Fort Stewart/Hunter Army Airfield
Stormwater Management Program
Municipal Separate Storm Sewer System

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Impaired Waters Monitoring and Implementation Plan

Georgia General NPDES Stormwater Permit GAG480000 for Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4) At Military Facilities

July 2024 Version

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations."

JAMES L. HEIDLE
Director, Public Works

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1. Purpose

To enhance and support the Fort Stewart and Hunter Army Airfield (FSGA/HAAF) Stormwater Management Program (SWMP) and ensure compliance with the Municipal Separate Storm Sewer Systems (MS4) permitting to establish a Monitoring and Implementation Plan for Impaired Waters.

2. Applicability

The Impaired Waters Monitoring and Implementation Plan is only applicable to Fort Stewart. Hunter Army Airfield currently does not have any MS4 Outfalls that discharge into any state designated impaired waters or within one linear mile upstream of state designated impaired waters.

3. General

The Georgia Environmental Protection Division has identified and listed impaired water bodies located in the state. Some of these water bodies are located within the boundaries of Fort Stewart. The table below lists these impaired water bodies, the segment of the impairment located on Fort Stewart, and the specific pollutant of concern.

Name of Impaired Water	Fort Stewart Stream Segment	Pollutant of Concern
Taylors Creek	Upstream of WPCP [the Hinesville Wastewater Treatment Facility] Drainage Canal	FC
Taylors Creek	Downstream of WPCP [the Hinesville Wastewater Treatment Facility]	DO
Tributary to Taylors Creek	Tributary to Taylors Creek #1	DO, FC
Peacock Creek	Melvin & Goshen Swamp-Hwy 144 to North Newport River near McIntosh	DO, FC, Mercury

FC = Fecal Coliform; DO = Dissolved Oxygen

4. Sampling Procedures

Instream samples will be collected at eight sampling locations on the four impaired water bodies located both upstream and downstream of the Fort Stewart MS4 outfalls' discharge (see map at Appendix A). Dependent upon stream segment impairment, the samples will be analyzed for dissolved oxygen (DO), fecal coliform (FC), and/or dissolved mercury (Mercury). The two Peacock Creek samples will be analyzed for DO, FC, and Mercury. Two of the four Taylors Creek sampling locations will be analyzed for DO and the other two for FC. The two Tributary to Taylors Creek samples will be analyzed for DO and FC.

4.1 Sampling Schedule

Samples will be collected annually in February. Samples will be collected at each sampling location only once during the month for DO and Mercury. On four Tuesdays in February, one FC sample will be collected at each of the six FC sampling sites to calculate a monthly geometric mean for each FC site. If unforeseen circumstances occur, the samples will be collected the next available day.

4.2 Field Screening/Sampling Procedures

a. Dissolved Oxygen Monitoring. Grab samples are collected, and field analyzed using a DO Measurement Probe. Each sample will be photo documented to capture the sample measurement with date stamp of sample collection, site location where sampling occurs, and probe reading(s).

b. Fecal Coliform (Bacteriological) Monitoring. Grab samples are collected using acceptable kit(s) obtained from a certified lab for FC analysis to detect potential sanitary wastewater discharges. The samples will be transported under chain of custody for analysis using Standard Method SM9222 D.

c. Dissolved Mercury Monitoring. Grab samples are collected using acceptable kit(s) obtained from a certified lab for Mercury analysis. The samples will be transported under chain of custody for analysis using EPA 245.1.

4.3 Standards

a. Dissolved Oxygen. The DO benchmark value shall be the Georgia Water Quality Standard of 5.0 ppm or above.

b. Fecal Coliform. The FC benchmark value shall be the instream geometric mean Water Quality Standard of 1000 CFU/100mL.

c. Dissolved Mercury. The Mercury benchmark value shall be the Georgia Water Quality Standard of 0.0012 mg/L.

NOTE: Fecal Coliform in excess of sanitary sewage standards does not necessarily indicate sanitary sewage discharges. This could potentially be due to indigenous wildlife or domestic animals.

4.4 Quality Assurance/Quality Control

a. Confirmation. To confirm positive results, field testing must be performed twice if a benchmark level is exceeded.

b. Dissolved Oxygen. Probe(s) will be used to measure DO instream, both upstream and downstream, on the impaired water bodies that are impaired for DO. Any probe used to measure DO will be calibrated and documented at the start of each day when sampling takes place following the FSGA/HAAF YSI PRO20 Dissolved Oxygen Measurement & Calibration Instructions (Appendix B of this document).

c. Fecal Coliform. FC samples must be collected instream, both upstream and downstream, on the impaired water bodies that are impaired for FC. Samples will be de-chlorinated with Sodium Thiosulfate and stored in a cooler with ice to be carried to the lab. FC samples will be taken to a State Certified Lab for processing. If the geometric mean exceeds the

benchmark value specified in paragraph 4.3.b, E. coli. and/or DNA samples will be collected to determine if the source of contamination is caused by humans or dogs to rule out indigenous wildlife.

d. Dissolved Mercury. Mercury samples must be collected instream, both upstream and downstream, on the impaired water bodies that are impaired for Mercury. Samples will be stored in a cooler with ice to be carried to the lab. Mercury samples will be taken to a State Certified Lab for processing.

5. Best Management Practices

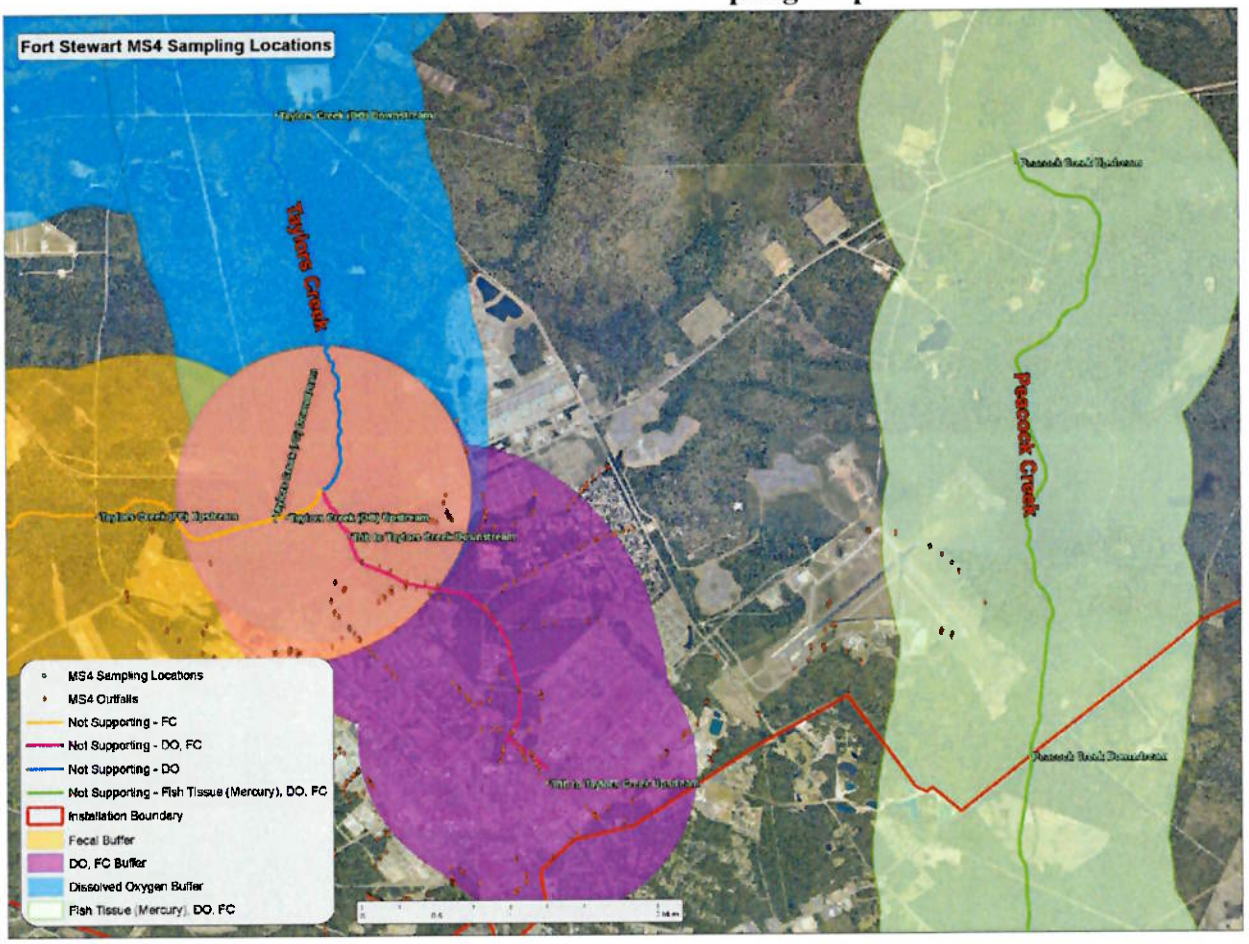
The Installation utilizes a number of Best Management Practices (BMPs) to address the pollutant of concern. While only certain water bodies are listed as impaired, these BMPs will be implemented throughout the entire MS4 area. The table in Appendix C summarizes these BMPs. Seven of the nine BMPs listed in the table are existing Fort Stewart Stormwater Management Program (SWMP) specified BMPs and are incorporated in this plan by reference as noted in the table.

6. Sampling Results Assessments

Sampling results will be collected over a five-year time period (permit cycle) and compared to the benchmark value specified in Paragraph 4.3 to determine if a trend exists for each pollutant of concern. Upstream monitoring will be utilized as a baseline condition to determine if Fort Stewart is contributing to the degradation of water quality. If the trend shows the degradation of water quality, then Fort Stewart will propose revised or additional BMPs to address the pollutant of concern. If the water quality stays the same, then the BMPs are determined to be effective. The annual report will include the results of the monitoring, an analysis of the results over the permit cycle, and a determination of the effectiveness of the BMPs.

Appendix A

Fort Stewart MS4 Sampling Map



Appendix B

FSGA/HAAF YSI PRO20 Dissolved Oxygen Measurement & Calibration Instructions

Dissolved Oxygen Measurement Collection:

1. Before taking measurements, be sure the instrument has been calibrated to ensure the most accurate readings.
2. Turn the instrument on and wait 5-15 minutes if using a polarographic sensor.
3. If using a field cable/sensor, install the sensor guard to protect the sensor and membrane.
4. Place the probe in the sample to be measured and give the probe a quick shake to release any air bubbles.
5. Allow the temperature readings to stabilize.
6. Next, stir the probe in the sample to overcome the stirring dependence of the dissolved oxygen sensor.
7. You must provide at least 6 inches (16 cm) per second of water movement.
8. Once the values plateau and stabilize you may record the measurement and/or store the data set.
9. The dissolved oxygen reading will drop over time if stirring is ceased.
10. If placing the DO sensor into a stream or fast flowing waters, it is best to place it perpendicular to the flow and NOT facing into the flow.
11. If using the DO sensor in an aeration tank/basin it is helpful to make sure bubbles do not burst on the membrane.
12. This may cause unstable readings to occur.
13. You should be able to prevent this by pointing the sensor upwards so it's facing the sky and twist tying, zip tying, or rubber banding the bulkhead to the cable.
14. Essentially making a simple curve to the cable without bending or breaking the cable will allow you to lower the sensor into the aeration tank while the sensor points skyward, and the bubbles are no longer bursting on the membrane surface.

Barometer Calibration:

1. The barometer in the Pro20 is calibrated at the factory.
2. The barometer reading must be accurate to ensure accurate % calibrations and DO readings.
3. If your barometer requires an adjustment, use the up or down arrow keys to highlight the barometer box on the run screen, then press enter.
4. Next, use the up or down arrow keys to adjust the barometer reading to the local, true barometric pressure.
5. Continually depress the up or down arrow keys to change the barometer value more rapidly.
6. Press enter to confirm and save the barometer adjustment.
7. Do not use a barometer value that is corrected to sea level.
8. Laboratory barometer readings are usually "true" (uncorrected) values of air pressure and can be used "as is" for barometer calibration.
9. Weather service readings are usually not "true", i.e., they are corrected to sea level, and therefore cannot be used until they are "uncorrected".

10. An approximate formula for this "uncorrection" is: True BP = [Corrected BP] – [2.5 * (Local Altitude in ft above sea level/100)].
11. Although the barometer range is 400.0 to 999.9 mmHg, you will be unable to adjust the value across the entire range.
12. The barometer is very accurate, and the instrument will not allow you to adjust the value drastically beyond what it is measuring during calibration.

Dissolved Oxygen Calibration:

1. The Pro20 can be easily calibrated with the press of one key by enabling One Touch Cal in the System Setup menu and following the One Touch Calibration procedure.
2. Ensure the barometer is reading accurately before performing a One Touch Calibration, DO %, or DO Local% calibration.
3. These calibration procedures use the barometer reading during calibration.
4. If the barometer reading is erroneous during a calibration, your dissolved oxygen values will be inaccurate.
5. It is not necessary to calibrate in both % and mg/L or ppm.
6. Calibrating in % will simultaneously calibrate mg/L and ppm and vice versa.
7. YSI recommends calibrating dissolved oxygen in % for both ease and accuracy.

One Touch Dissolved Oxygen Calibration:

1. Perform this calibration procedure when One Touch Cal is enabled in the System Setup menu.
2. If using a field cable, install the sensor guard onto the probe.
3. Moisten the sponge in the grey calibration/storage sleeve with a small amount of water and install it over the sensor guard.
4. The sleeve should be moist but should not have excess water that could cause water droplets to get on the membrane.
5. The storage sleeve ensures venting to the atmosphere.
6. If using the ProBOD sensor/cable assembly, place the probe in 300 ml BOD bottle with a small amount of water (1/8 inch or 0.3 cm).
7. The dissolved oxygen and temperature sensors should not be immersed in water.
8. If the calibration/storage sleeve is not available, substitute with a chamber of 100% relative humidity, vented to the atmosphere (not completely sealed).
9. Power the instrument on and wait approximately 5 to 15 minutes for the storage chamber to become completely saturated and to allow the sensor to stabilize if using a Polarographic sensor.
10. If using a galvanic sensor, wait approximately 5 to 10 minutes for the chamber to become completely saturated. Auto Shutoff time should be disabled or set to at least 20 minutes, see System Setup menu for more information on adjusting the Auto Shutoff.
11. Ensure the barometer reading is accurate.
12. If necessary, perform a barometer calibration.
13. Press and hold the Calibrate key for 3 seconds.

14. The Pro20 will indicate Calibrating % DO on the display and automatically calibrate the sensor to the barometer and salinity correction values.
15. This may take up to 2 minutes depending on the age of the sensor and membrane.
16. You may press the Cal key at this time to cancel the calibration.
17. Calibration Successful will display for a few seconds to indicate a successful calibration and then the instrument will return to the run screen.
18. If the calibration is unsuccessful, an error message will display on the screen.
19. Press the Cal key to exit the calibration error message and return to the run screen.
20. See the Troubleshooting guide for possible solutions.

Dissolved Oxygen % Calibration:

1. Perform this calibration procedure when One Touch Cal is disabled in the System Setup menu.
2. Prepare a 100% humid environment for the sensor as described in the previous calibration section.
3. Power the instrument on and wait approximately 5 to 15 minutes for the storage chamber to become completely saturated and to allow the sensor to stabilize if using a Polarographic sensor.
4. If using a galvanic sensor, wait approximately 5 to 10 minutes for the chamber to become completely saturated.
5. Auto Shutoff time should be disabled or set to at least 20 minutes, see System Setup menu for more information on adjusting the Auto Shutoff.
6. Ensure the barometer reading is accurate.
7. If necessary, perform a barometer calibration.
8. Press and hold the Calibrate key for 3 seconds.
9. Highlight % and press enter.
10. The Pro20 will display the current DO % and temperature readings along with the % calibration value.
11. The % calibration value is based on the barometer reading.
12. Wait at least 3 seconds, then, once the DO % and temperature readings are stable, press enter to complete the calibration.
13. Or press the Cal key to cancel the calibration.
14. Calibration Successful will display for a few seconds to indicate a successful calibration and then the instrument will return to the run screen.
15. If the calibration is unsuccessful, an error message will display on the screen.
16. Press the Cal key to exit the calibration error message and return to the run screen.
17. See the Troubleshooting guide for possible solutions.

Dissolved Oxygen Local % Enabled Calibration:

1. Perform this calibration procedure when DO Local % is enabled in the System Setup menu.
2. Prepare a 100% humid environment for the sensor as described in the One Touch Calibration section.

3. Power the instrument on and wait approximately 5 to 15 minutes for the storage chamber to become completely saturated and to allow the sensor to stabilize if using a Polarographic sensor.
4. If using a galvanic sensor, wait approximately 5 to 10 minutes for the chamber to become completely saturated.
5. Auto Shutoff time should be disabled or set to at least 20 minutes, see System Setup menu for more information on adjusting the Auto Shutoff.
6. Ensure the barometer reading is accurate. If necessary, perform a barometer calibration.
7. Press and hold the Calibrate key for 3 seconds.
8. % Local will be automatically highlight, press enter.
9. The Pro20 will display the current DO % and temperature readings along with the % calibration value.
10. The % calibration value will always be 100% for DO Local %.
11. Wait at least 3 seconds, then, once the DO % and temperature readings are stable, press enter to complete the calibration.
12. Or press the Cal key to cancel the calibration.
13. Calibration Successful will display for a few seconds to indicate a successful calibration and then the instrument will return to the run screen.
14. If the calibration is unsuccessful, an error message will display on the screen. Press the Cal key to exit the calibration error message and return to the run screen.
15. See the Troubleshooting guide for possible solutions.

Dissolved Oxygen MG/L Calibration:

1. Power the instrument on and place the sensor into a sample that has been titrated to determine the dissolved oxygen concentration.
2. Continuously stir or move the probe through the sample at a rate of at least ½ foot per second (16 cm per second) during the entire calibration process.
3. A stir plate may be helpful in this calibration.
4. Allow the dissolved oxygen and temperature readings to stabilize.
5. This may take 5 to 15 minutes, depending on the age of the instrument, type of sensor, and condition of the sensor.
6. Press the Calibrate key.
7. Highlight mg/L and press enter.
8. Use the up and down arrow keys to adjust the mg/L reading to the value of the titrated sample.
9. Press enter to confirm the value and calibrate or press the Cal key to cancel the calibration.
10. Calibration Successful will display for a few seconds to indicate a successful calibration and then the instrument will return to the run screen.
11. If the calibration is unsuccessful, an error message will display on the screen.
12. Press the Cal key to exit the calibration error message and return to the run screen.
13. See the Troubleshooting guide for possible solutions.

Appendix C

Best Management Practices to Address the Pollutant of Concern

Best Management Practice (BMP)	Title	Description	Pollutant of Concern Addressed
Illicit Discharge Detection and Elimination, SWMP 4.2.3.C BMP #3	IDDE Plan	20% of the MS4 outfalls will be inspected during the Dry Weather Screening inspections annually. During the inspections, any illicit discharge in the stormwater collection system will be identified and corrective actions will be implemented to eliminate the illicit discharge and prevent any pollutants from entering the collection system.	DO, FC, Mercury
Illicit Discharge Detection and Elimination, SWMP 4.2.3.D BMP #4	IDDE Education	10 posters will be hung, and 200 stormwater brochures will be distributed on an annual basis to educate the community about stormwater and illicit discharges.	DO, FC
Illicit Discharge Detection and Elimination	Sanitary Sewer Inspections	Perform wastewater treatment plant inspections monthly and lift station inspections annually to search for potential illicit discharges.	DO, FC
Illicit Discharge Detection and Elimination	Septic Tank Inspections	Perform septic tank inspections annually to search for potential illicit discharges.	DO, FC
Construction Site Storm Water Runoff Control, SWMP 4.2.4.C BMP #3	Inspection Program	Construction sites will be inspected monthly to document contractor compliance with Erosion & Sedimentation Pollution Control Plans and construction permitting.	DO, FC, Mercury
Post Construction Storm Water Management in New Development and Redevelopment, SWMP 4.2.5.A BMP #1	Post Construction Storm Water Management Legal Authority	The Installation requires all new development and redevelopment projects to meet the requirements of the Georgia Stormwater Management Manual and the Coastal Stormwater Supplement.	DO, FC
Pollution Prevention/Good Housekeeping for Municipal Operations, SWMP 4.2.6.B BMP #2	MS4 Inspection Program for Pollution Prevention	20% of the stormwater collection system will be inspected annually. During the inspections, any illicit discharge in the stormwater collection system will be identified and corrective actions will be implemented to eliminate the illicit discharge and prevent any pollutants from entering the collection system.	DO, FC
Pollution Prevention/Good Housekeeping for Municipal Operations, SWMP 4.2.6.D BMP #4	Trash/Liter Removal for Pollution Prevention	20% of the stormwater collection system will be inspected annually. During the inspection, trash in the stormwater collection system is identified and corrective actions will be implemented to remove it from the collection system	DO
Pollution Prevention/Good Housekeeping for Municipal Operations, SWMP 4.2.6.I BMP #9	Municipal-Type Facilities	20% of the Municipal Operations will be inspected annually. During the inspections, any deficiencies will be identified, and corrective actions will be implemented to prevent any pollutants from entering the collection system.	DO, FC

SWMP=Stormwater Management Program; MS4=Municipal Separate Storm Sewer System; DO=Dissolved Oxygen; FC=Fecal Coliform; Mercury=Dissolved Mercury