Sampler Programming-** Enter the following information:
(Refer to the Sigma 900 MAX Portable Sampler Instrument Manual)

**8.4.1** Bottles: 24
**8.4.2** Bottle Volume: 1000 ml
**8.4.3** Sample Collection; Timed Proportional; Sampling Interval – 15 minutes.
**8.4.4** Sample Distribution; Deliver Each Sample to All Bottles – No. Bottles Per Sample - 2
**8.4.5** Sample Volume - 800 mL
**8.4.6** Set point Sampling - Enable; Start on Set point - External Controller - On; Delay – 0 sec.
**8.4.7** Start / Stop Times; Monday 00:05 ➔ Thursday; 05:00
**8.4.8** Liquid Sensor - On;
**8.4.9** Intake Rises - 0
**8.4.10** Sample Retries - 0
**8.4.11** Intake tubing; Enter Intake "Tube Length" (See 8.2.1); Enter Intake "Tube Type" as Teflon.

**8.5 Flow Meter programming-** Enter the following information:

**8.5.1** Attach the Ultrasonic probe to the 950 Flow Meter.
**8.5.2** Attach the battery to the 950 Flow Meter.
**8.5.3** Flow Units – CFS
**8.5.4** Level Units – Inches
**8.5.5** Primary Device – Manning Equation; Enter in the pipe information.
**8.5.5.1** Circular Pipe
**8.5.5.2** Pipe Diameter **36** or **54** inches
**8.5.5.3** Slope: **0.02** (2%)
**8.5.5.4** Manning roughness coefficient: **0.014**
**8.5.6** Data Log; Level/Flow; Logged; 5 minutes.
**8.5.7** Option>Advance Options>Calibration>Ultrasonic Sensor- Calibrate
**8.5.8** Enter ambient Air Temperature
**8.5.9** Sensor Height; Enter sensor height:
**8.5.9.1** Gabriel Ct and 1st & D Street: 47 inches

**8.5.9.2** Commercial Ct: 54 inches

**8.5.10** Set the Invisible Range.

**8.5.10.1** 75kHz Ultrasonic Probe: 11 inches

**8.5.10.2** 50 kHz Ultrasonic Probe: 15 inches

**8.5.11** Options>Advance Options>Set point Sampling;

**8.5.11.1** Select Condition: Level

**8.5.11.2** Select High Condition

**8.5.11.3** Select Enable

**8.5.11.4** Select High Trip Point; Enter 3 inches for 36-inch pipe or 6 inches for 54-inch pipe.

**8.5.11.5** Select Deadband; Enter 0.5 inches

**8.5.11.6** Select Time Interval; enter 15 minutes

## 8.6 At the Manhole

**8.6.1** Gloves must be worn when handling bottles.

***Caution!***
***Sulfuric Acid Present***
***Operator must be wearing gloves and eye protection!***

**8.6.2** Removed lids shall be stored separately. Separate the lids from the preserved bottles into a separate zip lock bag and clearly label that Sulfuric Acid is present.

## 8.7 Install the Ultrasonic probe

**8.7.1** Gently lower the Ultrasonic Probe into the cup bracket. Be sure that the probe is sitting flush and not at an angle.

## 8.8 Connecting the equipment together

**8.8.1** Connect the 900 Sampler to the 950 Flow Meter using the 940 cable.

## 8.9 Install the tubing

**8.9.1** Thread the tubing through the retainer ring on the side wall downstream of the Ultrasonic Probe. Lower the strainer and weight on the intake into the flow insuring that it is centered in the flow line in the pipe and that the tubing is secure and will not be in the acoustic cone of the ultrasonic probe.

## 8.10 Installation of the equipment in the manhole

**8.10.1** Turn on the Flow Meter.

**8.10.2** Turn on the Sampler.

**8.10.3** Measure liquid depth with rod and verify against Flow Meter reading from already installed ultrasonic probe connected to the Flow Meter. If the channel is dry or if there is pooled water, press the Level Adjust function key on the front panel and enter in 0 inches.

**8.10.4** Press the “RUN” key on the Flow Meter.

**8.10.5** Press the “RUN” key on the Sampler and secure the top to the Sampler.

**8.10.6** Lower the Sampler into the manhole.

**8.10.7** Verify that the intake tubing is secured.

**8.10.8** Install the Flow Meter.
**8.10.9** Install the manhole cover.

## 9.0 Collection of the samples

**9.1.1** Storm events will be monitored to determine if the amount of rain fall will trigger the sampler.
**9.1.2** During a suspect storm event storm water staff will inspect sites to ensure sample collection.
**9.1.3** Retrieve data from flow meter. Download onto laptop.
**9.1.4** Verify the competition of the sampler cycle.

***Caution!***
***A full Sampler is heavy!***
***To avoid sample spillage keep Sampler level at all times!***
***Do Not lift by hand the Sampler from the Manhole!***
***Mechanical lifting shall be used when removing Sampler from the manhole.***

**9.1.5** Retrieve Sampler from manhole. Sampler shall be kept level during removal to prevent spilling and cross contamination between samples.
**9.1.6** Wear protective safety equipment (gloves, safety glasses) before opening the sampler.
**9.1.7** Establish a safe and clean area (free from falling objects, wind bound dust, rain, etc.) to work in.
**9.1.8** Remove the top controller section of the sampler to gain access to the sample bottles.
**9.1.9** Replace the lids starting with the preservative bottles first insuring that the correct lid is placed on the correct bottle.

***Caution!***
***Sulfuric Acid Present***
***Operator must be wearing gloves and eye protection***

**9.1.10** Verify that all the sample bottle's lids are tight. Add ice to cover the bottles. Transport to office.
**9.1.11** Before removing the bottles from the sampler, verify that the bottles are clearly marked as a pair set and that the number on the bottles correspond to the sampler's number placement in the sampler.
**9.1.12** Remove the bottles in pairs and place in cooler with ice. Verify the bottles labeling.
**9.1.13** Arrange transport to a certified lab as soon as possible for compositing and testing. Include print out of flow data in tabular form.
**9.1.14** E-mail in flow date to the lab in comma separated value (CSV) format.
**9.1.15** Ensure proper use of "Chain Of Custody" forms, procedures, and labels.

### 9.2 Grab Samples

Fecal Coliform E. Coli
Enterococcus

**9.2.1** Label all bottles before leaving the office. Take extra bottles and blank labels as backup.

**9.2.2** Wear gloves while handling sampling equipment and collecting the samples.
**9.2.3** Remove any samplers or flow meter if necessary to access flow.
**9.2.4** Lower the container into the center of the flow without touching the sides or bottom of the storm drain pipe, and collect a water sample.
**9.2.5** Fill bacteria samples to the 100 mL mark on the bottle.
**9.2.6** Close by touching only the top middle of the lid. Do not touch the rim or underside /inside of the sample bottle.
**9.2.7** Complete and verify information on bottle labels.
**9.2.8** Place samples in a cooler with ice.
**9.2.9** Arrange transport to a certified lab as soon as possible for testing.

**9.3 Field Testing**

**9.3.1** Collect a sample using a clean pre-rinse 5-gallon bucket.
**9.3.2** Sample volume amount should be approximately 2 -3 gallons.
**9.3.3** Using the Yellow Springs Instruments (YSI) 556 multi-probe meter (or equivalent) measure and record the following;
**9.3.3.1** Temperature
**9.3.3.2** Dissolved Oxygen (DO)
**9.3.3.3** pH
**9.3.4** Note the color and smell
**9.3.5** Complete all required information on the associated forms.

# Appendix 6A

## *Equipment List*

Sigma 900 Series Sampler

Sigma 950 Series Flow Meter

50 kHz Ultrasonic Probe

75 kHz Ultrasonic Probe

Yellow Springs Instruments (YSI) 556 multi-probe is used for temperature, dissolved oxygen, and pH. The pH probe is calibrated using 4, 7, and 10 standards. Calibration methods follow the YSI 556 operating manual and are conducted prior to sampling (http://www.ysi.com/media/pdfs/655279-YSI-556-Operations-Manual-RevC.pdf).

Turbidity is measured using a Hach 2100P Turbidimeter and calibrated using StablCal Stabilized Formazin standards as specified in the operating manual every 3 months (http://www.hach.com/fmmimghach?/CODE%3A4650088-2008-0416048%7C1)

Software
Laptop

# Appendix 6B

## *Chemical Sampling Constituents*

Alpha Analytical Laboratories, Inc.*
Main Laboratory (ELAP#1551)
208 Mason St.
Ukiah, CA. 95482
707-468-0401

*(or equivalent certified lab)

| ANALYSES | METHOD | Hold | MATRIX | Volume Needed | PQL | Volume Needs |
|---|---|---|---|---|---|---|
| TSS | SM2540D | 7dys | SW | Poly (unpreserved) | **1mg/l** | **500ml** |
| BOD | SM5210B | 2dys | SW | Poly (unpreserved) | **5** | **1000ml** |
| TKN | SM4500 | 28dys | SW | Poly (H2SO4) | **1** | **500ml** |
| Nitrate as N | EPA300.0 | 2dys | SW | Poly (unpreserved) | **0.2** | **50ml** |
| Nitrite as N | EPA300.0 | 2dys | SW | Poly (unpreserved) | **0.2** | **50ml** |
| Ammonia | SM4500 | 28dys | SW | Poly (H2SO4) | **1** | **500ml** |
| Total Phosphorus | SM4500 | 28dys | SW | Poly (H2SO4) | **0.1** | **100ml** |
| Orthophosphate | EPA300.0 | 2dys | SW | Poly (unpreserved) | **0.3** | **50ml** |
| Total Hardness | SM2340B | 180dys | SW | Poly (unpreserved) | **5** | **250ml** |

# Appendix 9A

## *Quality Assurance Audit*

STORM WATER SAMPLING PROGRAM

QA AUDIT

Audit performed by: _____ Date: _____

| | GOALS / OBJECTIVES | YES | NO |
|---|---|---|---|
| 1. | Changes to goals incorporated into written plan? | | |
| 2. | QA objectives consistent with program goals? | | |
| 3. | Changes to objectives incorporated into written plan? | | |
| 4. | Procedures adequate to achieve objectives? | | |
| 5. | Employees familiar with goals, objectives? | | |

| | RESOURCES | YES | NO |
|---|---|---|---|
| 1. | Work load commensurate with staffing? | | |
| 2. | Training/experience of staff adequate? | | |
| 3. | Adequate facilities? | | |
| 4. | Adequate equipment? | | |
| 5. | All equipment operating, calibrated? | | |
| 6. | Equipment manuals available? | | |
| 7. | Test kits complete? | | |

| | PROCEDURES (SAMPLE COLLECTION) | YES | NO |
|---|---|---|---|
| 1. | Samples collected in proper, clean containers? | | |
| 2. | Samples preserved properly? | | |
| 3. | Samples labeled in the field? | | |
| 4. | Staff knowledgeable of equipment operation? | | |
| 5. | Unusual auto sampler settings documented? | | |
| 6. | Samples collected safely? | | |
| 7. | Sample locations appropriate to achieve program goals? | | |
| 8. | Sample structure accessible? | | |
| 9. | Sample points provide representative samples? | | |
| 10. | Schedule sampling frequency adequate to achieve program goals? | | |
| 11. | Samples being collected according to schedule? | | |
| 12. | IU profiles specify sample point? | | |
| 13. | IU profile available for each IU? | | |
| 14. | Custody maintained during sampling, transport? | | |
| 15. | Test kits used properly? | | |

STORM WATER SAMPLING PROGRAM

QA AUDIT (Cont'd)

| DOCUMENTATION | YES | NO |
|---|---|---|
| 1. Labels filled out properly? | | |
| 2. Chain of Custody forms filled out for each sample? | | |
| 3. Chain of Custody forms filled out properly? | | |
| 4. Completed Chain of Custody forms filed? | | |
| 5. Analysis sheets reviewed for completeness? | | |
| 6. Typed copies proofread before release? | | |
| 7. Results copied accurately to typed copies? | | |
| 8. Documentation adequate to achieve QA objectives? | | |

| QUALITY ASSURANCE | YES | NO |
|---|---|---|
| 1. Employees aware of QA responsibility? | | |
| 2. Corrective action taken as required? | | |
| 3. Records kept of corrective action? | | |
| 4. QC records (sample results, sample log, etc.) maintained? | | |
| 5. Audit performed annually? | | |
| 6. Audit checklist filled out? | | |
| 7. Corrective action taken as required? | | |
| 8. Records kept of corrective action? | | |
| 9. QA Manual available to staff? | | |

| **AUDIT SUMMARY:** |
|---|
| |
| |
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|---|
| Auditor: |
| Date: |
| Reviewed by: |