Amendment #1 to Appendix J of the Houston-Galveston Area Council (H-GAC) Multi-Basin Clean Rivers Program FY 2022/2023 QAPP

Targeted Monitoring in Selected Assessment Units (AUs)

Prepared by the Houston-Galveston Area Council (H-GAC) in cooperation with the Texas Commission on Environmental Quality (TCEQ)

Effective: Immediately upon approval by all parties

Questions concerning this QAPP should be directed to:

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Justification

This amendment is to correct language used to describe water sampling of dry weather flows from permitted outfalls and unpermitted pipes/sources and to address Table SS-B1.1 which identifies which project – CRP or TMDL – will fund the activities related to each Assessment Unit (AU). In particular, AU_ID 1016D_01 – Unnamed Tributary of Greens Bayou will be funded by the TMDL program instead of CRP.

Detail of Changes

Section/Figure/Table	Page	Change	Justification
SS-A1 Approval Page	2	Replace Sarah Whitley with Lawrence Grant Bassett; Remove the 'Acting' for CRP Project Quality Assurance Specialist.	New employee started in QAS position.
SS-A1 Approval Page	4	Change last name for Eastex Lab Tiffany Guerrero with Tiffany Harrison.	Personnel name change.
SS-A1 Approval Page	4	Change Eastex Lab QAO from Emily McGregor to Tiffany Harrison. Add 'Acting' to title for Eastex Lab QAO	Personnel change at Eastex Lab.
SS-A4 Project/Task Organization	13	Replace Sarah Whitley with Lawrence Grant Bassett; Remove the 'Acting' for CRP Project Quality Assurance Specialist.	New employee started in QAS position.
SS-A4 Project/Task Organization	15	Change last name for Eastex Lab Tiffany Guerrero with Tiffany Harrison.	Personnel name change.
SS-A4 Project/Task Organization	15	Change name for Eastex Lab QAO from Emily McGregor to Tiffany Harrison. Add 'Acting' to title for Eastex Lab QAO	Personnel change at Eastex Lab.
Figure SS-A4.1 Organization Chart	17	Replace Sarah Whitley with Lawrence Grant Bassett as CRP Project Quality Assurance Specialist.	New employee started in QAS position.
SS-A6 Project/Task Description	21	Revised second paragraph of section to explain sampling from permitted	Clarification was needed to correctly describe what and

Section/Figure/Table	Page	Change	Justification
Phase 2 – Dry Weather Targeted Monitoring		and unpermitted sources/pipes/outfalls.	Clarify where water samples are collected.
SS-A7 Quality Objectives and Criteria Representativeness section	25	Remove &/or add words to clarify sentences for collecting water samples for this project.	Updated to reflect where water samples are collected.
SS-B1 Sampling Process Design	28	Revise first paragraph to better describe where samples were collected.	Language needed to be clarified to better describe where samples are collected in relation to permitted outfalls or unpermitted pipes.
SS-B1, Table SS-B1.1	31	Row: 1016D_01 Funding Source: Change CRP to TMDL	After reviewing and updating budgets for this project, staff realized work on 1016D_01 needs to be funded by TMDL, not CRP.
SS-B2 Sampling Methods Field Sampling Procedures	46	Clarify first bullet and add a second exception (2nd bullet) to this section.	The exception(s) failed to describe sampling from the end of unpermitted pipes.

SS-A1 Approval Page

Texas Commission on Environmental Quality

Water Quality Planning Division

Electronically Approved	8/10/2023
Sarah Whitley, Team Leader	Date
Water Quality Standards and Clean Rivers Program	

Electronically Approved	8/10/2023
Lawrence Grant Bassett	Date
CRP Project Quality Assurance Specialist	

Electronically Approved	8/10/2023
Jenna Wadman	Date
Project Manager, Clean Rivers Program	

Monitoring Division

Electronically Approved	8/10/2023
Jason Natho	Date
Acting Lead CRP Quality Assurance Specialist Laboratory and Quality Assurance Section	

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Electronically Approved	8/9/2023
Todd Running H-GAC CRP Project Manager	Date

Electronically Approved	8/9/2023
Jean Wright H-GAC Quality Assurance Officer	Date

Electronically Approved	8/9/2023
Steven Johnston H-GAC TMDL Project Manager	Date

Todd Running for Jessica Casillas Electronically Approved	8/9/2023
Jessica Casillas H-GAC Data Manager	Date

Eastex Environmental Laboratory, Inc. (Coldspring, TX)

Electronically Approved	8/9/2023
Tiffany Harrison Eastex Lab Technical Director	Date

Electronically Approved	8/9/2023
Tiffany Harrison 'Acting' Eastex Lab Quality Assurance Officer	Date

Texas Research Institute for Environmental Studies (TRIES) Lab

Electronically Approved 8/9/2023

Dr. Rachelle Smith Date
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Distribution

QAPP Amendments and Revisions to Appendices will be distributed to all personnel on the distribution list maintained by the Houston-Galveston Area Council (H-GAC).

These changes will be incorporated into the QAPP document and TCEQ and the H-GAC will acknowledge and accept these changes by signing this amendment.

H-GAC will secure written documentation from each sub-tier project participant (e.g., subcontractors, other units of government) stating the organization's awareness of and commitment to requirements contained in this quality assurance project plan and any amendments or added appendices of this plan. Signatures in section A1 will eliminate the need to adherence letters to be maintained. H-GAC will maintain this documentation as part of the project's quality assurance records and will ensure the documentation is available for review.

See sample letter in Appendix SS-1 of the Appendix J document.

SS-A4 Project/Task Organization

TCEQ

Sarah Whitley
Team Leader, Water Quality Standards and Clean Rivers Program
Responsible for Texas Commission on Environmental Quality (TCEQ) activities supporting the development and implementation of the Texas Clean Rivers Program (CRP). Responsible for verifying that the TCEQ Quality Management Plan (QMP) is followed by CRP staff. Supervises TCEQ CRP staff. Reviews and responds to any deficiencies, corrective actions, or findings related to the area of responsibility. Oversees the development of Quality Assurance (QA) guidance for the CRP. Reviews and approves all QA audits, corrective actions, reports, work plans, contracts, QAPPs, and TCEQ Quality Management Plan. Enforces corrective action, as required, where QA protocols are not met. Ensures CRP personnel are fully trained.

Jason Natho
Acting Lead CRP Quality Assurance Specialist
Participates in the development, approval, implementation, and maintenance of written QA standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Assists program and project manager in developing and implementing quality system. Serves on planning team for CRP special projects. Coordinates the review and approval of CRP QAPPs. Prepares and distributes annual audit plans. Conducts monitoring systems audits of Planning Agencies. Concurs with and monitors implementation of corrective actions. Conveys QA problems to appropriate management. Recommends that work be stopped in order to safeguard programmatic objectives, worker safety, public health, or environmental protection. Ensures maintenance of QAPPs and audit records for the CRP.

Jenna Wadman
CRP Project Manager
Responsible for the development, implementation, and maintenance of CRP contracts. Tracks, reviews, and approves deliverables. Participates in the development, approval, implementation, and maintenance of written QA standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Assists CRP Lead QA Specialist in conducting Basin Planning Agency audits. Verifies QAPPs are being followed by contractors and that projects are producing data of known quality. Coordinates project planning with the Basin Planning Agency Project Manager. Reviews and approves data and reports produced by contractors. Notifies QA Specialists of circumstances which may adversely affect the quality of data derived from the collection and analysis of samples. Develops, enforces, and monitors corrective action measures to ensure contractors meet deadlines and scheduled commitments.

Lawrence Grant Bassett
CRP Project Quality Assurance Specialist
Serves as liaison between CRP management and TCEQ QA management. Participates in the development, approval, implementation, and maintenance of written QA standards (e.g., Program Guidance, SOPs, QAPPs, QMP). Serves on planning team for CRP special projects and reviews QAPPs in coordination with other CRP staff. Coordinates documentation and implementation of corrective action for the CRP.

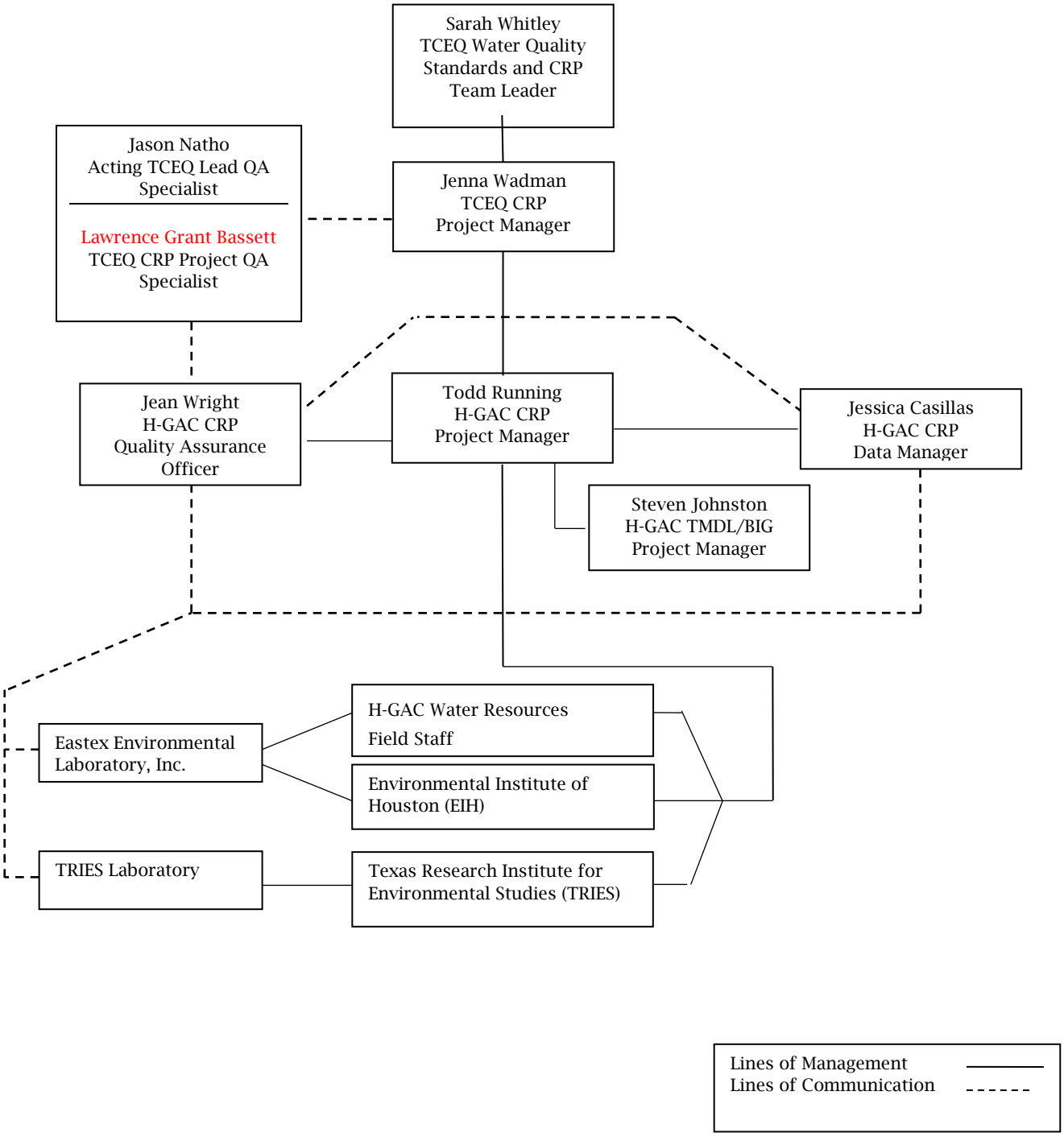
Eastex Environmental Laboratory (Eastex) (Coldspring, TX)

Tiffany Harrison
Laboratory Technical Director
Responsible for the overall performance, administration, and reporting of analyses performed by Eastex Environmental Laboratory (Coldspring, TX). Responsible for supervision of laboratory personnel involved in generating analytical data for the project. Ensures that laboratory personnel have adequate training and a thorough knowledge of this QAPP and related SOPs. Responsible for oversight of all laboratory operations ensuring that all QA/QC requirements are met, documentation is complete and adequately maintained, and results are reported accurately.

Tiffany Harrison
Acting Laboratory Quality Assurance Officer
Responsible for the overall quality control and quality assurance of analyses performed by Eastex Environmental Laboratory (Coldspring, TX). Monitors the implementation of the QM/QAPP within the laboratory to ensure complete compliance with QA data quality objectives, as defined by this QAPP. Coordinates and monitors deficiencies and corrective actions. Conducts in-house audits to ensure compliance with written SOPs and to identify potential problems. Responsible for supervising and verifying all aspects of the QA/QC in the laboratory.

Project Organization Chart

Figure SS-A4.1. Organization Chart – Lines of Communication



B1.1). The survey consists of driving nearly every block or street of the catchment area to confirm identified pollution sources found during the desktop review and to find any potential sources not identified during the desktop review. Bridge crossings chosen for sampling will be located approximately the same distance apart in an attempt to isolate sections of the waterway where higher bacteria concentrations could be found. Those areas will be focused upon during the intensive dry weather investigations in Phase 2. Other potential contributing variables identified during this phase will be included in the final report and made into recommendations to the BIG or other I-Plans.

Phase 2 – Dry Weather Targeted Monitoring

Based on the prioritization, twelve watersheds will be monitored during dry weather conditions, with two alternate AUs. For this project, dry weather sampling is defined as sampling dates or periods of time following a 72-hour antecedent dry period.

The intensive monitoring will require H GAC or its sub-contractor (EIH or TRIES) to survey each waterway and document all discharges found to be flowing during dry weather. These dry weather flows may be flowing from permitted wastewater treatment plant outfalls, permitted MS4 outfalls, or non-permitted pipes/sources discharging into a waterway. To determine whether flows from permitted discharges are affecting the receiving stream, samples will be collected downstream and upstream of those flowing outfalls. The downstream sample (always collected first) will be collected approximately 3-6 feet downstream of the outfall within the mixing zone unless best professional judgement decreases that distance. The upstream sample will be collected upstream of the outfall (generally 3-6 feet) and outside of the mixing zone to show the level of contamination in the ambient water. The difference in the bacteria results will indicate whether the discharge (dry weather flow) is contaminated with bacteria. If an unpermitted pipe/source (not associated with a WWTP discharge or an MS4 outfall) is found to have a dry-weather flow, a sample will be collected directly from the non-permitted pipe/source. No samples will be collected from a permitted discharge outfall. For AUs not monitored previously, the investigation will cover the entire length of the AU, with sampling at locations selected throughout the length of the AU to help identify potential sources of pollution. For AUs that were monitored during previous targeted monitoring projects, a partial investigation will be conducted by H-GAC or its sub-contractor. This partial investigation will focus on monitoring locations that have previously shown elevated bacteria levels, or upstream sites that may contribute to the bacteria levels observed at those identified locations.

When there is more than one ambient water monitoring station located on an AU, the data for each site will be reviewed individually and then compared against each site to prioritize where targeted monitoring should begin. For AUs with multiple stations, the area where the highest bacteria concentration is found will be an area of interest where field monitoring will be initiated first. Bacteria samples (*E. coli*) may be collected at locations upstream and downstream of the station to identify and refine source identification. Windshield surveys will also be utilized to identify potential sources such as pipes, drains, line breaks, etc., with monitoring occurring upstream and downstream of these potential sources/pipes/outfalls

to examine their contribution to bacterial loading. Where there is only one monitoring site per AU, ambient water quality monitoring will be conducted throughout the AU from primary road crossings since it will not be possible to isolate areas with the highest bacteria concentrations based upon the existing one-monitoring site data. Sample locations monitored as part of this targeted monitoring project will be identified and logged into the GPS for use in reporting. These GPS coordinates will also allow field personnel to potentially return to the location for later re-testing to verify results or to help determine the effectiveness of remediation activities by the responsible party. All bacteriological samples will be analyzed at one of H-GAC's CRP partner NELAP-approved labs as identified in Table SS-A7.1.

Ambient Water Reporting Limits (AWRLs)

As described in Section A7 of the *H-GAC Multi-Basin QAPP* (Effective Date 9/1/22).

Precision

As described in Section A7 of the *H-GAC Multi-Basin QAPP* (Effective Date 9/1/22).

Bias

As described in Section A7 of the H-GAC *Multi-Basin QAPP* (Effective Date 9/1/22).

Representativeness

Routine data collection is not the sampling goal for this project. Rather, targeted bacteria monitoring will be conducted in 12 selected AUs for the purpose of evaluating the quality of water in the selected waterways. Water samples will be collected upstream and downstream of suspect dry weather flows from permitted outfalls to determine the influence of each dry weather flow on the bacteria concentration of the water body. If a dry weather flow is found from an unpermitted pipe/source (being a non-MS4 and non-WWTP outfall), that discharge will be sampled directly from the pipe/source. Bacteriological measurements will be considered representative of conditions at each location at that specific time. (Refer to replacement page 21 for additional explanation of sampling outfalls vs unpermitted pipes.)

Comparability

As described in Section A7 of the H-GAC *Multi-Basin QAPP* (Effective Date 9/1/22).

Completeness

As described in Section A7 of the *H-GAC Multi-Basin QAPP* (Effective Date 9/1/22).

SS-B1 Sampling Process Design

Since identifying sources of bacteria is the primary goal of this special study, the number and location of samples to be collected will be determined during field reconnaissance. Whenever a dry weather flow is observed from a permitted outfall (i.e., MS4 or WWTP outfall), field crews (H-GAC, EIH, or TRIES) will collect an ambient water sample from upstream of the outfall (generally 3-6 feet upstream and outside of the mixing zone) and a sample downstream of the outfall within the mixing zone (generally 3-6 feet downstream of the outfall) to test for bacteria concentrations. No 'end-of-pipe' sampling will be conducted on permitted outfalls. When a dry weather flow is observed from an unpermitted pipe/source, the water sample will be taken directly from the source. (Refer to replacement page 21 for additional explanation of sampling outfalls vs unpermitted pipes.)

No routine field parameters are planned to be collected other than date, time, location of each discharge, and days since last significant rainfall. Rainfall accumulation (over three days) will be recorded to help document dry weather. Information related to discharge pipe material, diameter, and depth of flowing water will be notated on field sheets to help assist in locating specific outfall locations for further monitoring or remediation. This data will be provided to the responsible entities to assist those entities in remediation efforts. Photos may be taken to help identify the dry weather flow site in the future. Other than the initial bacteria sampling being conducted at major road crossings in the catchment area, there is no 'pre-determined' data collection design to be summarized in a monitoring schedule. Samples will be collected upstream and downstream of the confluences with all tributaries to the main body of water being investigated. The sampling maps included in this QAPP show the water body and catchment area for each AU to be investigated. A map showing all sampling points will be developed as field work is completed and presented in the final report.

Stream Segments with Bacteria Impairments and Concerns

The map presented in Figure SS-B1.1 shows all the AUs with bacteria impairments or concerns for the entire H-GAC region, as identified in the 2022 Texas Integrated Report. This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. The map does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries. For more information concerning this map, contact Jessica Casillas at 713-993-4594.

Table SS-B1.1. List of AUs for Targeted Monitoring Project

AU_ID	AU Description	Bacteria Geomean (MPN/100 mL)	New / Repeat	Investigations Performed & Reports Developed By	Funding Source	Activities
1004J_01	White Oak Creek (Conroe)	2981	Repeat	TRIES	TMDL	TRIES focuses on hot spots from FY21 study. Add investigations of upstream AUs. HG follows up with city/reasonable parties.
1007T_01	Bintliff Ditch	5969.1	Repeat	EIH	CRP	HG follows up with city/responsible parties. EIH conducts follow-up investigations.
1007U_01	Mimosa Ditch	1457.4	Repeat	EIH	CRP	HG follows up with city/responsible parties. EIH conducts partial/follow-up investigations.
1017E_01	Unnamed Tributary of White Oak Bayou	2288	Repeat	EIH	CRP	HG follows up with city/responsible parties. EIH conducts partial/follow-up investigations.
1017_03	White Oak Bayou Above Tidal	1624.8	New	EIH	CRP	Full investigations from beginning to end.
1017B_02	Cole Creek	1601.6	New	EIH	CRP	Full investigations from beginning to end.
1017A_01	Brickhouse Gully	1405.5	New	EIH	CRP	Full investigations from beginning to end.
1017D_01	Unnamed Tributary of White Oak Bayou	1225.9	New	EIH	CRP	Full investigations from beginning to end.
1016C_01	Unnamed Tributary of Greens Bayou	2023	New	TRIES	TMDL	Full investigations from beginning to end.
1016D_01	Unnamed Tributary of Greens Bayou	1535.9	Repeat	H-GAC	TMDL	HG follows up with city/responsible parties. H-GAC conducts partial/follow-up investigations.
1014O_01	Spring Branch (Tributary of Buffalo Bayou)	1206.2	New	EIH	CRP	Full investigations from beginning to end.
1101D_01	Robinson Bayou Tidal / Above Tidal (LC)	305.4	Repeat	EIH	CRP	HG follows up with city/responsible parties first. EIH conducts partial/follow-up investigations. Monitoring for this project will only be conducted in the Above Tidal portion of this segment.
1009_04	Cypress Creek	1030.9	New	EIH	CRP	Alternate AU if time allows & money is still available
1006D_02	Halls Bayou	1014.1	New	EIH	CRP	Alternate AU if time allows & money is still available

The following maps (Figures SS-B1.2 thru SS-B1.15) zoom into the specific locations of each AU targeted for investigation during this project and show the initial locations where bacteria sampling may be conducted during the windshield survey. The presence of flow and accessibility will be determined in the field during the survey.

Maps marked with an asterisk (*) indicated segments that were previously monitored during the FY 20-21 Targeted Monitoring Project.

SS-B2 Sampling Methods

Field Sampling Procedures

Field sampling will be conducted in accordance with the latest versions of the TCEQ *Surface Water Quality Monitoring Procedures Volume 1: Physical and Chemical Monitoring Methods*, 2012 (RG-415).

Field sampling will be as described in Section B2 of the *H-GAC Multi-Basin QAPP* (Effective Date 9/1/22), with the following exceptions:

- Downstream samples will be collected within the mixing zone (SWQM Procedures Manual, Vol. 1, page 2-9).
- Samples will be collected directly from unpermitted pipes/sources with dry weather flows. (Refer to replacement page 21 for additional explanation of sampling outfalls vs unpermitted pipes.)

The goals of this project require data that demonstrates the effect of dry weather flows on bacteria concentrations in water bodies with bacteria impairments. This data will not be submitted to SWQMIS and therefore will not be available for use in water quality assessments by the TCEQ. Sample volume, container types, minimum sampling volume, preservation requirements, and holding time requirements are shown in Table SS-B2 below.

Table SS-B2. Sample Storage, Preservation, and Handling Requirements

Parameter	Matrix	Container	Preservation	Minimum Sample Volume (mL)	Holding Time
E. coli	water	Sterile Plastic	Placed on ice to cool to <6°C but not frozen (bottles are pre-dosed with sodium thiosulfate by manufacturer)	100	8 hours*

* *E. coli* samples should always be processed as soon as possible and incubated no later than 30 hours from time of collection.