SINGLE STAGE SAMPLING

Purpose

This Water Quality and Hydrology Group procedure describes the process for installing and collecting storm water runoff from single stage samples from locations on LANL property.

Scope

This procedure applies to all ENV-WQH staff and contractors who conduct storm water runoff sampling using a single stage sampler.

In this procedure

This procedure addresses the following major topics:

Integrated Work Management

The work specified in this procedure is conducted with applicable Integrated Work Documents, in accordance with LANL IMP 300-00-00, Integrated Work Management for Work Activities.

Signatures

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General Information About This Procedure

Attachments

This document has the following attachments:

Number	Attachment Title	No. of pages
1	Equipment and Supplies	1
2	Single-Stage Sampler Diagram	1
3	Surface Water Sampling Field Notes	2
4	Site Specific Sampler Installation/Inspection Sheet	1

History of revision

This table lists the revision history and effective dates of this procedure.

Revision	Date	Description Of Changes
0	3/04	New document.
1	12/05	Annual review and walk down changes.

Who requires training to this procedure

The following personnel require training before implementing this procedure:

All ENV-WQH staff, contract personnel, and students who perform storm water runoff single stage sampling

Training method

The training method for this procedure is “self-study” (reading) and is documented in accordance with the procedure for training (ENV-WQH-QP-024, *Training)*.

Prerequisites

In addition to training to this procedure, the following training is also required:

ENV-WQH Training Plan 7347, General Field Work
ENV-WQH Training Plan 7692, Sample Storm Water Runoff

General Information About This Procedure

Definitions to this procedure

Single-Stage Sampler (Siphon Sampler) – A siphon sampler, or single stage sampler, is a device that collects water by siphoning surface water through a tube to a sample bottle located at an elevation below the siphon tube intake. Single-stage samplers automatically collect a sample when the water level of a stream passes a specified intake elevation.

Note

Actions specified within this procedure, unless preceded with "should" or "may," are to be considered mandatory guidance (i.e., "shall").

Background

Background

Single stage samplers were developed by the U.S. Geological Survey as a simple method to obtain suspended-sediment and surface water runoff samples automatically and without immediate attention. The samplers are designed to collect water when the water surface rises to a selected stage.

Single stage samplers are useful for "quick and dirty" site characterization. They can be deployed inexpensively and in great numbers to determine if certain constituents are present and, in general terms, a concentration of that constituent. However, the samplers should not be used as a long-term monitoring tool; there is no time stamp, the samplers are manpower intensive, and results are not reproducible.

Single-stage samplers may be the only means to sample in certain situations, but should not be considered a low cost solution. Used properly, they can be a good screening tool or a precursor to a long-term monitoring plan.

Prepare for sampling

Equipment needed	Prior to leaving for the field, assemble equipment and supplies (Attachment 1). Consult the single stage sampling plan to determine the bottle requirements (glass or plastic) for each sampling location.
Two person process	Single Stage Sampling, as discussed in this document, is a two-person process.
Access to sampling site	Notify the Facility Manager (FM) and access control prior to accessing locations at DX and ESA.
Pre job briefing	Conduct the pre-job briefing prior to conducting sampling. Use the most current RDL-approved Integrated Work Document. Obtain worker signatures.
Photos	Photos may be taken if unusual sampling situations, such as oil sheen or other evidence of contamination, is encountered. Have photos reviewed by an Authorized Derivative Classifier (ADC) if in secure area. Download photos to WQH server and label with location and date.

Conduct sampling

Installation

Single-stage samplers are installed so that surface water will flow into the prepared bottle. See Attachment 2 for a diagram. The area upstream from the bottle, in many instances, must be built or dammed up (staged) so that water collects or ponds around the inlet tube for the bottle. The bottle and inlet tube must be located below the surface of any ponded water so that flow will result in water flowing into the tube and bottle via gravity.

Note: An Excavation Permit (EX-ID) must be obtained before conducting this work.

Visit: https://esh-id.lanl.gov/excavation/reqmap.asp?Cmd=MAP to obtain a EX-ID or to obtain additional more information.

To install a single stage sampler, perform the following steps:

Step	Action
1	Mobilize to site.
2	Construct a small earthen berm or install a water detention structure across the channel.
3	Dig a hole down slope of the water detention structure in a location adjacent to the stream channel, large enough to hold the sample bottles. In some cases a small crate can be used in place of the hole.
4	Place proper number of glass and poly bottles in the hole or crate (consult Single Stage Sampling Plan).
5	Connect to the bottles the Teflon tubes for intakes and Tygon tubes for vents.
6	Pound a short stake into the stream channel above the earthen berm.
7	Connect the Teflon intake tubes to the stake in the channel at a level of stream flow that will allow a sample to be collected.
8	Pound a long stake or fence post in the vicinity of the sample bottles.
9	Using wire or other suitable fastening devices, connect the vent tubes to the bottom and the top of the stake/fence post. This will allow air to vent out of the sample bottle as it fills with water.
10	If using hole in earth to contain bottles, cover bottles with excavated soil. If using crate, leave bottles un-covered.

Conduct sampling, continued

Sample Bottle Collection

To collect sample bottles from a single stage sampler, perform the following steps:

Step	Action
1	Complete the Storm Water Sampling Field Sheet (Attachment 3) as much as possible prior to retrieving sample. **Note**: On page 1 of Storm Water Sampling Field Sheet, Mean Date is the date sample is retrieved. Time is the standard time (subtract 1 hour for daylight savings) sample is retrieved. On page 2 of Storm Water Sampling Field Sheet, Date and Time refer to automated sampler collection date and time. Contact the Operations Team to obtain this date and time.
2	Don nitrile gloves and safety glasses.
3	Gain access to sample bottles by removing soil if buried. Be careful to not break glass bottles.
4	Remove sample bottles from sampling lids (caps with tubes) by grasping bottom of bottle and turning while holding lid still. Be careful to not twist tubing. Place replacement lids onto the sample bottles.
5	Record the date and time sample retrieved and Station Number on the sample bottle.
6	Record the Date and Time on page 2 of the Surface Water Sampling Field Sheet. Enter bottle type, volume acquired, and other relevant information in Comments.

Table continued on next page.

Conduct sampling, continued

Sample Bottle Collection, continued

Step	Action
7	Conduct a visual observation of the samples. Document observations on page 1, Visual Observation section, of the Surface Water Sampling Field Sheet. Conduct observation within the first ½ hour of sampling; if unable conduct observation within first ½ hour, document reason on the Surface Water Sampling Field Sheet. Parameters to be noted include: • Odor • Clarity • Settled Solids • Foam • Color • floating solids • Suspended Solids • Oil Sheen • Other indicators of possible storm water pollution.
8	Place samples in cooler and cool with blue ice.
9	A location being sampled with single-stage samplers may not be flowing when sample bottles are collected. If there is no flow, use visual clues such as debris lines or wet soil in the channel to estimate the width and depth to which water occupied the channel during the runoff event. Record this information on page 1, Field Measurements Staff line, of the Surface Water Sampling Field Sheet.
10	Install single stage samplers following steps in the Installation section of this document..
11	Complete Site Specific Sampler Installation/Inspection Sheet (Attachment 4).

Disposing of wastes

There are only non-hazardous wastes associated with this operation. For all wastes generated, contact the Waste Management Coordinator (667-9415).

Deliver samples to TA-59-1

Upon return to TA-59

Transport samples under chain of custody to TA-59, Building 1, basement refrigerator. Surface Water Sampling Field Sheet must remain with the sample. Reference ENV-DO-207, *Handling, Packaging, and Transporting Field Samples.*

Maintaining chain of custody

A sample is physical evidence collected from the environment. Chain-of-custody must be documented for all samples. Reference ENV-WQH-QP-029, *Creating and Maintaining Chain of Custody.*

Records resulting from this procedure

Records

The following records generated as a result of this procedure are to be filed as records in the specified location.

- Surface Water Sampling Field Sheet: TA 59-97-RM 301
- Chain of Custody Form: WQH IM Team
- Field notebook: TA 29-97-RM 301
- Photographs taken of the described activities, when taken: TA-64-64-Rm 1
- Site Specific Sampler Installation/Inspection Sheet: TA 29-97-RM 301

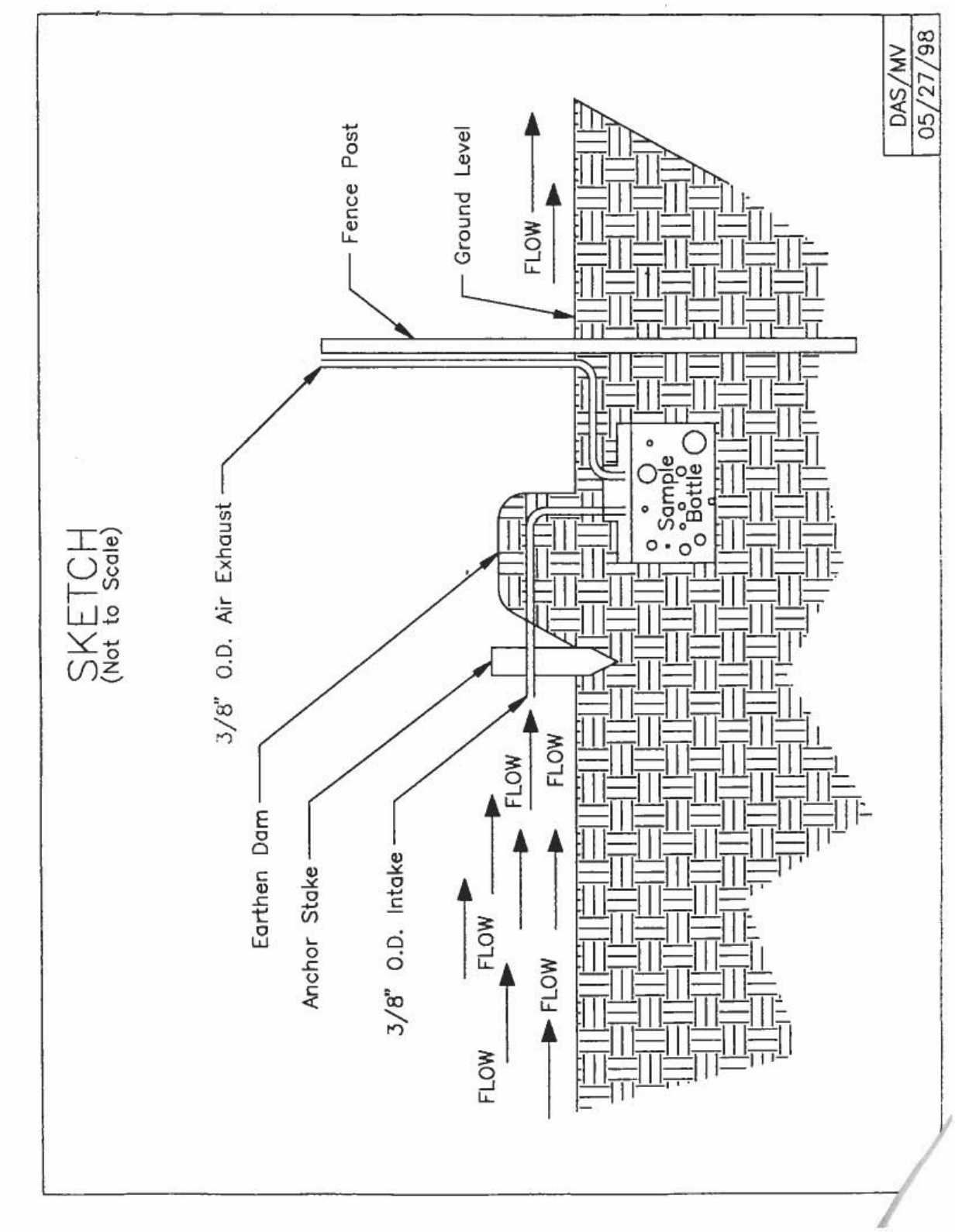
Click here to record self-study training to this document.

Equipment and Supplied Needed for Sampler Installtion

- IWD
- Copy of this procedure
- Excavation Permit
- Sampling plan with locations and bottle types for each location
- GPS (optional)
- Safety glasses with side shields
- Leather gloves
- Radio
- Pager
- Shovel
- Rock bar
- Sledge hammer
- Leatherman type tool
- Spool of “bailing” wire
- Aluminum stakes, one 1 foot and one 4 foot
- Glass and poly bottles
- Sampling lids for bottles
- Teflon tubing for intake
- Tygon tubing for exhaust
- Silt Dyke
- Flagging
- Permanent marker

Equipment and Supplied Needed for Sample Collection

- IWD
- Copy of this procedure
- Coolers with ice or Blue Ice® blocks
- Surface Water Sampling Field Sheet (Attachment 3)
- Site Specific Sampler Installation/Inspection Sheet (Attachment 4)
- Field log book
- Replacement sample bottles (glass and plastic) with lids
- Marker pen (permanent, waterproof)
- Ball point pen
- Copy of Station Contact/FMU Listing
- List of stations to be sampled
- Digital camera (recommended)
- Zip lock bags
- Radio
- Group pager
- Nitrile gloves
- Safety glasses with side shields
- Leather gloves


SKETCH
(Not to Scale)
DAS/MV
05/27/98
Fence Post
Ground Level
FLOW
3/8" O.D. Air Exhaust
Earthen Dam
Anchor Stake
3/8" O.D. Intake
Sample
Bottle
FLOW
FLOW
FLOW
FLOW
FLOW

Los Alamos National Laboratory
Water Quality and Hydrology Group (RRES-WQH)
Surface Water Sampling Field Sheet

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(RRES-WQH-HCP-009.1, Attachment 3)

Station Name:	**Mean Time:** **Date:**
Station Number:	**Analytical Request Record No.:**
Sampled By: _____	**Sample Purpose:** Baseflow Surveillance Storm Water Storm Water Permit Outfall Permit Other:

②

Req	Parameter	Bottle	Preserv.	Coll
	Rad (tot)	P, 2-1 gallon	HNO_3 pH<2	
	Rad (tot) 3H	G, 1-250 ml amb	None	
	Rad (filter)	P, 2-1 gal	HNO_3 pH<2	
	Metals (tot)	P, 1-1 liter	HNO_3 pH<2	
	Metals (tot) Hg	G, 1-250 ml amb	HNO_3 pH<2	
	Metals (filter) Hg	G, 1-250 ml amb	HNO_3 pH<2	
	Metals (filter)	P, 1-1 liter	HNO_3 pH<2	
	Gen Inorg (tot)	P, 1-1 liter	Cool 4°C	
	Gen Inorg CN	P, 1-250 ml	NaOH pH>12	
	Gen Inorg (tot)	P, 1-1 liter	Cool 4°C, H_2SO_4	
	Gen Inorg (filter)	P, 1-1 liter	Cool 4°C	
	Perchlorate (tot)	P, 1-250 ml	None	
	PCB (tot)	G, 1-1 liter amb	Cool 4°C	
	SVOA (tot)	G, 1-1 liter amb	Cool 4°C	
	HE (tot)	G, 1-1 liter amb	Cool 4°C	
	Diox/Furans (tot)	G, 1-1 liter amb	Cool 4°C	
	VOA (tot)	G, 2-40 ml amb	Cool 4°C, HCl	
	Toxicity	P, 1-1 gallon	Cool 4°C	
	FLOOD			
	Grab (Inorg)	P, 7-1 gallon	Cool 4°C	
	Grab (organ)	G, 3-2 liter amb	Cool 4°C	
	Grab (organ)	G, 2-40 ml amb	Cool 4°C, HCl	
		See Comments below		

QA SAMPLES

Req		DI	Lab	Site	Bottle	Preserv	Col
	Field Blank				As specified above		
	Trip Blank				G, 2-40ml amb	4°C HCl	
	Matrix				G, 4-2 l amb	Cool 4°C	
	Matrix				P, 4-1 gal	Cool 4°C	
	Field Dupl.				As specified above		
	Equipment				As specified above		

③

FIELD MEASUREMENTS

Q. Inst.: cfs meas. rating Est.	**Gage Ht.:** ft.
Staff:	**HWM:**
Peak Discharge:	**Other:**
pH: S.U.	**Water Temp.:** C°

SAMPLING CONDITIONS

(Circle all that apply)

Location:	wading bank station gage: at above below bridge: upstr., down str., side bridge ft mile, boat, ice, other (specify):
Sampling Site:	pool riffle open channel braided backwater sampler type:
Bottom:	bedrock rock cobble gravel sand mud concrete other (specify):
Stage Conditions:	Not determined Stable: normal low high Falling Rising Peak Other (specify:)
Hydraulic Event:	Routine Sampling Regular Flow Snowmelt Flood Drought Spill Ice cover: thickness inches Other (specify:)
Stream Color(s):	brown clear green blue gray other:
Weather:	Clear Partly cloudy Cloudy Hot Warm Cold Snow Rain: Light Medium Heavy Over Calm Light Breeze Windy Very Gusty
Stream Mixing:	Excellent Good Fair Poor

Visual Observations

Inspection Completed from sample within first half hour of flow:	Yes No

Reason if not within first half hour:_____

Provide Description

Odor:	Color:
Clarity:	Floating Solids
Settled Solids:	Suspended Solids:
Foam:	Oil Sheen:

Other indicators of possible storm water pollution:_____

Other Observations: _____

Los Alamos National Laboratory
Water Quality and Hydrology Group (RRES-WQH)
Surface Water Sampling Field Sheet

(RRES-WQH-HCP-009.1, Attachment 3)

⑥

Station Number:	Station Name:	Analytical Request Record Number:

Automated Sampler			
BOTTLE #	Date	Time	Comments (bottle type, volume, readings)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

Automated Sampler			
BOTTLE #	Date	Time	Comments (bottle type, volume, readings)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

Sampling event checked/reviewed by: Name and Initials		Date:

Relinquished By: Signature	Date	Time		Received By Signature	Date	Time

Site Specific Sampler Installation/Inspection Sheet

Field team: _____

Date/Time: _____ **Location:** _____

Location Number/Name: _____ **PRS:** _____

Sampling Setup: (ISCO, Single Stage)

Bottles: 1 Gal Glass_____ 1 Gal Poly_____ 1 L Poly____ 300 ml Glass ____
Additional SSC: 1 L Poly____

Inspection Items: ISCO

□ ISCO turned on/off reason if off:_____ □ Bottles replaced/present

□ Battery cable OK □ Voltage on bat: _____ □ Sample tubing OK

□ Sample tubing plugged/unplugged □ Debris cleaned from intakes/vent tubes

Inspection Items: SS

□ Sample/Vent tubing OK

□ Silt dike, sand bags, or other Daming material OK

□ Bottles replaced/present

□ Sample tubing plugged/unplugged

□ Debris cleaned from intakes/vent tubes

Comments:_____
_____
_____
_____
_____

Repairs/Improvements:_____
_____
_____
_____
_____