Work Instruction (WI)

DIRECTIVE NO.	250-WI-8500.5.3E	**APPROVED BY Signature:**	*Original signed by*
EFFECTIVE DATE:	06/28/2019	**NAME:**	Kimberly Finch, P.E.
EXPIRATION DATE:	06/28/2024	**TITLE:**	Chief, Medical and Environmental Management Division

COMPLIANCE IS MANDATORY

Responsible Office: 250 / Medical and Environmental Management Division

Title: National Pollutant Discharge Elimination System (NPDES) Sampling and Analysis Plan

TABLE OF CONTENTS

PREFACE 3
1.0 METHOD SUMMARY 6
2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) 7
2.1 Field QA/QC 7
2.2 Laboratory QA/QC Reporting Requirements 8
2.3 Sample Identification 9
2.4 Quality Control Samples - Duplicates 9
3.0 PROCEDURES 9
3.1 Preparation for Sampling 9
3.2 Monthly and Quarterly Sample Collection 10
3.3 Sample Collection Sites 11
3.4 Flow Volume Determination 11
3.5 Decontamination 12
3.6 Sample Shipment 12
3.7 Analytical Methods 12
3.8 Non-Compliances 13
3.9 Effluent Limitations 13
3.10 Filtration Procedures 13
Appendix A – Definitions 15
Appendix B – Acronyms 16
Appendix C – Eight Hour Composite Setup and Programming Instructions 17
Appendix D – Sample Locations 19

CHANGE HISTORY LOG 20

PREFACE

P.1 PURPOSE

This WI defines the procedures for conducting monthly and quarterly sampling to ensure compliance with NASA Goddard Space Flight Center's (GSFC) NPDES industrial discharge permit.

P.2 APPLICABILITY

a. This instruction applies to the Medical and Environmental Management Division (MEMD) civil servants, and their authorized contractors at GSFC, Greenbelt only.

b. In this document, all document citations are assumed to be the latest version unless otherwise noted.

c. In this document, all mandatory actions (i.e., requirements) are denoted by statements containing the term "shall." The terms "may" or "can" denote discretionary privilege or permission; "should" denotes a good practice and is recommended but not required; "will" denotes expected outcome; and "are/is" denotes descriptive material.

P.3 APPLICABLE DOCUMENTS AND FORMS

a. 40 Code of Federal Regulations (CFR) Part 136.
b. Goddard Procedural Requirement (GPR) 8500.5, Water Management
c. Maryland Department of the Environment (MDE), State Discharge Permit/NPDES Permit (current permit available in MEMD files)
d. 250-WI-8500.0.5, Contract Laboratory Audit Inspection
e. 250-WI-8500.5.9, Calibration, Use, and Storage of Water Sampling Equipment
f. NPDES Flow Methodology (see MEMD files for current methodology)
g. Teledyne ISCO 6712 Portable Sampler Installation and Operation Guide
h. Sigma 900 MAX Portable Sampler Instruction Manual

P.4 CANCELLATION

250-WI-8500.5.3D

P.5 TOOLS, EQUIPMENT, AND MATERIALS

Field tools, equipment, materials, and personal protective equipment (PPE) for Monthly NPDES sampling include:

- Hanna HI 98183 or HI 98191 pH/ORP meter, with buffer solutions and deionized (DI) water;
- Disposable hand warmers (to warm hands and pH buffers during cold weather);
- Hach Pocket Colorimeter II;
- Syringes and filters for testing chlorine;

- Sample containers and labels (refer to section 3.7 for complete list of required containers);
- Cooler to ship samples to lab;
- Ice for cooler;
- NPDES Logbook;
- Indelible ink pens;
- Paper towels;
- 0.45 µm membrane filter assembly and vacuum for dissolved copper samples;
- Insect repellant, if desired;
- Watch;
- Protective gloves and eyewear; and
- A graduated container or cylinder.

Field tools, equipment, materials, and PPE for Quarterly NPDES sampling include:

- Protective gloves and eyewear;
- NPDES Logbook;
- Indelible ink pens;
- Insect repellant, if desired;
- Ice for sampler during warm months and ice for cooler;
- Disposable hand warmers (to warm hands during cold weather);
- Cooler to ship samples to lab;
- Portable samplers (one for each outfall): Sigma 900Max Sampler or ISCO 6712 Portable Sampler;
- Accessories for each sampler including composite bottles, vinyl tubing, strainers, and batteries; and
- Plastic funnels (2) for pouring composite samples.

P.6 SAFETY PRECAUTIONS AND WARNINGS

The NPDES compliance sampling does not pose a threat to human health when PPE is worn correctly. When sampling, new protective gloves shall be donned for each location to prevent possible contamination of samples. Proper non-slip footwear should be worn to prevent slips and falls. Sampling procedures will be performed by a team of two. Care should be taken to prevent tick bites, as Lyme disease is prevalent throughout Maryland. At a minimum, personnel performing sampling activities must check for ticks at the end of the work day.

P.7 TRAINING

There is no formal training requirement for this activity.

P.8 RECORDS

Record Title	Record Custodian	Retention
NPDES Logbook	MEMD	*NRRS 8/23.5A11 Destroy after second reissuance of permit or 10 years after permit expires or is cancelled. Retention should be coordinated with related permit.
Quarterly Discharge Monitoring Reports (DMR)	MEMD	*NRRS 8/23.5A11 Destroy after second reissuance of permit or 10 years after permit expires or is cancelled. Retention should be coordinated with related permit.

** NRRS 1441.1 – NASA Records Retention Schedule*

P.9 MEASUREMENT/VERIFICATION

None.

Instructions

1.0 METHOD SUMMARY

1.1 There are two locations at GSFC that receive industrial effluent discharges to waters of the state. GSFC's NPDES permit requires sampling of certain parameters at these locations. Sampling and analysis for these locations ascertain compliance with discharge limitations for the NPDES permit and, if necessary, provide evidence to initiate the design and installation of appropriate treatment devices to protect surface water resources. Sampling is performed by authorized MEMD personnel only.

1.2 Discharge limitations stipulated within the permit apply to the following locations within GSFC:

a. GSFC main pond, sampling point located at the outflow pipe (Outfall 001), pH is monitored at the inflow pipe into the pond system; and
b. GSFC Earth Observing System Data and Information System (EOSDIS) pond, sampling point located at the outflow pipe (Outfall 004).

See section 3.3 for specific details pertaining to sample collection sites.

1.3 Laboratory contract management, logistical coordination, sample collection, data analysis, and report preparation will be completed by authorized MEMD or contract support personnel only. A listing of acceptable Analytical Methods is provided in section 3.7.

1.4 Sampling shall be completed during dry weather conditions, defined as having no rainfall, snow, or other type of precipitation with sufficient volume to allow runoff for at least 24 hours before the sampling is to take place. For snow, sampling should occur no earlier than 24 hours after the snow has ceased melting (either due to remaining frozen or after melting).

1.5 Sampling shall be completed at the frequency specified by the permit (monthly or quarterly) unless no flow is present; this condition will be recorded in the logbook. MEMD or contract support personnel will maintain notes in the logbook of conditions pertaining to sampling. For instance, in the event there is "no flow" for the duration of a month, the logbook will be noted weekly to verify that the outfall was checked for discharge until conditions allow for sampling to take place. In addition, MEMD will log the weather conditions on the day of sampling, and note that there has been no precipitation in the past 24 hours preceding sampling. In the case of frozen precipitation, the melting of snow or ice may constitute precipitation depending on the significance of daily temperature fluctuations.

1.6 Each sampling location shall have its own collection container to avoid cross contamination. Sampling parameters are listed below in section 3.2.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

The following general quality assurance procedures shall apply:

2.1 Field QA/QC

2.1.1 Document all data in GSFC's NPDES Logbook using indelible black or blue ink pen to include samplers' names, date/time, sampling event, weather conditions, and any deviations from this WI. Any problems (e.g., difficult to take sample due to low flow), non-compliance results (e.g., exceeded chlorine limit), and/or equipment problems (e.g., pH meter not functioning) shall be entered into the NPDES Logbook. Include the following information in the NPDES Logbook:

a. Date, name of sampling event, weather conditions, persons present;
b. Statement of "no precipitation in previous 24 hours";
c. For each outfall:
   (1) Time arrived at outfall;
   (2) Sampling parameters;
   (3) Sample identification number and time; and
   (4) Notes (use this space to report problems, outfall conditions, and necessary deviations from this WI.)

2.1.2 Chain of Custody (COC) information should be documented during each step of the event. Information documented onto COC forms during sampling will include:

a. Client name, project name, and sampler(s) name;
b. Sample identification;
c. Date/Time collected;
d. Grab/Composite indication;
e. Sample matrix (surface water);
f. Total number of containers per sample identification;
g. Analyses requested;
h. Preservative used, if applicable; and
i. Note that dissolved metal samples have already been filtered and any other remarks or conditions.

2.1.3 All instrumentation will be operated in accordance with the manufacturer's operating instructions, unless otherwise specified in this WI. Equipment calibration activities will occur prior to sampling/operation and will be documented in the NPDES Logbook. Calibration records in the NPDES Logbook will include: time; results; field conditions; and manufacturer, lot number, and expiration date of the standards used for the calibration. Decontaminate instrumentation before and after calibration to prevent cross-contamination (see Section 3.5).

a. Calibration procedures are described in 250-WI-8500.5.9, Calibration, Use, and Storage of Water Sampling Equipment. Calibration shall be followed with pH checks using at least three pH buffers (ranging between pH 4 and 10). If the sample pH result is less than 6.5 or greater than 8.5, the pH

meter calibration will be checked using the two buffers closest to the sample result (e.g., sample pH 9.1 – use pH buffers 7 and 10.) If the calibration for either buffer is off by 0.1 or more pH units, the sample result is invalid. Make a record in the logbook indicating that the sample result is invalid due to pH calibration failure. Recalibrate the pH meter and resample. Perform a calibration check following resampling. If the calibration check following resampling is off by 0.1 or more pH units, this result is also invalid. Get the backup pH meter and fresh buffers and start the process over.

b. The chlorine colorimeter shall be calibrated prior to each NPDES sampling event using one blank and a set of three reference standards within the range of 0.00 to 2.00 mg/L. Calibration procedures are described in 250-WI-8500.5.9. The chlorine colorimeter functions by passing a beam of light through the sample. Even something as simple as a fingerprint or smudge on the colorimeter sample container can cause significant errors. Similarly, variations in the amount of suspended matter in the sample can cause erroneous results.

Note: Fill both sample vials with a filtered sample (See 250-WI-8500.5.9). Carefully clean the sample vials making sure there is no lint or smudges remaining. Follow the procedures in 250-WI-8500.5.9 and record the sample result. If the sample result is 0.1 mg/l or greater, clean all of the equipment including the container used to obtain the sample with DI water. Resample and record the sample result. If the two samples have a difference greater than 0.02 mg/l, clean the equipment again and resample. Continue this process until two consecutive results are within 0.02 mg/l of each other. Note in the logbook that only the final two results are valid and the prior results were invalid due to calibration/sampling error.

2.2 Laboratory QA/QC Reporting Requirements

MEMD shall ensure that the laboratory has a QA/QC program in place that meets the minimum requirements established in the approved analytical methods. The program will be evaluated periodically in compliance with 250-WI-8500.0.5, Contract Laboratory Audit Inspection. The selection of United States Environmental Protection Agency (EPA) methods will be verified annually using 40 CFR Part 136. Laboratory data will include the following, as a minimum:

a. Laboratory sample identification;
b. Date and time sample collected;
c. Preservation techniques;
d. Date sample received at laboratory;
e. Date sample extracted (if applicable);
f. Date sample analyzed;
g. Parameter analyzed;
h. Methodology;
i. Instrumentation;
j. Dilution factor (if applicable);

k. Detection Limits - Numeric values must be submitted for all analyses. If values are below detection limit, indicate the numeric detection limit (e.g., <0.01 mg/L);
l. Concentration/units;
m. Technician performing analysis;
n. Related comments;
o. A cooler receipt (showing the pH, temperature, and overall sample conditions); and
p. Signature by qualified quality assurance professional.

2.3 Sample Identification

Samples shall be identified by using the sampling date and outfall number as follows: YYYYMMDD-00x (e.g., 20031215-001). If a composite sample is collected on the same day as a grab sample, the samples must be differentiated by adding the letter C to the composite sample identification.

2.4 Quality Control Samples - Duplicates

2.4.1 Per EPA protocols, for each batch of up to 20 samples, the laboratory analyzes at least 10 percent of samples as duplicates or as matrix spikes/matrix spike duplicates. Protocols vary from method to method and may depend on the number of components or analytes measured by a procedure. The laboratory routinely selects duplicate QC samples from among the samples they have received.

2.4.2 At a minimum, duplicate field samples will be collected at least once every tenth sampling event. Duplicates shall be collected for all laboratory and field parameters. Duplicate samples may be identified by adding a letter (e.g., 20170703-001A and 20170703-001B).

3.0 PROCEDURES

The following procedures shall be followed:

3.1 Preparation for Sampling

3.1.1 Prior to sampling:

a. Order bottles from lab for delivery at least two days before the planned sampling date.
b. Consult forecasted weather and prepare the sampling schedule accordingly to ensure ample precipitation-free weather. Notify necessary parties.
c. Set up equipment for 8-hour composite sampling once per quarter. Programming instructions and field setup are provided in Appendix C. Note that composite samples may need to be collected on a different schedule to allow for weather and holding time restrictions. Total phosphorus needs to be analyzed within 48 hours. Check with the lab to see if they work on the weekends; otherwise, composite sampling may be restricted to ensure adequate time to deliver sample for processing. This is particularly true when sending samples on Friday.
d. Notify laboratory for courier service remembering to account for critical scheduling factors.

3.1.2 Day of Sampling (before entering the field):

a. Obtain necessary sampling and monitoring equipment and PPE.
b. Decontaminate or pre-clean equipment and ensure that it is in working order.
c. Calibrate pH meter (see Section 2.1).
d. Calibrate colorimeter for chlorine determination (see Section 2.1).
e. Prepare sample bottle labels (leaving the "time sampled" portion blank).
f. Mobilize equipment and set up for sampling event.

3.2 Monthly and Quarterly Sample Collection

Monthly and quarterly samples are collected at both outfalls. Locations are listed in section 3.3.

3.2.1 Quarterly samples consist of an 8-hour composite. The composite shall be analyzed for total nitrogen (i.e., nitrate-nitrite and total Kjeldahl nitrogen) and total phosphorus. The composite samples must be planned to ensure no precipitation occurred in the previous 24-hour period and that no precipitation is forecasted to occur during the duration of the 8-hour composite. Set up and programming instructions for quarterly sampling are provided in Appendix C.

3.2.2 Monthly sampling consists of flow, total residual chlorine (TRC), temperature, pH, total and dissolved copper, and hardness. Flow measurement is addressed in Section 3.4. TRC, temperature and pH are measured onsite using the calibrated meters. Laboratory samples for total and dissolved copper and hardness are collected as grabs. Field parameters for TRC and pH are also collected as grab samples. Laboratory samples are sent out for contract laboratory analysis.

Notes on Sample Collection:
(1) The pH and temperature will be measured with the calibrated Hanna HI 98183 or HI 98191 meter by lowering the probe (or probes if an integrated sensor is not used) into a container of the effluent and waiting until the meter stabilizes. Calibration and operating procedures are described in 250-WI-8500.5.9.
(2) TRC shall be analyzed by using the calibrated Hach Pocket Colorimeter II in the Low Range (0.02 to 2.00 mg/L Cl_2). A glass container will be used to collect the sample to fill the 10-mL blank cell and the second 10-mL cell to which the content of one DPD Total Chlorine Powder Pillow is added. Calibration and operating procedures are described in 250-WI-8500.5.9.
(3) Samples will be collected using a collection device (e.g., bottle) by lowering the collection device into the center of flow and obtaining the sample. One must be careful not to collect debris within the sample, and not to overfill and spill the preservative.
(4) The dissolved metal samples shall be filtered and preserved within 24-hours of sample collection. The samples will be filtered in-house, when possible, prior to transporting to the laboratory for analysis. The sample filtration procedure is described in section 3.10. If filtration in-house is not possible, arrangements must be made for the laboratory to perform filtration.

3.3 Sample Collection Sites

A map of the two outfall locations and the additional pH monitoring location is provided in Appendix D. Photos of the sampling locations are also provided in Appendix D.

3.3.1 Outfall 001

Outfall 001 is located where the GSFC main pond discharges to waters of the state on the northwest quadrant of GSFC. The site can be accessed using the gravel access driveway near the perimeter road adjacent to the parkway gate. Sampling will be performed at the discharge pipe at the north end of the pond for all parameters except pH. The pH at Outfall 001 will be monitored at the inlet of the sediment pond, south of Cobe Road, adjacent to the Main Pond.

3.3.2 Outfall 004

a. Outfall 004 is located where the EOSDIS pond behind building 32 discharges to waters of the state on the southern perimeter. Water within the pipe flows slowly in periods with few rain events; this makes it difficult to sample from the discharge pipe. GSFC was therefore granted permission to collect samples from the pond near the outlet structure. Sampling shall be completed at the outlet structure at the southwest end of the pond near IceSAT Road.

b. Outfall 004 can experience times when there is no flow to waters of the state. During these times, MEMD shall inspect the spillway at least once a week to determine whether the pond discharged at some time during the month. If the spillway is wet, then Outfall 004 will be sampled even if it is not flowing on the day of sampling. If the spillway is dry at Outfall 004 for the entire one-month period in which NPDES compliance sampling should be performed, “no flow” will be entered on the DMR for that given month.

3.4 Flow Volume Determination

Flow determination calculations for Outfalls 001 and 004 are documented in the NPDES Flow Methodology, which is available in MEMD file number E-6.2.1.2. Revisions to the flow methodology, as well as temporary deviations, shall be documented and reported to MDE with the corresponding DMR.

3.5 Decontamination

a. Ensure sampling equipment is in good operating condition.
b. Prior to and between sampling events, clean all equipment that will contact the discharge to be sampled using the following decontamination procedure:
   (1) Rinse equipment with tap water;
   (2) Wash equipment with a laboratory grade detergent in solution;
   (3) Wash sensors with brush;
   (4) Rinse with tap water followed by a DI water rinse; and
   (5) Air dry and store equipment as described in associated WI or manual.

3.6 Sample Shipment

Pack labeled sample containers following preservation techniques for associated analytical methods. All samples will be packed securely in a cooler with ice. Container lids will be tightened to prevent sample loss. Glass containers will be wrapped in bubble wrap or a similar protective media to prevent breakage. Complete COC and arrange for transportation to laboratory. Most laboratories provide courier service. Alternatively, samples can be shipped using an overnight shipping service such as UPS or FedEx.

3.7 Analytical Methods

Samples shall be analyzed using only the approved analytical methods, preservation techniques, and processed within the specified holding times. The following analytical methods are specified in the NPDES industrial permit (or by reference to 40 CFR Part 136). See footnote at the bottom of the table.

Analytical Parameter	**Analytical Methods[1]**	**Container Size / Type**	**Preservative** (Cool all samples to ≤ 6°C)	**Holding Time**
Copper, total	EPA 200.8[2]	250 mL plastic	HNO_3 to pH<2	6 months
Copper, dissolved	EPA 200.8[2]	250 mL plastic	Initial collection: Neat; After filtration: HNO_3 to pH<2	filter and preserve within 24 hours; 6 months thereafter
Hardness, total as $CaCO_3$	SM 2340 C, or Ca plus Mg by EPA 200.8	250 mL plastic	HNO_3 to pH<2	28 days
Kjeldahl nitrogen, total	EPA 351.2	250 mL plastic	H_2SO_4 to pH<2	28 days
Nitrate-nitrite	EPA 300.0	250 mL plastic	Neat	48 hours
Phosphorus, total	EPA 365.3	250 mL plastic	H_2SO_4 to pH<2	28 days

[1] See 40 CFR Part 136 except as noted.
[2] NPDES permit number 08DP3156 (MDG0067482). Deviations are strictly prohibited unless authorized by a modification to the permit.

3.8 Non-Compliances

The GSFC NPDES Water Program Manager shall be notified immediately of any permit non-compliance by phone and e-mail. See section 3.9 for NPDES permit limits. Notification should include the following information: parameter of non-compliance, result, possible cause of non-compliance, date, and time of sampling. The GSFC NPDES Water Program Manager will then contact MDE and inform them of the permit non-compliance. Further monitoring instructions may follow per MDE's discretion.

3.9 Effluent Limitations

Parameter	Daily Minimum	Quarterly Average	Daily Maximum	Annual Maximum	Units
Flow (effluent)		Report	Report		gpd[1]
Flow (combined-stormwater and effluent)		Report	Report		MG/ Quarter[2]
Copper (total)		0.009	0.013		mg/L[3]
Copper (dissolved)		Report	Report		mg/L
Total Residual Chlorine[4]		0.011	0.019		mg/L
Hardness (as CaCO3)		Report	Report		mg/L
Temperature			90		°F
pH	6.5		8.5		pH
Phosphorus, Total (as P)		Report		Report (Net)	lbs/quarter and lbs/year
Nitrogen, Total (as N)		Report		Report (Net)	lbs/quarter and lbs/year

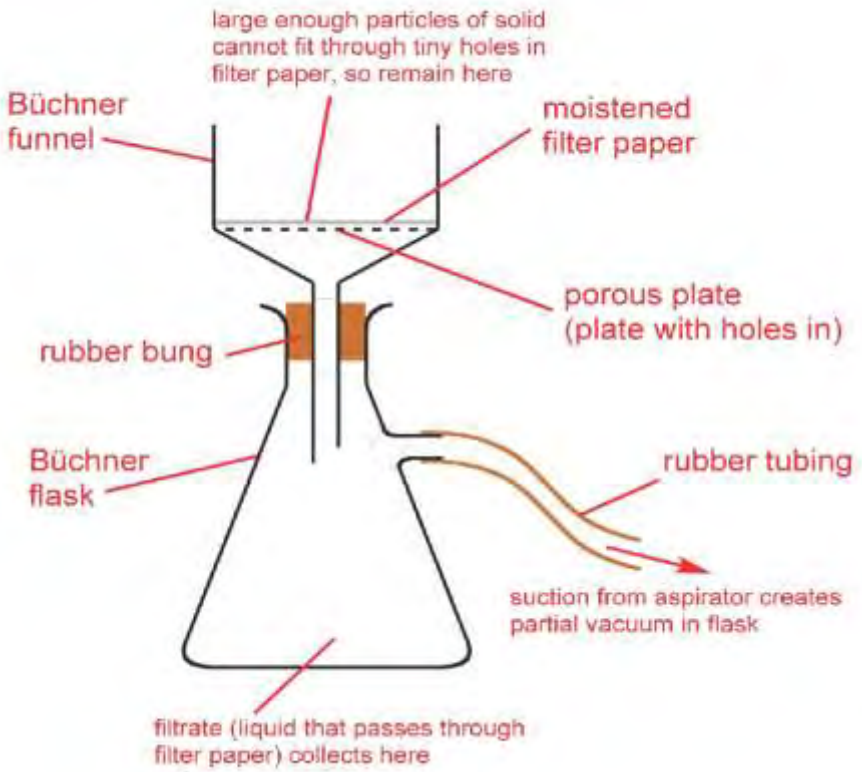
[1]Gallons per day
[2]Million gallons per quarter
[3]Milligrams per liter
[4]This level is undetectable using current field techniques. The quantification level is 0.10 mg/L and all results under this level will be reported as <0.10 mg/L per the NPDES permit.

3.10 Filtration Procedures

Dissolved copper samples will be collected in unpreserved containers. Plastic containers are acceptable.

a. Set up filtration apparatus by one of the following methods:
   (1) For disposable 0.45 µm filter units: Take filter container out of bag and make sure glass fiber filter paper is in top receiving funnel.
   (2) For reusable filtration apparatuses: Assemble clean apparatus as shown in figure below using 0.45 µm membrane filter paper.
b. Pour sample into receiving funnel.

c. Secure vacuum hose to nozzle on flask.
d. Turn water on (for aspirators) or activate vacuum pump; vacuum pressure will draw sample liquid from top receiving funnel into bottom flask.
e. Once sufficient sample volume is filtered into bottom flask, remove receiving funnel and pour contents of bottom flask into preserved container(s).
f. Repeat steps 1-5 for additional sample volume as necessary.
g. Enter the time dissolved copper samples were filtered in the NPDES logbook.



Appendix A – Definitions

A.1 Chain of Custody (COC) – A form, provided by the laboratory, that shows the record of custody of samples. The Chain of Custody is completed with the sample information (number of samples, testing to be performed, etc.) and is signed by the person packaging the cooler with the water samples. When the lab's courier service picks up the samples, the driver signs the form and gives the customer a copy. When the samples arrive at the lab, the form is signed again, indicating the samples arrived at their intended destination.

A.2 Grab Sample – An individual sample collected over a time period not exceeding 15 minutes.

A.3 Neat – A sample container without a preservative.

Appendix B – Acronyms

COC	Chain of Custody
DI	Deionized
DMR	Discharge Monitoring Report
EOSDIS	Earth Observing System Data and Information System
EPA	Environmental Protection Agency
GPD	Gallons per Day
GPR	Goddard Procedural Requirement
GSFC	Goddard Space Flight Center
H_2SO_4	Sulfuric acid
HNO_3	Nitric Acid
MDE	Maryland Department of the Environment
MEMD	Medical and Environmental Management Division
NPDES	National Pollutant Discharge Elimination System
PPE	Personal Protective Equipment
QA/QC	Quality Assurance/Quality Control
TRC	Total Residual Chlorine
WI	Work Instruction

Appendix C – Eight Hour Composite Setup and Programming Instructions

Outfall Setup:

Place the sampler on the concrete structure located over the sampling locations. Drape the vinyl tubing so that the strainer will be submerged but not resting in the substrate of the pond or stream. The strainer shall be attached to the intake end of the tubing and connected to the intake of the sampler. Measure the tubing or suction line and note the length so it can be entered in the programming (step 7 for the ISCO 6712 Portable Sampler). For Outfall 001, the concrete structure has limited space and a refrigerated sampler will not fit without modification to the structure. A temporary structure or alternative location can be used at the discretion of the field sampling team. If a portable sampler is used, ice should be placed around the composite sampler bottle to ensure sample preservation during the program. Ice can be omitted during winter months when temperatures are cold. Connect the sampler to a power source (battery, generator, etc.). Use the programming instructions that follow for the selected sampler. Once programming is complete, ensure that the program is running.

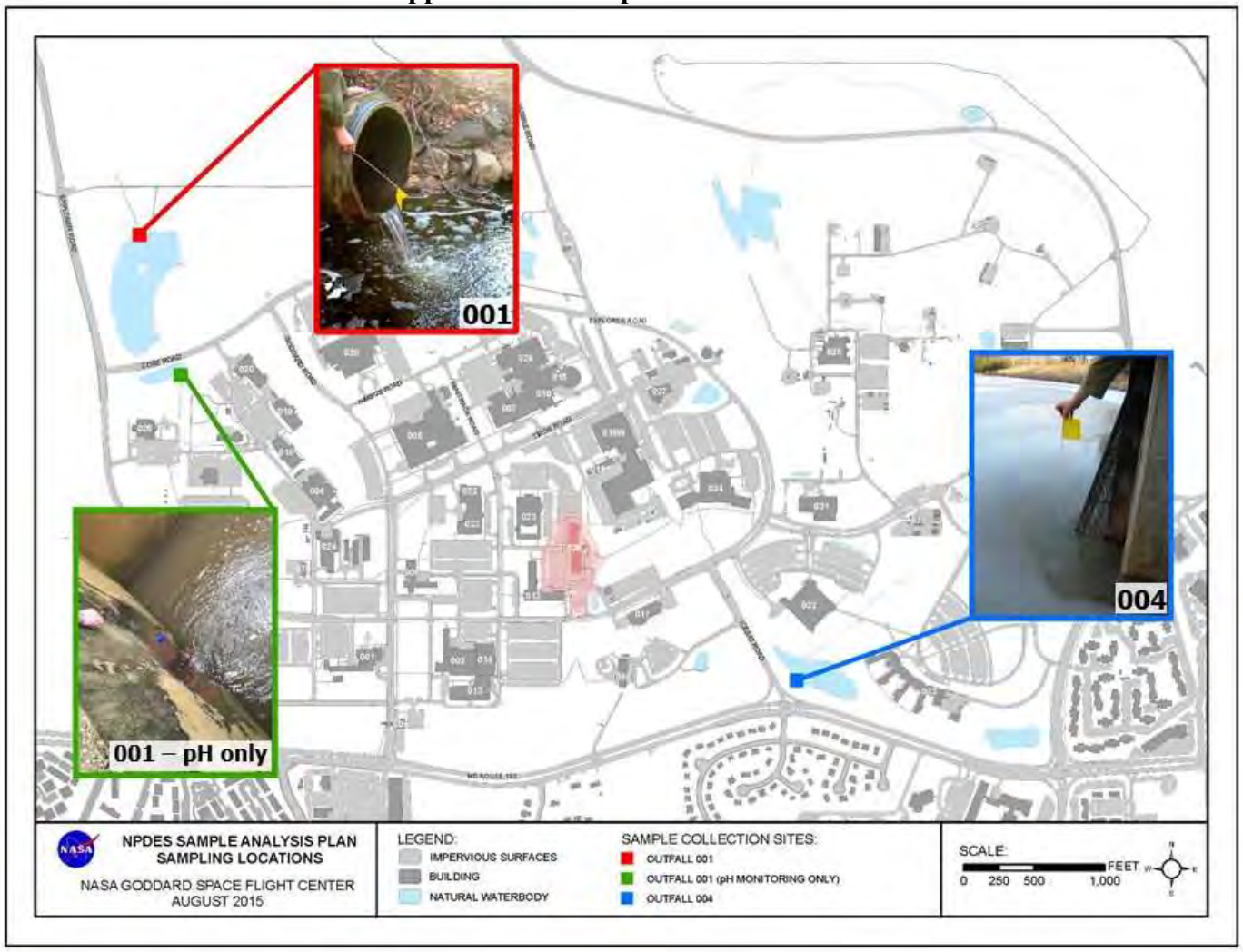
Programming instructions for the ISCO 6712 Portable Sampler:

(1) Turn on sampler.
(2) Initiation screen should indicate you are in standard programming mode. If not, change by entering 6712.1 when the main menu screen displays.
(3) Select program.
(4) Enter "site description" as 001 or 004. See section 3.3 for sample site locations. Select done.
(5) Under number of bottles, select 1.
(6) Enter the bottle volume in liters (e.g., 5 liters).
(7) Enter suction line length in feet. This will vary depending on the position of the sampler. Measure the hose and enter this value.
(8) Select time paced sampling.
(9) For time between sample events, enter 30 minutes.
(10) Select no for "run continuously."
(11) Enter 17 samples to take.
(12) Enter sample volume. Adjust as necessary to ensure you do not overflow the composite bottle. For example, 250 mL sample volume times 17 samples equals 4,250 mL or 4.25 liters. If your composite bottle is only 3 liters you need to reduce the sample volume.
(13) Select clock time and enter the time to start sampling.
(14) Select day to start sample. The selected item will be flashing. Select done.
(15) Screen will display programming complete. Select yes to start.
(16) Verify time and date are correct for start and current time.
(17) If current time is incorrect, stop program and use the following steps to change the date/time:
    (a) Select main menu.
    (b) Select other functions.
    (c) Select maintenance.
    (d) Select set clock.
    (e) Enter time and date.

(f) Press stop.

(18) Stop the program and perform volume calibration using the following steps:
- (a) Select main menu.
- (b) Select other functions.
- (c) Select manual functions.
- (d) Select calibrate volume.
- (e) Enter a sample volume (e.g., 250 mL).
- (f) Use a graduated jar or cylinder to collect sample.
- (g) Press enter button when ready.
- (h) Screen will display purging suction line, pumping [selected volume], and purging suction line again. When complete, enter volume delivered in mL as indicated by the graduated jar or cylinder.
- (i) Screen will ask you to verify the entered value. Select yes to confirm or no to correct the entered value.

Appendix D – Sample Locations



CHANGE HISTORY LOG

Revision	Effective Date	Description of Changes
Baseline	10/12/2006	Initial Release
A	5/22/2008	• Section 2.1: Included additional instructions for pH and chlorine monitoring. • The table in Section 3.7 was revised.
B	3/26/2010	• Changed Safety and Environmental Division (S&E) references to Medical and Environmental Management Division (MEMD) due to division reorganization. • Updated signature block.
C	9/28/2012	• Put WI on new template. • Added industrial in front of permit (P.1). • Changed pH meter WI and meter model number throughout WI (P.3, P.5, 2.1). • Made changes to method to reflect new pH limits (2.1). • Added procedures and equipment for nitrogen and phosphorus sampling (P.5, 2.3, 3.1, and Appendix C). • Removed 002 sampling and associated aspects (P.5, 1.0, 2.3, 2.4, 3.1). • Updated records retention (P.8), and metrics (P.9). • Clarified notes and weather conditions (1.0, 2.1). • Made some changes to method summary to coordinate with procedural and organizational changes (1.0). • Updated laboratory QA/QC requirements (2.2) and Quality Control Samples (2.4). • Removed sample bottle order (3.1, appendices). • Reorganized and revised procedures (3.1 through 3.3) to make the WI easier to follow. • Revised analytical methods (3.7) to reflect permit changes. • Moved Effluent Limitations out of appendix and into procedures (3.9), and updated and reorganized table. • Added Filtration Procedures (3.10) for dissolved copper samples preparation. • Added a map of outfall locations in appendix D.
D	12/15/2015	• Changed formatting of numbering to comply with GPR 1410.1 • Added “reusable” to 3.10, item 1b.

		• Modified text in section 3.8. • Updated P.7 – Training; there is no formal training requirement for this activity. • Updated section 3.3 to reflect NPDES Permit modification for monitoring pH at Outfall 001. • Updated Appendix D, Sampling Location Map, to reflect new monitoring location for pH at Outfall 001.
E	06/28/2019	• Updated WI Template and added a Table of Contents. • Added Water GPR to P.3. • Updated equipment WI numbers is P.3, 2.1.3, and 3.2.2. • Updated P.5 –Separated monthly and quarterly sampling tools, equipment, and materials list. Added more sampling tools, equipment and materials to the lists. • Replaced several 'shall' statements and made format changes throughout. • Reorganized last three paragraphs in 1.0, Method Summary. Text is unchanged. • Grammatical edits in sections 2.1, 3.4, units column of table in 3.9, and in Appendices A and C. • Combined paragraphs in 2.1.3.a and deleted text pertaining to using at least two pH buffers. The requirement for three pH buffers conflicts with text. • Reorganized paragraphs within section 2.2. • Deleted references to equipment blanks and trip blanks in sections 2.3, 2.4, and Appendix A. These blanks are commonly used for QC with Volatile Organic Compounds. These analyses have not been required since the removal of landfill leachate. • Updated section 2.3 to change numbering system for duplicate samples. • Updated 3.2 – Listed the individual component parameters for total nitrogen for Quarterly Nutrient Sampling. • Added HI 98191 to section 3.2.2 • In section 3.5 changed "Alconox®" to "laboratory grade detergent." • Updated acronyms in Appendix B. • Replaced map in Appendix D.

For Best Practices refer to:
https://gs279gdmsias.gsfc.nasa.gov/GDMSv2/downloadFile.htm?docId=28819