

# Field Sampling Protocol

September 3, 1997

Version 4.1

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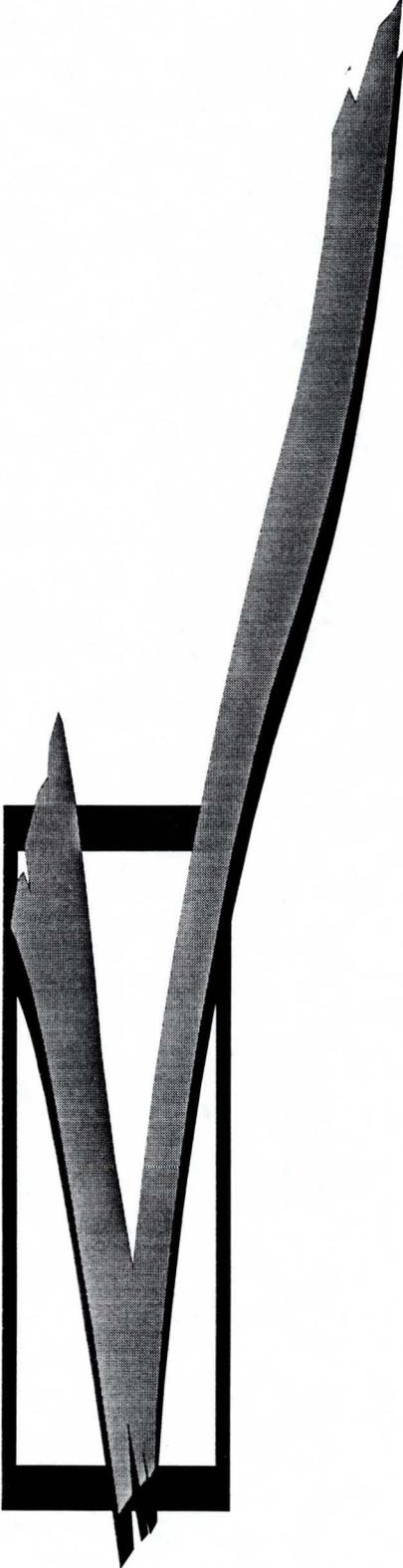


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Table of Contents ✓

Changes in this Edition .....	8
Priorities of the Sampling Program.....	9
Site Basics .....	10
Equipment Setup.....	11
Safety.....	12
Sampling Procedures .....	13
Grab Samples.....	2, 15
Composite Samples.....	3, 16
QC Samples.....	5, 17
Multiple Sample Sites .....	18
Data Downloading .....	7, 18
Site Cleaning .....	6, 19
Maintenance .....	20
Appendix .....	21

# Sampling Checklist

- 
- Refer to PROCEDURE SHEETS
  - Check Voice Mail
  - Check sampling status via computer
  - Gather equipment - coolers, ice, pH/temperature probes, gloves, etc...
  - Call lab to alert them about incoming samples
  - Collect grab samples and return them to lab within 6 hours of collection. Collect grabs in laboratory bottles when possible
  - Collect composite samples
  - Hold one composite sample for a QC sample
  - Prepare the QC sample, and turn in to the lab
  - Turn composite samples in to the lab
  - Clean station equipment
  - Take an equipment blank QC sample at one site
  - Download data

## GRAB SAMPLE COLLECTION PROCEDURE

1. Ensure that the laboratory grab sample bottles are properly labeled prior to filling.
2. Remove the sample jars (1 & 2) from the sampler unit. It is best to do this without PAUSING the sampler program. (For South Mountain and Dreamy Draw Dam, use all 8 jars.)
3. Place ice around the remaining jars in the sampler unit.
4. If possible, collect grab samples from the discharge into the laboratory provided bottles.

If this is not possible, transfer the grab sample from jars 1 and 2 into the laboratory provided bottles.

Be careful not to overfill the bottles and spill out any preservative. If any bottles were overfilled, DO NOT submit those bottles, as the sample is no longer properly preserved. Use another bottle if it is available.

South Mountain and Dreamy Draw Dam samples can be taken from the automatic sampler.

5. Place all labeled bottles into an ice chest surrounding the bottles with ice. Place the 6 travel blank bottles into the ice chest also.
6. Collect pH and temperature data and record them on the field data sheet.
7. Record the time, date, and sample number on the chain of custody form.
8. Before leaving, ensure that the sampler is running and not paused. If the sampler is paused, RESUME the sampling program. Do not use START SAMPLING to restart the sampler.

## COMPOSITE SAMPLE COLLECTION PROCEDURE

1. Remove the composite sample jars from the sampler unit. Cap the jars and place them into a suitable carrying case or ice chest. Add ice to the case or chest.

Do not reset the sampler program at this time. If this is done, all of the flow data will be erased. If the sampler is accidentally reset, DO NOT submit the samples to the lab. The water quality data is not useful without the flow data.

2. Fill out the Chain of Custody sheet indicating time, date, and sample number on the form.
3. If the contract lab is available, take the samples to the contract lab for compositing and preservation. Skip remaining steps.
4. If the contract lab is unavailable, take the samples to the Instrumentation Lab for compositing.
5. Take the composite jars for a single site and combine the contents into a single clean glass compositing jar.
6. Using a clean glass or stainless steel rod, gently stir the contents of the composite jar.
7. Using the Sample Bottle Priority sheet in the Appendix, fill the laboratory provided sample bottles using either a pipette or stopcock on the jar. The sample bottles should be filled to within one inch from the top. DO NOT overfill the bottle.
8. Fill out the Lab Analysis Sheet in the Appendix. Use a separate sheet for each site.

The compositing jar must be cleaned after each use. Use the following procedure to clean the jars, stirring rod, and pipette or stopcock.

## GLASSWARE CLEANING PROCEDURE

1. Pour out any remaining contents, and rinse thoroughly with tap water.
2. Wash the container with Liquinox® solution. Use a wire brush to scrub the inside of the container.
3. Thoroughly rinse the container with tap water.
4. Rinse the container with nitric acid. *Pour rinsate into waste collection container.*
5. Rinse with deionized water.
6. Rinse with methanol. *Pour rinsate into waste collection container.*
7. Thoroughly rinse with deionized water.
8. Rinse with acetone if the vessel is to be used again immediately. If not, allow to air dry. *Pour excess acetone into waste collection container.*

Deionized water is available from the laboratory on request.

MSDS sheets must be available for nitric acid and methanol, both of which are harmful chemicals.

## QUALITY CONTROL SAMPLING PROCEDURES

QC samples are only taken if more than 5 samplers collected samples.

### TRAVEL BLANKS

1. These are provided by the lab. Submit one set of six bottles for each container of grab samples.

(cooler)

### FIELD DUPLICATES

1. Using one set of jars from one site only, this sample will become the Field Duplicate. The site used for a Field Duplicate sample WILL NOT be submitted as a regular storm sample.
2. Composite as described in the COMPOSITE SAMPLING PROCEDURE.
3. Fill TWO sets of Field Duplicate bottles. (You will have two samples.)
4. Provide separate identification numbers for each set. Place samples in ice chest and fill with ice. Fill out Chain of Custody form. Submit samples to lab.

### EQUIPMENT BLANKS

1. After sample event, clean the automatic samplers as usual. The equipment must be cleaned prior to the sampling.
2. At one site per event, disconnect the intake tubing in the pipe.
3. Using the manual sampling feature on the automatic sampler, pump deionized water through the intake tubing directly into laboratory provided bottles.
4. Give a sample identification number, fill out the chain of custody, place the samples on ice, and submit to the lab.

## EQUIPMENT CLEANING PROCEDURE

1. Disconnect the intake tubing on the sampler unit.
2. Pump a gallon of tap water through the intake tubing. Pump this water into the stormdrain.
3. Pump a 1-liter mixture of tap water and Liquinox<sup>®</sup> through the intake tubing.
4. Pump a large amount of tap water through the intake tubing line to flush the soap out of the line.
5. Pump 1 half liter of nitric acid through the line.
6. Pump approximately 1 liter of deionized water through the line.
7. Pump approximately one half-liter methanol through the line.
8. Final rinse of approximately 2 liters deionized water through the line.
9. Reconnect the intake tubing line on the sampler unit.
10. Reset the sampler for the next storm event.

NOTE: Deionized water can be obtained from the lab on request.

## DATA DOWNLOADING PROCEDURES

### 800 SERIES SIGMAS

(MESA, GILA DRAIN, SOUTH MOUNTAIN, DREAMY DRAW)

Remotely, the data can be downloaded by site from a computer through the program BITCOM. Once BITCOM is started, a screen should have the sites listed.

1. Select the site to interrogate.
2. Press the Escape key and press the Enter key.
3. Once connection has been made, wait for the timer to count 20 seconds. When 20 seconds have elapsed, press C (or shift C, the C must be in capital.)
4. The data should begin to scroll. Download time takes approximately 15 minutes. The download is done when the data stops scrolling.
5. Once complete quit BITCOM. The file the data is stored in is called bitcom.tra.
6. From the C: prompt, type rename bitcom.tra siteID.sam, where siteID is MESA1 etc.
7. Then at the C: prompt, type del bitcom.tra.
8. Restart BITCOM and repeat the steps until all sites have been interrogated.

At each site, the data can be downloaded onto a DTU. This procedure is necessary whenever a phone download fails, or no phone line exists. To use the DTU, connect the DTU and the sampler unit's RS-232 port. Follow the directions on the DTU unit for downloading.

### 900 SERIES SIGMA SAMPLERS (PHOENIX SITES)

Download of data from the 900 series samplers requires a program called INSIGHT be installed on a laptop or office computer. INSIGHT allows modem or RS-232 connection to the sampler.

If connecting by modem, click on the Modem button in the Insight program. If connecting directly, click on the 900 MAX button in the program. The appropriate site should be chosen for connection. Once connection has been made, the screens will ask for the operation (in this case "Retrieve Logged Data").

A central computer will be programmed to collect data on a schedule, and assuming it works, 900 series data collection should be automated.

## Changes from the Third Edition

1. Samplers must be readied within 5 days of the previous storm event. Previously, samplers were required to be readied for another event within 72 hours of the previous event.
2. Inclusion of Sampling Checklist.
3. Changes have been made to the Quality Control Sampling section. The changes should make this activity easier to accomplish.
4. Procedure sheets have been added for Grab Sampling, Composite Sampling, Glassware Cleaning, and Equipment Cleaning.

## 1.0 Priorities

Safety of personnel is the highest priority. Care must be exercised when handling samples and sample containers, and when out on busy streets collecting samples and doing maintenance work. Sample integrity and quality is also high priority. Collection, preservation, and delivery of samples to the lab take priority over any other activity, such as cleaning stations.

Please note the following items:

- Always wear latex gloves when handling samples. (Use only latex gloves.) In addition to the threat of dermal exposure to hazardous compounds, contact between skin and samples can introduce contamination to the samples resulting in false results.
- Use caution when entering manholes to service the sampler intake tubing and depth sensors. Proper Standard Operating Procedures must be followed for Confined Space Entry.
- Always keep samples as cool as possible. The regulations require samples be kept at 4 degrees Celsius. Actually cooling the samples to that temperature may not be possible. However, keeping the samples iced and as cool as possible shows a good faith effort in following the regulations. Lower temperatures discourage bacterial growth and slows the breakdown process of nutrients and organics in the sample. Always use ice during all phases of sample collection and preservation.
- Collect samples as quickly as possible. Ideally, no sample should sit more than two hours once sampling has ended.
- Take composite samples to the lab for preservation ASAP or preserve samples at the office ASAP. Once samples are collected and cooled, samples should be transferred to the plastic and glass bottles/jars for delivery to the lab. Preservation of samples inhibits bacterial growth and breakdown of pollutants.
- Follow the Sample Bottle Fill priority sheet located in the Appendix. This will allow the most important parameters to be analyzed when an insufficient sample has been collected by the sampler.

## 2.0 Site Basics

The District has 12 stormwater monitoring sites that it currently maintains. There are five land based sites in Mesa, six in Phoenix, and one at the Gila Drain on the Gila River Indian Community.

The sites are identified as follows:

MESA-1	Horne and Sixth Street	644-1691
MESA-2	Broadway and Lindsay	644-1998
MESA-3	Falcon Field	830-6929
MESA-4	Horne and Grandview	644-1455
MESA-5	Dobson and Broadway	644-1599
PHX-1	Salt River and 35th Avenue (north bank)	278-9457
PHX-2	Salt River and 67th Avenue (north bank)	4
PHX-3	Salt River and 40th Street (south bank)	470-0127
PHX-4	Indian Bend Wash and 40th Street	494-9926
Gila Drain	Maricopa Road and I-10	
South Mountain	Central Avenue in South Mountain Park	
Dreamy Draw	Outlet of Dreamy Draw Dam	

### 3.0 Equipment Setup

#### 3.1 Site Specific Equipment

An assortment of equipment is employed in the notification and sampling efforts.

**The five sites in Mesa** have identical setups. The following equipment is used:

- Sigma 800 SL Automatic Sampler with integral flowmeter
- 8 jar configuration, jar volume = 1900 mL (15.2L total)
- Autodialer
- Modem
- Raingage

Each site in Mesa also contains a large grey tote with eight bottles in addition to the eight in the sampler unit.

**Four sites in Phoenix (PHX 1-4)** have identical setups. The following equipment is used:

- Sigma 900 MAX Automatic sampler with integral flowmeter, modem, and dialout alarm.
- 8 jar configuration, jar volume = 1900 mL (15.2L total)
- Raingage

**The sites at Gila Drain, South Mountain, and Dreamy Draw Dam** will have identical setups, except that Gila Drain will have a cellular phone, and South Mountain and Dreamy Draw will have no phone communications.

- Sigma 800 SL Automatic Sampler with integral flowmeter
- Raingage

#### 3.2 Programming of Equipment

Specific programming for each site is included in the Appendix. Updates will be forwarded to you.

## 4.0 Safety

A number of safety issues need to be considered when sampling. There are concerns of traffic safety and sample/chemical handling safety. Furthermore, when performing routine maintenance involving manhole entry, additional precautions must be taken.

### 4.1 Traffic Safety

Most of the samplers are not located on busy streets. However, a few samplers are adjacent to busy streets. Care should be exercised so that traffic does not endanger work activities. When working in manholes in major streets, barricades should be set up to direct traffic away from work activities.

### 4.2 Sample / Chemical Safety

The stormwater samples contain contaminants of unknown composition. In most cases, the concentrations of contaminants in the stormwater are so low as to not be of concern. However, since the make up of the stormwater is unknown at the time of sampling, it is required that latex gloves be worn when handling stormwater. The gloves also prevent contamination from being transferred from hands to the samples. Furthermore, the latex gloves will protect skin from contact with the preservatives in some laboratory sample containers. The preservatives are either acids or bases. Both can burn skin.

If contact between skin and stormwater and/or preservatives occurs, wash the affected area with large amounts of water to dilute the contamination.

### 4.3 Maintenance Safety

Entering manholes may cause exposure to unknown vapors and gases in manholes. Proper Confined Space Entry procedures must be followed prior to entering manholes.

Confined Space Entry is not covered in this manual. A separate manual covers this subject.

## 5.0 Sampling Procedures

### 5.1 Sampler Storm Setup

Samplers must be readied for sampling within 5 days after the previous storm event. A number of bottles are necessary for the proper collection and preservation of the samples for analysis. Grab sample bottles will be kept at each site with lids tightly closed. Composite sample bottles will be kept at the District office. Clean sampler jars will be kept at the District office.

One set of grab sample bottles contain the following:

- 2 1-liter plastic, non preserved
- 2 125 mL plastic bacti bottles
- 2 1-liter amber glass,  $H_2SO_4$  preserved
- 4 40 mL VOAs, HCl preserved
- 4 filled travel blank bottles, not to be opened

Site identification should be placed on the bottles prior to filling, and prior to the storm event. It is difficult to write on wet labels, whether it be from sample spillage or from rainwater. The travel blank bottles should have the site identification listed on them also.

In addition to the grab bottles, ten sets of laboratory composite bottles should be on hand at the District office. This allows us to composite and preserve the samples at the office should the contract laboratory not be available.

One set of composite sample bottles contains the following:

- 2 1 liter plastic, nonpreserved
- 1 1 liter plastic,  $H_2SO_4$  preserved
- 1 1 liter plastic, NaOH preserved
- 1 1 liter plastic,  $HNO_3$  preserved
- 2 1 liter amber glass,  $H_2SO_4$  preserved
- 3 1 liter amber glass, nonpreserved

Always request a replacement set for any bottles used and submitted to the lab.

## 5.2 Sample Event

### 5.2.1 General

All samplers except Gila Drain, South Mountain, and Dreamy Draw Dam are set to activate when 0.05 inch of rain, and 0.5 inch of water level is reached at the gage. The table below gives the activation parameters for each site.

SITE	RAINFALL (inch)	LEVEL (inch)
Mesa 1	0.05	0.5
Mesa 2	0.05	0.5
Mesa 3	0.05	0.5
Mesa 4	0.05	0.5
Mesa 5	0.05	0.5
Phx 1	0.05	0.5
Phx 2	0.05	0.5
Phx 3	0.05	0.5
Phx 4	0.05	0.5
Gila Drain	0.10	NA
South Mountain	<del>NA</del> 0.05 / 999 MIN	<del>1.5</del> 1.0 inch
Dreamy Draw Dam	<del>NA</del> 0.05	<del>1.5</del> 1.0

Gila Drain is set to activate on rain only because there is usually flow in the channel. South Mountain and Dreamy Draw Dam are set to activate on level only because it is likely that there will be many rain event without flow, or a rain event may occur before flow begins.

All sites except South Mountain and Dreamy Draw Dam will have dialout alarms which will call the voice mail number of 506-7300 and leave messages. The voice mail then pages the responders to notify them which gages have been activated.

Occasionally, a dialout alarm will fail. Some ALERT raingages have been set up to notify the voice mail that rainfall has occurred at the ALERT gages.

### 5.2.2 Grab Samples

All of the samplers are programmed to automatically collect a first flush grab sample as soon as the sampler has been activated.

Because Oil and Grease, Volatile Organic compounds, and bacteria are best not pumped through the sampler, it is required, when practical, to collect the samples manually from the discharge.

When the automatic sampler takes the first flush grab samples, it places them in the first two bottles.

The two bacterial samples have a short hold time of six hours. This means that from the time the sampler was activated, the sample must be collected, preserved, transported to the lab, and the analysis begun at the lab within six hours. If the sample is collected manually, the six hour period begins at that time.

Proper coordination with the lab must be done to ensure that this six hour window is met. If it is not possible to get to the lab with the sample taken by the automatic sampler within the six hours, another sample can be taken manually. (Use the manual sample feature on the sampler unit if it cannot be collected from the discharge.)

As mentioned previously, chilling the samples is extremely important. Ice is to be taken to all of the sites and placed around the jars in the sampler unit to keep the pumped samples as cool as possible. Samples remaining at ambient temperatures run the risk of having their chemical content altered from bacterial action and/or volatilization.

#### South Mountain and Dreamy Draw

For the South Mountain and Dreamy Draw samplers, a single sample will be distributed into all eight jars. The samples for these sites can be collected by the automatic sampler because no bacteria, volatile organic or oil & grease compounds will be analyzed.

Pour the contents of the eight jars into the laboratory provided sample bottles. Begin the filling from the first jar and progress to jar eight. Put the bottles in a cooler and surround by ice.

### 5.2.2 Composite Samples

Along with the grab samples, a flow-weighted composite sample is collected. This sample is based on a set quantity of water passing over the flow sensor between each aliquot collection. Each site has a different flow interval, based on site characteristics.

The composite will require from 2 to 16 hours to complete, depending upon the strength and intensity of the storm. In general, sampling is usually complete within a few hours. No sample should sit more than two hours once sampling is complete.

Sigma sampling equipment will indicate on the sampler unit's display if the program is complete. Occasionally, insufficient flow is produced from the storm to complete a sampling routine.

Composite samples will be collected in jars 3 through 8 in the Sigma samplers. The method for collecting, compositing, and preserving composite sample is given below.

Once the sampler is complete, or flow has stopped, remove jars 3 through 8 from the automatic sampler. Cap the jars and place them in a carrying case (Mesa) or an ice chest (Phoenix). Note the date, time, and sample number on a chain-of-custody form and in the Field Log Book.

If the contract lab is available, the samples will be transported to and composited by them. If the lab is not available, the samples will be first transported to the Instrumentation Lab for compositing and then to the contract lab for analysis.

To composite, take jars 3 through 8 for a single site and pour the contents into a large vessel. Using a clean glass rod, gently stir the contents. Fill the laboratory provided, preserved bottles. If only a small amount of sample is collected, fill the bottles according to the Sample Priority Sheet in the Appendix. After filling all bottles (or as many as possible), clean the vessel and repeat the procedure with the remaining sites. Once complete, transport the samples to the contract lab.

### 5.2.3 Quality Control Samples

To ensure that the data received from the lab is of highest quality, and to assess the cleanliness of the sample equipment, three types of QC samples will be submitted. Travel blanks, equipment blanks and field duplicates will be assessed. Travel blanks have been mentioned previously in the grab sample section.

For the NPDES stormwater monitoring project, one field duplicate and one equipment blank will be submitted per storm event when more than five samples are submitted. If the number of sites sampled is less than five, no duplicate or equipment blanks will be submitted. Travel blanks will be submitted each time the 40 mL VOA bottles are submitted.

#### Travel Blanks

The laboratory furnishes the travel blanks. These are used to assess whether contamination was introduced during transport of volatile organic samples to the lab.

There must be one set (4 bottles) of travel blanks per container that contain the 40 mL vials sampled. *cooler*

#### Field Duplicates

Field blanks will assess the accuracy of the laboratory analyses. One site will be chosen to be the field blank sample for a given storm event, preferably the site most likely to display contamination; alternatively, the site providing the largest sample volume. Due to sample volume constraints, this site will not have the usual suite of NPDES analyses performed. It will have a lesser number of parameters analyzed as indicated below.

A sample will be collected in the usual manner, but will be brought to the District Instrumentation Lab instead of being taken to the lab for compositing. District personnel will composite the sample using the procedure given above. A special set of laboratory provided bottles will be used. The set will consist of two of each bottle type. Each 'pair' is filled in succession. The sample sets are given different sample identification numbers. The samples are submitted to the lab just as any other samples, with no mention made to the lab that this is a duplicate sample.

Duplicates will be analyzed for:

Total Metals  
TKN, Nitrate, Nitrite, Phosphorous

These parameters were chosen because they are likely to be detected in most samples.

### Equipment Blanks

The equipment blank will measure the effectiveness of the cleaning program of the sampling equipment.

One site will be chosen to serve as the equipment blank. The equipment is cleaned in the usual manner according to the instructions. After the cleaning, deionized water is pumped through the intake tubing directly into laboratory bottles for analysis.

Some sites, mainly in Mesa, will rarely be evaluated. A site with an easily accessible intake tubing should be used.

Equipment blanks will be analyzed for:

Total Metals as in the NPDES samples  
TKN, Phosphorous, Nitrate, Nitrite

#### 5.2.4 Multiple Sampler Sites

This section intentionally left blank.

### 5.3 Post Sample

#### 5.3.1 Flow Data Collection

It is desirable to collect the flow data remotely from the office. However, this is not always possible due to modem problems or lack of a phone line.

As required, data will be collected in the field using a DTU. A different DTU is required for the Sigma 800 SL and the Sigma 900 MAX.

Mesa Sigmas and the sampler at Gila Drain can be collected by phone line using the Bitcom program. Phoenix samplers can be interrogated by phone line using a program called Insight. Data also can be collected directly from the equipment with a laptop computer and connect cable using the Insight program.

The samplers at South Mountain and Dreamy Draw must be collected by DTU. DTU data can be downloaded into the Insight program.

### **5.3.2 Post Event Cleaning**

Cleaning of the sample equipment is very important in obtaining high quality samples. The sample jars should be cleaned according to the GLASSWARE CLEANING PROCEDURE, and the intake tubing line should be cleaned according to the EQUIPMENT CLEANING PROCEDURE. The contract lab will clean the sample jars when they are taken to the lab for compositing.

## 6.0 Periodic Maintenance

### 6.1 Six Month Maintenance

1. Calibrate the depth sensor
2. Calibrate the pumped sample volume
3. Check and clean rain gages of debris
4. Inspect sample intake line, connect cables, connections, pump tubing, batteries, solar panels, batteries, charging system

Make any repairs or replacements as necessary.

### 6.2 Annual Maintenance

1. Perform the Six Month Maintenance
2. Replace sample intake tubing
3. Replace sampler pump tubing
4. Rinse new intake tubing with deionized water

### 6.3 As Needed Maintenance

As equipment ages and fails, equipment should be replaced as quickly as possible. A small inventory of parts should be on-hand to replace failed parts. Replacement of stocked parts should be done within 2 weeks of problem report. Ordered parts should be replaced within a week of being received. As equipment is replaced, calibrations need to be performed.

### 6.4 Recordkeeping

A maintenance log needs to be kept. The log is part of a larger quality assurance and quality control program.

Maintenance records should include the date, time, personnel doing the service, and a description of the service done.

Calibration records should include the date, time, personnel doing the calibration, depth to which sensors are calibrated, and amount of pumped sample volume.

All records are kept at the District offices.

# Appendix



# NPDES STORMWATER ANALYSIS FORM

SITE \_\_\_\_\_ DATE \_\_\_\_\_

## GRAB SAMPLE

			Bottle(s) Required
<input checked="" type="checkbox"/>	BOD5	405.1	1- 1 liter plastic, unpreserved
<input checked="" type="checkbox"/>	Dissolved Oxygen	4500-O	1- 500 mL plastic, unpreserved
<input checked="" type="checkbox"/>	Fecal Coliform	9222C	1- bacterial bottle, tablet preserved
<input checked="" type="checkbox"/>	Fecal Streptococci	9230C	1- bacterial bottle, tablet preserved
<input checked="" type="checkbox"/>	Oil and Grease	413.1	1- 1 liter glass, HCl (acid) preserved
<input checked="" type="checkbox"/>	Purgeables	EPA 624	2- 40 mL glass vials, sodium thiosulfate preserved
<input type="checkbox"/>			

## COMPOSITE SAMPLE

### Inorganic Chemistry - Non-Metals

<input checked="" type="checkbox"/>	pH	150.1	<input checked="" type="checkbox"/>	Nitrogen, NO2 + NO3	353.2
<input checked="" type="checkbox"/>	COD	410.1	<input checked="" type="checkbox"/>	Nitrogen, Organic	351.4
<input checked="" type="checkbox"/>	Chloride	300.0	<input checked="" type="checkbox"/>	Nitrogen, Kjeldahl	351.3
<input checked="" type="checkbox"/>	Cyanide	335.3	<input checked="" type="checkbox"/>	Phosphorous, Total	365.2
<input checked="" type="checkbox"/>	Total Dissolved Solids	160.1	<input checked="" type="checkbox"/>	Phosphorous, Dissolved	365.3
<input checked="" type="checkbox"/>	Total Suspended Solids	160.1	<input checked="" type="checkbox"/>	Phosphorous, Ortho	365.2
<input checked="" type="checkbox"/>	Nitrogen, Ammonia	350.3	<input checked="" type="checkbox"/>	Organic Carbon, Total	415.1
<input checked="" type="checkbox"/>	Nitrogen, Nitrate	353.2	<input checked="" type="checkbox"/>	Alkalinity, Total	310.1
<input checked="" type="checkbox"/>	Nitrogen, Nitrite	353.2	<input checked="" type="checkbox"/>	Hardness	130.2
<input type="checkbox"/>			<input checked="" type="checkbox"/>	Sulfate, Dissolved	375.3
<input type="checkbox"/>			<input checked="" type="checkbox"/>	Phenols	420.1
<input type="checkbox"/>			<input type="checkbox"/>		

### Inorganic Chemistry - Metals, Total and Dissolved

<input checked="" type="checkbox"/>	Antimony, Total	200.7	<input checked="" type="checkbox"/>	Lead, Total	239.2
<input checked="" type="checkbox"/>	Antimony, dissolved	200.7	<input checked="" type="checkbox"/>	Lead, dissolved	239.2
<input checked="" type="checkbox"/>	Arsenic, Total	200.7	<input checked="" type="checkbox"/>	Mercury, Total	245.1
<input checked="" type="checkbox"/>	Arsenic, dissolved	200.7	<input checked="" type="checkbox"/>	Mercury, dissolved	245.1
<input checked="" type="checkbox"/>	Beryllium, Total	200.7	<input checked="" type="checkbox"/>	Nickel, Total	249.2
<input checked="" type="checkbox"/>	Beryllium, dissolved	200.7	<input checked="" type="checkbox"/>	Nickel, dissolved	249.2
<input checked="" type="checkbox"/>	Cadmium, Total	213.2	<input checked="" type="checkbox"/>	Selenium, Total	200.7
<input checked="" type="checkbox"/>	Cadmium, dissolved	213.2	<input checked="" type="checkbox"/>	Selenium, dissolved	200.7
<input checked="" type="checkbox"/>	Chromium, Total	218.2	<input checked="" type="checkbox"/>	Silver, Total	200.7
<input checked="" type="checkbox"/>	Chromium VI, Total	SM3500	<input checked="" type="checkbox"/>	Silver, dissolved	200.7
<input checked="" type="checkbox"/>	Chromium, dissolved	218.2	<input checked="" type="checkbox"/>	Thallium, Total	200.7
<input checked="" type="checkbox"/>	Copper, Total	220.2	<input checked="" type="checkbox"/>	Thallium, dissolved	200.7
<input checked="" type="checkbox"/>	Copper, dissolved	220.2	<input checked="" type="checkbox"/>	Zinc, Total	289.2
<input type="checkbox"/>			<input checked="" type="checkbox"/>	Zinc, dissolved	289.2
<input type="checkbox"/>			<input type="checkbox"/>		

### Organic Compounds

<input checked="" type="checkbox"/>	Organochlorine Pesticides	608	<input type="checkbox"/>		
<input checked="" type="checkbox"/>	Base/Neutral/Acid Extractable	625	<input type="checkbox"/>		
<input type="checkbox"/>			<input type="checkbox"/>		
<input type="checkbox"/>			<input type="checkbox"/>		

# Analysis Priority and Bottle Fill Priority

*Needs updating*

## Analytic Priority

- 1 Total/Dissolved Metals, Hardness
  - 2 COD
  - 3 TSS/TDS
  - 4 Phosphorous - Total/Dissolved/Ortho
  - 5 Nitrogen - Nitrate/Nitrite/Ammonia/TKN/Organic
  - 6 pH
  - 7 Alkalinity
  - 8 608 - Organochlorine Pesticides
  - 9 625 - Base/Neutral/Acid Extractables
  - 10 Cyanide
  - 11 Sulfates
  - 12 Chloride
  - 13 Total Organic Carbon
  - 14 Phenols
- 

## Bottle Fill Priority

- 1 One Liter Plastic - Nitric Acid Preserved
  - 2 One Liter Plastic - Non Preserved
  - 1 One Liter Plastic - Sulfuric Acid Preserved
  - 2 One Liter Amber Glass - Sulfuric Acid Preserved
  - 3 One Liter Amber Glass - Non Preserved
  - 1 One Liter Plastic - Sodium Hydroxide Preserved
- ✓*

# Sample Bottle Request Form

*Needs updating*

## Grab Sample Bottle Set

2	1-liter plastic	non-preserved
2	sterile bacti bottles	
2	1-liter glass amber	H <sub>2</sub> SO <sub>4</sub> preserved
4	40 mL vial	HCl preserved
Travel Blanks for EPA 624		

MESA 1		PHX 1	
MESA 2		PHX 2	
MESA 3		PHX 3	
MESA 4		PHX 4	
MESA 5		GILA DRAIN	

<b>TOTAL GRAB SETS NEEDED</b>	
-------------------------------	--

## Composite Sample Bottle Set

2	1-liter plastic	non preserved
1	1-liter plastic	H <sub>2</sub> SO <sub>4</sub> preserved
1	1-liter plastic	NaOH preserved
1	1-liter plastic	HNO <sub>3</sub> preserved
2	1-liter amber glass	H <sub>2</sub> SO <sub>4</sub> preserved
3	1-liter amber glass	non preserved

MESA 1		PHX 1	
MESA 2		PHX 2	
MESA 3		PHX 3	
MESA 4		PHX 4	
MESA 5		GILA DRAIN	

<b>TOTAL COMPOSITE SETS NEEDED</b>	
------------------------------------	--

## South Mountain/Dreamy Draw Bottle Set

6	1-liter plastic	non preserved
1	1-liter plastic	HNO <sub>3</sub> preserved
1	1-liter plastic	H <sub>2</sub> SO <sub>4</sub> preserved
2	1-liter amber glass	H <sub>2</sub> SO <sub>4</sub> preserved

South Mountain	
Dreamy Draw	

<b>TOTAL SM/DD SETS NEEDED</b>	
--------------------------------	--

## Additional Bottles Needed



# Calibration Sheet

	Initials	Date	Time	Depth of Sensor	Volume Pumped
Mesa 1 Sixth and Horne					
Mesa 2 Broadway and Lindsay					
Mesa 3 Falcon Field					
Mesa 4 Horne and Grandview					
Mesa 5 Dobson Road					
Phx 1 Salt River and 35th Avenue					
Phx 2 Salt River and I-10					
Phx 3 Salt River and 40th Street					
Phx 4 IBW and 40th Street					
Gila Drain					
South Mountain					
Dreamy Draw					



Gila Drain Stormwater Sampler  
Sigma Stormwater Sampler Program

---

To begin programming the sampler, press the #2 key (change/halt)  
Enter 8000 as the access code

Press the \* key

- |     |                               |  |
|-----|-------------------------------|--|
| 1.  | Advanced Program Features     | <u>yes</u>   |
| 2.  | Number of Sample Bottles      | <u>8</u>   |
| 3.  | Units for Bottle Volume       | <u>mL</u>  |
| 4.  | Bottle Volume                 | <u>1900 mL</u>   |
| 5.  | Enter Units for Tubing Length | <u>Feet</u>  |
| 6.  | Length of Intake Tubing       | <u>xx feet</u> (Change each time tubing is replaced)   |
| 7.  | Program Lock?                 | <u>Yes</u>   |
| 8.  | Enable Internal Flowmeter?    | <u>Yes</u>   |
| 9.  | Flow Units                    | <u>CFS</u>   |
| 10. | Program Delay?                | <u>No</u>  |
| 11. | Flow Mode?                    | <u>Yes</u>   |
| 12. | Variable Interval?            | <u>No</u>  |
| 13. | Interval                      | <u>5000</u> (Enter 50)   |
| 14. | Timed Override?               | <u>No</u>  |
| 15. | Discrete Mode?                | <u>Yes</u>   |
| 16. | Sample/Bottle?                | <u>Yes</u>   |
| 17. | Number of Samples/Bottle?     | <u>4</u>   |
| 18. | Change Volume?                | <u>No/Yes</u>  |
| 19. | Sample Volume                 | <u>450 mL</u>  |
| 20. | Calibrate Volume?             | <u>No/Yes</u>  |
| 21. | Intake Rinses?                | <u>Yes</u>   |
| 22. | Rinse Cycles?                 | <u>1</u>   |
| 23. | Intake Faults?                | <u>Yes</u>   |
| 24. | Intake Faults                 | <u>2</u>   |
| 25. | Enter ID                      | <u>0102</u>  |
| 26. | Set Up Flowmeter?             | <u>Yes</u>   |
| 27. | Head vs Flow                  | <u>Yes</u>   |
| 28. | Enter Data Points             | Head 01 = 0.29 Flow 01 = 5<br>Head 02 = 0.47 Flow 02 = 9<br>Head 03 = 0.51 Flow 03 = 10<br>Head 04 = 0.71 Flow 04 = 16<br>Head 05 = 0.79 Flow 05 = 19<br>Head 06 = 1.13 Flow 06 = 37<br>Head 07 = 1.23 Flow 07 = 45<br>Head 08 = 1.37 Flow 08 = 60 |

- 29. Flow Recording Interval 1 min
- 30. Calibrate Depth Sensor? No/Yes (Yes during maintenance)
- 31. Set Current Water Level Enter current level if known

-Ready to Start-

Program for storm sampling

---

Press and hold the clear entry key

- 1. Level control? Yes
- 2. Storm Mode? Yes
- 3. External Start? No
- 4. Start on Rain
- 5. Rain = 0.10 inch
- 6. Rainfall Time limit 60 min
- 7. First Flush Period 20
- 8. Number of Bottles 2
- 9. Set Timed Interval Interval 01 = 0001 min  
Interval 02 = 0000 min (Use No/Pass key)
- 10. Samples/Bottle= 002
- 11. First Flush Vol= 950 mL
- 12. Calibrate Vol? No/Yes
- 13. Sample Time limit? 480
- 14. Special Output? Yes
- 15. Sample Output? No
- 16. Event Output? Yes

-Ready to start-

Programming is complete. Press the START SAMPLING key to initiate the program/sampler.

## South Mountain Stormwater Sampler Sigma Stormwater Sampler Program

---

To begin programming the sampler, press the #2 key (change/halt)  
Enter 8000 as the access code

Press the \* key

- |     |                               |  |
|-----|-------------------------------|--|
| 1.  | Advanced Program Features     | <u>yes</u>   |
| 2.  | Number of Sample Bottles      | <u>8</u>   |
| 3.  | Units for Bottle Volume       | <u>mL</u>  |
| 4.  | Bottle Volume                 | <u>1900 mL</u>   |
| 5.  | Enter Units for Tubing Length | <u>Feet</u>  |
| 6.  | Length of Intake Tubing       | <u>32</u> <u>12 feet</u> (Change each time tubing is replaced) |
| 7.  | Program Lock?                 | <u>Yes</u>   |
| 8.  | Enable Internal Flowmeter?    | <u>Yes</u>   |
| 9.  | Flow Units                    | <u>CFS</u>   |
| 10. | Program Delay?                | <u>No</u>  |
| 11. | Timed Mode?                   | <u>Yes</u>   |
| 12. | Variable Interval?            | <u>No</u>  |
| 13. | Interval                      | <u>5 Min</u>   |
| 14. | Discrete Mode?                | <u>Yes</u>   |
| 15. | Bottles/Sample?               | <u>Yes</u>   |
| 16. | Number of Bottles/Sample?     | <u>4</u>   |
| 17. | Change Volume?                | <u>No/Yes</u>  |
| 18. | Sample Volume                 | <u>1875 mL</u>   |
| 19. | Calibrate Volume?             | <u>No/Yes</u>  |
| 20. | Intake Rinses?                | <u>Yes</u>   |
| 21. | Rinse Cycles?                 | <u>1</u>   |
| 22. | Intake Faults?                | <u>Yes</u>   |
| 23. | Intake Faults                 | <u>2</u>   |
| 24. | Enter ID                      | <u>0101</u>  |
| 25. | Set Up Flowmeter?             | <u>Yes</u>   |
| 26. | Manning Formula               | <u>Yes</u>   |
| 27. | Pipe ID                       | <u>72.00</u> (Be sure to enter 7200)                           |
| 28. | Roughness =                   | <u>0.013</u>   |
| 29. | Slope =                       | <u>4.00/100</u>  |
| 30. | Flow Recording Interval       | <u>1 min</u>   |
| 31. | Calibrate Depth Sensor?       | <u>No/Yes</u> (Yes during maintenance)                         |
| 32. | Set Current Water Level       | Enter current level if known                                   |

-Ready to Start-  
proceed to page 2

Program for storm sampling

---

Press and hold the clear entry key

- |     |                    |                 |
|-----|--------------------|-----------------|
| 1.  | Level control?     | <u>Yes</u>      |
| 2.  | Storm Mode?        | <u>Yes</u>      |
| 3.  | External Start?    | <u>No</u>       |
| 4.  | Start on           | <u>Depth</u>    |
| 5.  | Level =            | <u>1.5</u> inch |
| 6.  | First Flush Period | <u>0</u>        |
| 7.  | Sample Time limit? | <u>480</u>      |
| 8.  | Special Output?    | <u>Yes</u>      |
| 9.  | Sample Output?     | <u>No</u>       |
| 10. | Event Output?      | <u>Yes</u>      |

*Rain & Depth*  
*1.0* ~~*1.5*~~ inch  
*No* ~~*480*~~  
*Rain = 0.05*  
*Rainfall Time Limit = 999*

-Ready to start-

Programming is complete. Press the START SAMPLING key to initiate the program/sampler.

Dreamy Draw Dam Stormwater Sampler  
Sigma Stormwater Sampler Program

---

To begin programming the sampler, press the #2 key (change/halt)  
Enter 8000 as the access code

Press the \* key

- |     |                               |  |
|-----|-------------------------------|--|
| 1.  | Advanced Program Features     | <u>yes</u>   |
| 2.  | Number of Sample Bottles      | <u>8</u>   |
| 3.  | Units for Bottle Volume       | <u>mL</u>  |
| 4.  | Bottle Volume                 | <u>1900 mL</u>                                       |
| 5.  | Enter Units for Tubing Length | <u>Feet</u>  |
| 6.  | Length of Intake Tubing       | <u>xx feet</u> (Change each time tubing is replaced) |
| 7.  | Program Lock?                 | <u>Yes</u>   |
| 8.  | Enable Internal Flowmeter?    | <u>Yes</u>   |
| 9.  | Flow Units                    | <u>CFS</u>   |
| 10. | Program Delay?                | <u>No</u>  |
| 11. | Timed Mode?                   | <u>Yes</u>   |
| 12. | Variable Interval?            | <u>No</u>  |
| 13. | Interval                      | <u>5 Min</u>   |
| 14. | Discrete Mode?                | <u>Yes</u>   |
| 15. | Bottles/Sample?               | <u>Yes</u>   |
| 16. | Number of Bottles/Sample?     | <u>4</u>   |
| 17. | Change Volume?                | <u>No/Yes</u>  |
| 18. | Sample Volume                 | <u>1875 mL</u>                                       |
| 19. | Calibrate Volume?             | <u>No/Yes</u>  |
| 20. | Intake Rinses?                | <u>Yes</u>   |
| 21. | Rinse Cycles?                 | <u>1</u>   |
| 22. | Intake Faults?                | <u>Yes</u>   |
| 23. | Intake Faults                 | <u>2</u>   |
| 24. | Enter ID                      | <u>0103</u>  |
| 25. | Set Up Flowmeter?             | <u>Yes</u>   |
| 26. | Manning Formula               | <u>Yes</u>   |
| 27. | Pipe ID                       | <u>xx.xx</u> (Be sure to enter xxxx)                 |
| 28. | Roughness=                    | <u>0.013</u>   |
| 29. | Slope=                        | <u>xxx/100</u>                                       |
| 30. | Flow Recording Interval       | <u>1 min</u>   |
| 31. | Calibrate Depth Sensor?       | <u>No/Yes</u> (Yes during maintenance)               |
| 32. | Set Current Water Level       | <u>Enter current level if known</u>                  |

-Ready to Start-      proceed to page 2

Program for storm sampling

---

Press and hold the clear entry key

1. Level control?
2. Storm Mode?
3. External Start?
4. Start on
5. Level =
6. First Flush Period
7. Sample Time limit?
8. Special Output?
9. Sample Output?
10. Event Output?

Yes  
Yes  
No  
Depth  
1.5 inch  
0  
480  
Yes  
No  
Yes

*Match to South Mountain*

-Ready to start-

Programming is complete. Press the START SAMPLING key to initiate the program/sampler.

Mesa 1- Horne and Sixth Street  
Sigma Stormwater Sampler Program

---

To begin programming the sampler, press the #2 key (change/halt)  
Enter 8000 as the access code

Press the \* key

- |     |                               |  |
|-----|-------------------------------|--|
| 1.  | Advanced Program Features     | <u>yes</u>   |
| 2.  | Number of Sample Bottles      | <u>8</u>   |
| 3.  | Units for Bottle Volume       | <u>mL</u>  |
| 4.  | Bottle Volume                 | <u>1900 mL</u>   |
| 5.  | Enter Units for Tubing Length | <u>Feet</u>  |
| 6.  | Length of Intake Tubing       | <u>50 feet</u> (Change each time tubing is replaced)             |
| 7.  | Program Lock?                 | <u>Yes</u>   |
| 8.  | Enable Internal Flowmeter?    | <u>Yes</u>   |
| 9.  | Flow Units                    | <u>CFS</u>   |
| 10. | Program Delay?                | <u>No</u>  |
| 11. | Flow Mode?                    | <u>Yes</u>   |
| 12. | Variable Interval?            | <u>No</u>  |
| 13. | Interval                      | <u>1000</u> cu. Ft. (Enter 10, the 00 is provided)<br><i>500</i> |
| 14. | Timed Override?               | <u>No</u>  |
| 15. | Discrete Mode?                | <u>Yes</u>   |
| 16. | Samples/Bottles?              | <u>Yes</u>   |
| 17. | Number of Samples/Bottles     | <u>4</u>   |
| 18. | Change Volume?                | <u>No/Yes</u>  |
| 19. | Sample Volume                 | <u>450 mL</u>  |
| 20. | Calibrate Volume?             | <u>No/Yes</u>  |
| 21. | Intake Rinses?                | <u>Yes</u>   |
| 22. | Rinse Cycles?                 | <u>1</u>   |
| 23. | Intake Faults?                | <u>Yes</u>   |
| 24. | Intake Faults                 | <u>2</u>   |
| 25. | Enter ID                      | <u>0001</u>  |
| 26. | Set Up Flowmeter?             | <u>Yes</u>   |
| 27. | Manning Formula               | <u>Yes</u>   |
| 28. | Pipe ID                       | <u>36.00</u> (Be sure to enter 3 6 0 0 )                         |
| 29. | Roughness =                   | <u>0.013</u>   |
| 30. | Slope =                       | <u>0.29/100</u>  |
| 31. | Flow Recording Interval       | <u>1 min</u>   |
| 32. | Calibrate Depth Sensor?       | <u>No/Yes</u> (Yes during maintenance)                           |
| 33. | Set Current Water Level       | <u>Enter current level if known</u>                              |

-Ready to Start-      proceed to page 2

Program for storm sampling

---

Press and hold the clear entry key

- |     |                       |  |
|-----|-----------------------|--|
| 1.  | Level control?        | <u>Yes</u>   |
| 2.  | Storm Mode?           | <u>Yes</u>   |
| 3.  | External Start?       | <u>No</u>  |
| 4.  | Start on              | <u>Depth and Rain (fourth choice)</u>                          |
| 5.  | Rain =                | <u>0.05 inch</u>   |
| 6.  | Rainfall Time Limit = | <u>60 min</u>  |
| 7.  | Level =               | <u>0.5 inch</u>  |
| 8.  | First Flush Period    | <u>20 min</u>  |
| 9.  | Number of Bottles     | <u>2</u>   |
| 10. | Set Timed Interval    | <u>Interval 01 = 0001 min</u><br><u>Interval 02 = 0000 min</u> |
| 11. | Samples/Bottle =      | <u>002</u>   |
| 12. | First Flush Vol =     | <u>950 mL</u>  |
| 13. | Calibrate Vol?        | <u>No/Yes</u>  |
| 14. | Sample Time limit?    | <u>480</u>   |
| 15. | Special Output?       | <u>Yes</u>   |
| 16. | Sample Output?        | <u>No</u>  |
| 17. | Event Output?         | <u>Yes</u>   |

use the NO/PASS key if 0000 is entered, else enter 0000 and press the NO/PASS key. The Yes key will not work.

-Ready to start-

Programming is complete. Press the START SAMPLING key to initiate the program/sampler.

Mesa 2- Broadway and Lindsay  
Sigma Stormwater Sampler Program

---

To begin programming the sampler, press the #2 key (change/halt)  
Enter 8000 as the access code

Press the \* key

- |     |                               |  |
|-----|-------------------------------|--|
| 1.  | Advanced Program Features     | <u>yes</u>   |
| 2.  | Number of Sample Bottles      | <u>8</u>   |
| 3.  | Units for Bottle Volume       | <u>mL</u>  |
| 4.  | Bottle Volume                 | <u>1900 mL</u>                                       |
| 5.  | Enter Units for Tubing Length | <u>Feet</u>  |
| 6.  | Length of Intake Tubing       | <u>60 feet</u> (Change each time tubing is replaced) |
| 7.  | Program Lock?                 | <u>Yes</u>   |
| 8.  | Enable Internal Flowmeter?    | <u>Yes</u>   |
| 9.  | Flow Units                    | <u>CFS</u>   |
| 10. | Program Delay?                | <u>No</u>  |
| 11. | Flow Mode?                    | <u>Yes</u>   |
| 12. | Variable Interval?            | <u>No</u>  |
| 13. | Interval                      | <u>2000 cu. Ft.</u> (Enter 20, the 00 is provided)   |
| 14. | Timed Override?               | <u>No</u>  |
| 15. | Discrete Mode?                | <u>Yes</u>   |
| 16. | Samples/Bottles?              | <u>Yes</u>   |
| 17. | Number of Samples/Bottles     | <u>4</u>   |
| 18. | Change Volume?                | <u>No/Yes</u>  |
| 19. | Sample Volume                 | <u>450 mL</u>  |
| 20. | Calibrate Volume?             | <u>No/Yes</u>  |
| 21. | Intake Rinses?                | <u>Yes</u>   |
| 22. | Rinse Cycles?                 | <u>1</u>   |
| 23. | Intake Faults?                | <u>Yes</u>   |
| 24. | Intake Faults                 | <u>2</u>   |
| 25. | Enter ID                      | <u>0002</u>  |
| 26. | Set Up Flowmeter?             | <u>Yes</u>   |
| 27. | Manning Formula               | <u>Yes</u>   |
| 28. | Pipe ID                       | <u>72.00</u> (Be sure to enter 7 2 0 0 )             |
| 29. | Roughness=                    | <u>0.013</u>   |
| 30. | Slope=                        | <u>0.11/100</u>                                      |
| 31. | Flow Recording Interval       | <u>1 min</u>   |
| 32. | Calibrate Depth Sensor?       | <u>No/Yes</u> (Yes during maintenance)               |
| 33. | Set Current Water Level       | <u>Enter current level if known</u>                  |

-Ready to Start-      proceed to page 2

Program for storm sampling

---

Press and hold the clear entry key

- |     |                       |  |
|-----|-----------------------|--|
| 1.  | Level control?        | <u>Yes</u>   |
| 2.  | Storm Mode?           | <u>Yes</u>   |
| 3.  | External Start?       | <u>No</u>  |
| 4.  | Start on              | <u>Depth and Rain (fourth choice)</u>                          |
| 5.  | Rain =                | <u>0.05 inch</u>   |
| 6.  | Rainfall Time Limit = | <u>60 min</u>  |
| 7.  | Level =               | <u>0.5 inch</u>  |
| 8.  | First Flush Period    | <u>20 min</u>  |
| 9.  | Number of Bottles     | <u>2</u>   |
| 10. | Set Timed Interval    | <u>Interval 01 = 0001 min</u><br><u>Interval 02 = 0000 min</u> |
| 11. | Samples/Bottle =      | <u>002</u>   |
| 12. | First Flush Vol =     | <u>950 mL</u>  |
| 13. | Calibrate Vol?        | <u>No/Yes</u>  |
| 14. | Sample Time limit?    | <u>480</u>   |
| 15. | Special Output?       | <u>Yes</u>   |
| 16. | Sample Output?        | <u>No</u>  |
| 17. | Event Output?         | <u>Yes</u>   |

use the NO/PASS key if 0000 is entered, else enter 0000 and press the NO/PASS key. The Yes key will not work.

-Ready to start-

Programming is complete. Press the START SAMPLING key to initiate the program/sampler.

Mesa 3- Falcon Field  
Sigma Stormwater Sampler Program

---

To begin programming the sampler, press the #2 key (change/halt)  
Enter 8000 as the access code

Press the \* key

- |     |                               |  |
|-----|-------------------------------|--|
| 1.  | Advanced Program Features     | <u>yes</u>   |
| 2.  | Number of Sample Bottles      | <u>8</u>   |
| 3.  | Units for Bottle Volume       | <u>mL</u>  |
| 4.  | Bottle Volume                 | <u>1900 mL</u>                                       |
| 5.  | Enter Units for Tubing Length | <u>Feet</u>  |
| 6.  | Length of Intake Tubing       | <u>27 feet</u> (Change each time tubing is replaced) |
| 7.  | Program Lock?                 | <u>Yes</u>   |
| 8.  | Enable Internal Flowmeter?    | <u>Yes</u>   |
| 9.  | Flow Units                    | <u>CFS</u>   |
| 10. | Program Delay?                | <u>No</u>  |
| 11. | Flow Mode?                    | <u>Yes</u>   |
| 12. | Variable Interval?            | <u>No</u>  |
| 13. | Interval                      | <u>4500 cu. Ft.</u> (Enter 45, the 00 is provided)   |
| 14. | Timed Override?               | <u>No</u>  |
| 15. | Discrete Mode?                | <u>Yes</u>   |
| 16. | Samples/Bottles?              | <u>Yes</u>   |
| 17. | Number of Samples/Bottles     | <u>4</u>   |
| 18. | Change Volume?                | <u>No/Yes</u>  |
| 19. | Sample Volume                 | <u>450 mL</u>  |
| 20. | Calibrate Volume?             | <u>No/Yes</u>  |
| 21. | Intake Rinses?                | <u>Yes</u>   |
| 22. | Rinse Cycles?                 | <u>1</u>   |
| 23. | Intake Faults?                | <u>Yes</u>   |
| 24. | Intake Faults                 | <u>2</u>   |
| 25. | Enter ID                      | <u>0003</u>  |
| 26. | Set Up Flowmeter?             | <u>Yes</u>   |
| 27. | Manning Formula               | <u>Yes</u>   |
| 28. | Pipe ID                       | <u>48.00</u> (Be sure to enter 4 8 0 0 )             |
| 29. | Roughness=                    | <u>0.013</u>   |
| 30. | Slope=                        | <u>0.14/100</u>                                      |
| 31. | Flow Recording Interval       | <u>1 min</u>   |
| 32. | Calibrate Depth Sensor?       | <u>No/Yes</u> (Yes during maintenance)               |
| 33. | Set Current Water Level       | <u>Enter current level if known</u>                  |

-Ready to Start-      proceed to page 2

Program for storm sampling

---

Press and hold the clear entry key

- |     |                       |  |
|-----|-----------------------|--|
| 1.  | Level control?        | <u>Yes</u>   |
| 2.  | Storm Mode?           | <u>Yes</u>   |
| 3.  | External Start?       | <u>No</u>  |
| 4.  | Start on              | <u>Depth and Rain</u> (fourth choice)                          |
| 5.  | Rain =                | <u>0.05</u> inch   |
| 6.  | Rainfall Time Limit = | <u>60</u> min  |
| 7.  | Level =               | <u>0.5</u> inch  |
| 8.  | First Flush Period    | <u>20</u> min  |
| 9.  | Number of Bottles     | <u>2</u>   |
| 10. | Set Timed Interval    | Interval 01 = <u>0001</u> min<br>Interval 02 = <u>0000</u> min |
| 11. | Samples/Bottle =      | <u>002</u>   |
| 12. | First Flush Vol =     | <u>950</u> mL  |
| 13. | Calibrate Vol?        | <u>No/Yes</u>  |
| 14. | Sample Time limit?    | <u>480</u>   |
| 15. | Special Output?       | <u>Yes</u>   |
| 16. | Sample Output?        | <u>No</u>  |
| 17. | Event Output?         | <u>Yes</u>   |

use the NO/PASS key if 0000 is entered, else enter 0000 and press the NO/PASS key. The Yes key will not work.

-Ready to start-

Programming is complete. Press the START SAMPLING key to initiate the program/sampler.

Mesa 4 - Horne and Grandview  
Sigma Stormwater Sampler Program

---

To begin programming the sampler, press the #2 key (change/halt)  
Enter 8000 as the access code

Press the \* key

- |     |                               |  |
|-----|-------------------------------|--|
| 1.  | Advanced Program Features     | <u>yes</u>   |
| 2.  | Number of Sample Bottles      | <u>8</u>   |
| 3.  | Units for Bottle Volume       | <u>mL</u>  |
| 4.  | Bottle Volume                 | <u>1900 mL</u>                                       |
| 5.  | Enter Units for Tubing Length | <u>Feet</u>  |
| 6.  | Length of Intake Tubing       | <u>75 feet</u> (Change each time tubing is replaced) |
| 7.  | Program Lock?                 | <u>Yes</u>   |
| 8.  | Enable Internal Flowmeter?    | <u>Yes</u>   |
| 9.  | Flow Units                    | <u>CFS</u>   |
| 10. | Program Delay?                | <u>No</u>  |
| 11. | Flow Mode?                    | <u>Yes</u>   |
| 12. | Variable Interval?            | <u>No</u>  |
| 13. | Interval                      | <u>1500</u> cu. Ft. (Enter 15, the 00 is provided)   |
| 14. | Timed Override?               | <u>No</u>  |
| 15. | Discrete Mode?                | <u>Yes</u>   |
| 16. | Samples/Bottles?              | <u>Yes</u>   |
| 17. | Number of Samples/Bottles     | <u>4</u>   |
| 18. | Change Volume?                | <u>No/Yes</u>  |
| 19. | Sample Volume                 | <u>450 mL</u>  |
| 20. | Calibrate Volume?             | <u>No/Yes</u>  |
| 21. | Intake Rinses?                | <u>Yes</u>   |
| 22. | Rinse Cycles?                 | <u>1</u>   |
| 23. | Intake Faults?                | <u>Yes</u>   |
| 24. | Intake Faults                 | <u>2</u>   |
| 25. | Enter ID                      | <u>0004</u>  |
| 26. | Set Up Flowmeter?             | <u>Yes</u>   |
| 27. | Manning Formula               | <u>Yes</u>   |
| 28. | Pipe ID                       | <u>54.00</u> (Be sure to enter 5 4 0 0 )             |
| 29. | Roughness=                    | <u>0.013</u>   |
| 30. | Slope=                        | <u>0.40/100</u>                                      |
| 31. | Flow Recording Interval       | <u>1 min</u>   |
| 32. | Calibrate Depth Sensor?       | <u>No/Yes</u> (Yes during maintenance)               |
| 33. | Set Current Water Level       | <u>Enter current level if known</u>                  |

-Ready to Start-      proceed to page 2

Program for storm sampling

---

Press and hold the clear entry key

- |     |                       |  |
|-----|-----------------------|--|
| 1.  | Level control?        | <u>Yes</u>   |
| 2.  | Storm Mode?           | <u>Yes</u>   |
| 3.  | External Start?       | <u>No</u>  |
| 4.  | Start on              | <u>Depth and Rain</u> (fourth choice)                          |
| 5.  | Rain =                | <u>0.05</u> inch   |
| 6.  | Rainfall Time Limit = | <u>60</u> min  |
| 7.  | Level =               | <u>0.5</u> inch  |
| 8.  | First Flush Period    | <u>20</u> min  |
| 9.  | Number of Bottles     | <u>2</u>   |
| 10. | Set Timed Interval    | Interval 01 = <u>0001</u> min<br>Interval 02 = <u>0000</u> min |
| 11. | Samples/Bottle =      | <u>002</u>   |
| 12. | First Flush Vol =     | <u>950</u> mL  |
| 13. | Calibrate Vol?        | <u>No/Yes</u>  |
| 14. | Sample Time limit?    | <u>480</u>   |
| 15. | Special Output?       | <u>Yes</u>   |
| 16. | Sample Output?        | <u>No</u>  |
| 17. | Event Output?         | <u>Yes</u>   |

use the NO/PASS key if 0000 is entered, else enter 0000 and press the NO/PASS key. The Yes key will not work.

-Ready to start-

Programming is complete. Press the START SAMPLING key to initiate the program/sampler.

Mesa 5 - Dobson Road south of Broadway  
Sigma Stormwater Sampler Program

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To begin programming the sampler, press the #2 key (change/halt)  
Enter 8000 as the access code

Press the \* key

- |     |                               |   |
|-----|-------------------------------|---|
| 1.  | Advanced Program Features     | <u>yes</u>  |
| 2.  | Number of Sample Bottles      | <u>8</u>  |
| 3.  | Units for Bottle Volume       | <u>mL</u>   |
| 4.  | Bottle Volume                 | <u>1900 mL</u>  |
| 5.  | Enter Units for Tubing Length | <u>Feet</u>   |
| 6.  | Length of Intake Tubing       | <u>70-80 feet</u> (Change each time tubing is replaced) |
| 7.  | Program Lock?                 | <u>Yes</u>  |
| 8.  | Enable Internal Flowmeter?    | <u>Yes</u>  |
| 9.  | Flow Units                    | <u>CFS</u>  |
| 10. | Program Delay?                | <u>No</u>   |
| 11. | Flow Mode?                    | <u>Yes</u>  |
| 12. | Variable Interval?            | <u>No</u>   |
| 13. | Interval                      | <u>2000</u> cu. Ft. (Enter 20, the 00 is provided)      |
| 14. | Timed Override?               | <u>No</u>   |
| 15. | Discrete Mode?                | <u>Yes</u>  |
| 16. | Samples/Bottles?              | <u>Yes</u>  |
| 17. | Number of Samples/Bottles     | <u>4</u>  |
| 18. | Change Volume?                | <u>No/Yes</u>   |
| 19. | Sample Volume                 | <u>450 mL</u>   |
| 20. | Calibrate Volume?             | <u>No/Yes</u>   |
| 21. | Intake Rinses?                | <u>Yes</u>  |
| 22. | Rinse Cycles?                 | <u>1</u>  |
| 23. | Intake Faults?                | <u>Yes</u>  |
| 24. | Intake Faults                 | <u>2</u>  |
| 25. | Enter ID                      | <u>0005</u>   |
| 26. | Set Up Flowmeter?             | <u>Yes</u>  |
| 27. | Manning Formula               | <u>Yes</u>  |
| 28. | Pipe ID                       | <u>30.00</u> (Be sure to enter 3 0 0 0 )                |
| 29. | Roughness=                    | <u>0.013</u>  |
| 30. | Slope=                        | <u>0.14/100</u>   |
| 31. | Flow Recording Interval       | <u>1 min</u>  |
| 32. | Calibrate Depth Sensor?       | <u>No/Yes</u> (Yes during maintenance)                  |
| 33. | Set Current Water Level       | <u>Enter current level if known</u>                     |

*as of 1/22/95*

-Ready to Start-      proceed to page 2

Program for storm sampling

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Press and hold the clear entry key

- |     |                       |  |
|-----|-----------------------|--|
| 1.  | Level control?        | <u>Yes</u>   |
| 2.  | Storm Mode?           | <u>Yes</u>   |
| 3.  | External Start?       | <u>No</u>  |
| 4.  | Start on              | <u>Depth and Rain (fourth choice)</u>                          |
| 5.  | Rain =                | <u>0.05 inch</u>   |
| 6.  | Rainfall Time Limit = | <u>60 min</u>  |
| 7.  | Level =               | <u>0.5 inch</u>  |
| 8.  | First Flush Period    | <u>20 min</u>  |
| 9.  | Number of Bottles     | <u>2</u>   |
| 10. | Set Timed Interval    | <u>Interval 01 = 0001 min</u><br><u>Interval 02 = 0000 min</u> |
| 11. | Samples/Bottle =      | <u>002</u>   |
| 12. | First Flush Vol =     | <u>950 mL</u>  |
| 13. | Calibrate Vol?        | <u>No/Yes</u>  |
| 14. | Sample Time limit?    | <u>480</u>   |
| 15. | Special Output?       | <u>Yes</u>   |
| 16. | Sample Output?        | <u>No</u>  |
| 17. | Event Output?         | <u>Yes</u>   |

use the NO/PASS key if 0000 is entered, else enter 0000 and press the NO/PASS key. The Yes key will not work.

-Ready to start-

Programming is complete. Press the START SAMPLING key to initiate the program/sampler.

Phoenix (for all sample units)  
Sigma 900 MAX Sampler Unit

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Some Basic Program Notes:

To start sampling: press the **RUN/STOP** key and follow the directions.

To see the current status, Press the **STATUS** key from the **MAIN MENU**.

The **MAIN MENU** key can be pressed at any time to return to that point.

The password is 9000.

To look at data, press **DISPLAY DATA** from the **MAIN MENU** and follow prompts.

1. Press the **MAIN MENU** key.
2. Press the **SETUP** key at the upper right side of the display.
3. Press the **MODIFY ALL ITEMS** key at the upper right side of the display.
4. **Number of bottles: 8**  
if 8 is displayed, press **ACCEPT**  
if 8 is not displayed, press **CHANGE CHOICE** until 8 appears, then press **ACCEPT**.
5. **Bottle Volume: 1900 mL**  
if 1900 mL is displayed, press **ACCEPT**  
if 1900 mL not displayed,  
Press **CHANGE UNITS** to change to mL AND  
Enter 1900 and press **ACCEPT**.
6. **Intake Tubing Length: 26 Ft.**  
PHX1 26 ft  
PHX2  
PHX3 19 ft  
PHX4 21 ft  
if the correct value is displayed, press **ACCEPT**  
if the correct value is not displayed, enter the correct value and press **ACCEPT**.
7. **Intake Tubing Type: 3/8" vinyl**  
if 3/8" vinyl is displayed, press **ACCEPT**  
if 3/8" vinyl is not displayed, press **CHANGE CHOICE** until it appears, then press the **ACCEPT** button.
8. **Program Lock: Enabled**  
if enabled is displayed, press **ACCEPT**  
if disabled is displayed, press **CHANGE CHOICE** until it appears, then press the **ACCEPT** button.

9. **Program Delay: Disabled**  
if disabled is displayed, press ACCEPT  
if enabled is displayed, press CHANGE CHOICE until it appears, then press the ACCEPT button.
10. **Sample Collection: Flow Proportional**  
if flow proportional is displayed, press ACCEPT  
if flow proportional is not displayed, press CHANGE CHOICE until it appears, then press the ACCEPT button.
11. **Flow Meter: Integral**  
if integral is displayed, press ACCEPT  
if integral is not displayed, press CHANGE CHOICE until it appears, then press the ACCEPT button.
12. **Take Sample Every: (PHX 1: 3000 cf, PHX 3: 1000 cf, PHX 4: 3000 cf)**  
if xxxx cf appears in the display, press ACCEPT  
if xxxx cf does not appear in the display,  
press CHANGE UNITS to get CF, AND  
enter xxxx and press ACCEPT.
13. **Timed Override?: Disabled**  
if disabled appears in the display, press ACCEPT  
if enabled appears in the display, press CHANGE CHOICE until it appears, then press ACCEPT.
14. **Take First Sample: Immediately**  
if immediately appears in the display, press ACCEPT  
if immediately does not appear in the display, press CHANGE CHOICE until it appears, then press ACCEPT.
15. **Deliver Each Sample To All Bottles?: No**  
If no appears in the display, press ACCEPT  
If yes appears in the display, press CHANGE CHOICE until it appears, then press ACCEPT.
16. **Choose a Method of Distribution: Samples/Bottle**  
If Samples/Bottle appears in the display, press ACCEPT.  
If Bottles/Sample appears in the display, press CHANGE CHOICE until it appears, then press ACCEPT.
17. **Samples/Bottle: 4**  
If 4 appears in the display, press ACCEPT.  
If 4 does not appear in the display, enter 4 and press ACCEPT.
18. **Liquid Sensors: Enabled**  
If enabled appears in the display, press ACCEPT  
If disabled appears in the display, press CHANGE CHOICE until it appears, then press ACCEPT.
19. **Sample Volume: 450 mL**  
If 450 mL appears in the display, press ACCEPT  
If 450 mL does not appear in the display, enter 450 and press ACCEPT.

20. Intake Rinses: 2  
If 2 appears in the display, press ACCEPT  
If 2 does not appear in the display, enter 2 and press ACCEPT.
21. Sample Retries: 2  
If 2 appears in the display, press ACCEPT  
If 2 does not appear in the display, enter 2 and press ACCEPT.
22. Site ID: ...011  
PHX1 ...011  
PHX2 ...022  
PHX3 ...033  
PHX4 ...044  
If the correct ID appears in the display, press ACCEPT  
If the correct ID does not appear in the display, enter 11 and press ACCEPT.
23. Do You Wish to Access Advanced Sampling Features?: Yes  
Press the button for YES.
24. Use the DOWN arrow key to go to STORMWATER and press SELECT.
25. Storm Water:Enabled  
If Enabled appears in the display, press ACCEPT  
If Enabled does not appear in the display, press CHANGE CHOICE until it appears, then press ACCEPT.
26. Storm Water Start Condition: Rain and Level  
If Rain and Level appears in the display, press ACCEPT  
If Rain and Level does not appear in the display, press CHANGE CHOICE until it appears, then press ACCEPT.
27. Storm Water Rain Trigger: 0.05 inch  
If 0.05 inch appears in the display, press ACCEPT  
If 0.05 inch does not appear in the display, enter 0.05 and press ACCEPT.
28. Rainfall Time Interval: 1:00  
If 1:00 (hr:min) appears in the display, press ACCEPT  
If 1:00 (hr:min) does not appear in the display, enter 100 and press ACCEPT.
29. Storm Water Level Trigger: 0.5 inch  
If 0.5 inch appears in the display, press ACCEPT  
If 0.5 inch does not appear in the display, enter 0.5 and press ACCEPT.
30. First Flush Number of Bottles: 2  
If 2 appears in the display, press ACCEPT  
If 2 does not appear in the display, enter 2 and press ACCEPT.
31. Choose a Method of Distribution: Samples/Bottle  
If Samples/Bottle appears in the display, press ACCEPT  
If Bottles/Sample appears in the display, press CHANGE CHOICE until it appears, then press ACCEPT.
32. First Flush: Samples per Bottle: 2  
If 2 appears in the display, press ACCEPT  
If 2 does not appear in the display, enter 2 and press ACCEPT.

33. **First Flush Interval 1: 0:05 (hr:min)**  
If 0:05 (hr:min) appears in the display, press **ACCEPT & REPEAT**  
If 0:05 (hr:min) does not appear in the display, enter 005 and press **ACCEPT & REPEAT**.
34. **First Flush Interval 2: 0:05 (hr:min)**  
If 0:05 (hr:min) appears in the display, press **ACCEPT & REPEAT**  
If 0:05 (hr:min) does not appear in the display, enter 005 and press **ACCEPT & REPEAT**.
35. **First Flush Interval 3: 0:05 (hr:min)**  
If 0:05 (hr:min) appears in the display, press **ACCEPT & REPEAT**  
If 0:05 (hr:min) does not appear in the display, enter 005 and press **ACCEPT & REPEAT**.
36. **First Flush Interval 4: 0:05 (hr:min)**  
If 0:05 (hr:min) appears in the display, press **ACCEPT & REPEAT**  
If 0:05 (hr:min) does not appear in the display, enter 005 and press **ACCEPT & REPEAT**.
37. **First Flush Sample Volume: 950 mL**  
If 950 mL appears in the display, press **ACCEPT**  
If 950 mL does not appear in the display, enter 950 and press **ACCEPT**.
38. **Program Time Limit: Enabled**  
If Enabled appears in the display, press **ACCEPT**  
If Disabled appears in the display, press **CHANGE CHOICE** until it appears, then press **ACCEPT**.
39. **Storm Water Program Time Limit: 8:00**  
If 8:00 (hr:min) appears in the display, press **ACCEPT**  
If 8:00 (hr:min) does not appear in the display, enter 800 and press **ACCEPT**.
40. Press **MAIN MENU** button.
41. Press **OPTIONS** from the main menu.
42. Press **ADVANCED OPTIONS**.
43. Enter 9000 and press **ACCEPT**.
44. Select **ALARMS** and press **SELECT**.
45. Scroll to **RAINFALL** using the down arrow keys, and press **SELECT**.
46. **Rainfall Alarm Condition: Enabled**  
If Enabled appears in the display, press **ACCEPT**  
If Disabled appears in the display, press **CHANGE CHOICE** until it appears, then press **ACCEPT**.
47. **Rainfall High Trigger Point: 0.05 inch**  
If 0.05 inch appears in the display, press **ACCEPT**  
If 0.05 inch does not appear in the display, enter 0.05 and press **ACCEPT**.
48. **Rainfall Time Interval: 1:00 (hr:min)**  
If 1:00 (hr:min) appears in the display, press **ACCEPT**  
If 1:00 (hr:min) does not appear in the display, enter 100 and press **ACCEPT**.

49. **Report Via Modem**  
Press **SELECT**
50. Press **RETURN**
51. Scroll to **CALIBRATION** if PT is to be calibrated.
52. Scroll to **COMMUNICATION SETUP** and press **SELECT**.
53. Scroll to **MODEM SETUP** and press **SELECT**.
54. **Modem Power: Enabled**  
If **Enabled** appears in the display, press **ACCEPT**  
If **Disabled** appears in the display, press **CHANGE CHOICE** until it appears and then press **ACCEPT**.
55. **Modem Baud Rate: 2400**  
If **2400** appears in the display, press **ACCEPT**  
If **2400** does not appear in the display, press **CHANGE CHOICE** until it appears and then press **ACCEPT**.
56. **Phone Number: 4151084**  
If **4151084** appears in the display, press **ACCEPT**  
If **4151084** does not appear in the display, enter **4151084** and press **ACCEPT**.
57. **Dial Method: Tone**  
If **Tone** appears in the display, press **ACCEPT**  
If **Pulse** appears in the display, press **CHANGE CHOICE** until it appears, then press **ACCEPT**.
58. Scroll to **RS-232** setup and press **SELECT**.
59. **RS-232 Baud Rate: 9600**  
If **9600** appears in the display, press **SELECT**  
If **9600** does not appear in the display, enter **9600** and press **ACCEPT**.
60. Press **RETURN**
61. Scroll to **DATA LOG** and press **SELECT**.
62. Scroll to **SELECT INPUTS** and press **SELECT**.
63. Scroll to **RAINFALL** and press **SELECT**.
64. **Rainfall Input Data: Logged**  
If **Logged** appears in the display, press **SELECT**  
If **Logged** does not appear in the display, press **CHANGE CHOICE** until it appears, then press **ACCEPT**.
65. **Rainfall Logging Interval: 1 min**  
If **1 min** appears in the display, press **ACCEPT**  
If **1 min** does not appear in the display, enter **1** and press **CHANGE CHOICE** until minutes appears in the display, then press **ACCEPT**.
66. Scroll to **LEVEL/FLOW** and press **SELECT**.
67. **Level/Flow Input Data: Logged**  
If **Logged** appears in the display, press **SELECT**  
If **Logged** does not appear in the display, press **CHANGE CHOICE** until it appears, then press **ACCEPT**.

68. Level/Flow Logging Interval: 1 min  
If 1 min appears in the display, press ACCEPT  
If 1 min does not appear in the display, enter 1 and press CHANGE CHOICE until minutes appears in the display, then press ACCEPT.
69. Press RETURN.
70. Scroll to EXTENDED POWER MODE and press SELECT.
71. Extended Power Mode: Disabled  
If Disabled appears in the display, press ACCEPT  
If Enabled appears in the display, press CHANGE CHOICE until it appears, then press ACCEPT.
72. Press RETURN.
73. Scroll to SET MEMORY MODE and press SELECT.
74. Memory Mode: Wrap  
If Wrap appears in the display, press ACCEPT  
If Wrap does not appear in the display, press CHANGE CHOICE until it appears then press ACCEPT.
75. Press RETURN.
76. Scroll to FLOW METER SETUP and press SELECT.
77. Flow Units: cfs  
If cfs appears in the display, press ACCEPT  
If cfs does not appear in the display, press CHANGE CHOICE until it appears then press ACCEPT.
78. Level Units: in  
If in appears in the display, press ACCEPT  
If in does not appear in the display, press CHANGE CHOICE until it appears then press ACCEPT.
79. Primary Device: Manning Equation  
If Manning Equation appears in the display, press ACCEPT  
If Manning Equation does not appear in the display, press CHANGE CHOICE until it appears then press ACCEPT.
80. Shape: Circular Pipe  
If Circular Pipe appears in the display, press ACCEPT  
If Circular Pipe does not appear in the display, press CHANGE CHOICE until it appears then press ACCEPT.
81. Pipe Diameter:  
PHX1 75 inch  
PHX2  
PHX3 54 inch  
PHX4 66 inch  
If the value in the display is correct, press ACCEPT  
If the value in the display is incorrect, enter the correct value (75, 54, 66, etc.), and press SELECT.

82. Pipe Slope:  
PHX1 0.0009  
PHX2  
PHX3 ~~0.0023~~ 0.0029  
PHX4 0.0032

If the value in the display is correct, press **ACCEPT**

If the value in the display is incorrect, enter the correct value (0.0009, 0.0023, etc.), and press **ACCEPT**.

83. Pipe Roughness: 0.013

If 0.013 appears in the display, press **SELECT**

If 0.013 does not appear in the display, enter 0.013 and press **ACCEPT**.

84. Total Flow Units: cf

If cf appears in the display, press **SELECT**

If cf does not appear in the display, press **CHANGE CHOICE** until it appears and press **ACCEPT**.

85. Press **RETURN**.

86. Scroll to **FLOW TOTALIZER**, and press **SELECT**.

87. Scroll to **MODIFY SETUP**, and press **SELECT**.

88. Totalizer Scaling: x 1

If x 1 appears in the display, press **ACCEPT**

If x 1 does not appear in the display, press **CHANGE CHOICE** until it appears, and then press **ACCEPT**.

89. Total Flow Units: cf

If cf appears in the display, press **ACCEPT**

If cf does not appear in the display, press **CHANGE CHOICE** until it appears, and then press **ACCEPT**.

90. Press **RETURN**.

91. Press **RETURN**.

92. Press **MAIN MENU**.

93. Ready to Start, press **RUN/STOP** to begin sampling.