Roanoke River Bacteria TMDL Action Plan

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This Action Plan is developed to address applicable sections of Part II.B, as applicable, of the Commonwealth's General VPDES Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems. This Action Plan is also developed for consistency with the *Bacteria TMDLs for Wilson Creek, Ore Branch, and Roanoke River Watersheds,* approved by the EPA on August 2, 2006.

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Executive Summary

Virginia Western Community College (VWCC) is permitted to discharge stormwater from the college's municipal separate storm sewer system (MS4) by maintaining coverage under the General Virginia Pollutant Discharge Elimination System (VPDES) Permit for Discharges of Stormwater from Small MS4s (MS4 General Permit). In part, the MS4 General Permit requires the college to meet special conditions for a Total Maximum Daily Load (TMDL) when the college has been assigned a waste load allocation (WLA). VWCC has been assigned a WLA for the Roanoke River in the *Bacteria TMDLs for Wilson Creek, Ore Branch, and Roanoke River Watersheds*, approved by the Environmental Protection Agency (EPA) on August 2, 2006. Assignment of the WLA necessitates the development and implementation of a TMDL Action Plan (Plan). The WLA requires VWCC implement best management practices (BMPs) to reduce bacteria loading discharge from the college's MS4 by 98.8% from the baseline TMDL loadings. However, the TMDL states, "For MS4/VSMP permits, the permittee may address the TMDL WLAs for stormwater through the iterative implementation of programmatic BMPs." The BMPs to address the WLA are described in the VWCC MS4 Program Plan available on the college's stormwater webpage.

This Action Plan supersedes and replaces previous versions of the VWCC bacteria TMDL action plan and evaluates results achieved thus for achieving the assigned WLA. The action plan characterizes the bacteria loadings from the campus, the WLA and potential bacteria sources that could originate on campus. The action plan also describes the programmatic BMPs in place to address the WLA, specifically with:

- ✓ Continued implementation of the existing MS4 Program Plan BMPs that could impact bacteria loading from the MS4;
- ✓ Modification of MS4 Program supporting documents, as applicable, to include information regarding bacteria as a local TMDL pollutant of concern; and
- ✓ Semiannual inspection of dumpsters on campus, with subsequent repairs, as necessary.

This Plan is part of the VWCC MS4 Program Plan, by reference, and implementation will be annually reported as part of VWCC's MS4 annual reporting requirements.

1.0 Introduction

VWCC has developed, maintains, implements and enforces a municipal separate storm sewer system (MS4) program designed to reduce the discharge of pollutants from the college's MS4 to the maximum extent practicable (MEP). The program is designed in accordance with the *General Virginia Pollutant Discharge Elimination System (VPDES) Permit for Discharges of Stormwater from Small MS4s*, also known as the MS4 General Permit. The program is intended to protect water quality and to satisfy the water quality requirements of the State Water Control Law and its attendant regulations. VWCC utilizes the legal authority provided by the laws and regulations of the Commonwealth of Virginia to control discharges, into and from, the college's MS4 consistent with the MS4 General Permit. Legal authorities include college policies and specific contract language, as applicable.

Compliance with the MS4 General Permit is dependent on the implementation of best management practices (BMPs) to address the requirements described in the permit, including special conditions associated with applicable total maximum daily loads (TMDLs). A TMDL is a study producing a calculation of the maximum amount of an impairing pollutant than can enter a waterbody while still maintaining water quality standards (including a margin of safety). A TMDL assigns pollutant reduction targets and allocates allowable loadings of the pollutant(s) to point source discharges, including discharges from regulated MS4s. The allocations to MS4s, known as waste load allocations (WLAs), represent the amount of the pollutant the MS4 permittee is allowed to discharge annually, often translated to a percent reduction of the existing, or TMDL baseline, annual pollutant loading. VWCC has been assigned a WLA for bacteria (as *E. coli*) in an Environmental Protection Agency (EPA) approved total maximum daily load (TMDL) for the Wilson Creek, Ore Branch, and Roanoke River Watersheds.

The Louis Berger Group, Inc., prepared the report entitled "*Bacteria TMDLs for Wilson Creek, Ore Branch and Roanoke River Watersheds, Virginia*," dated February 2006, and approved by the EPA on August 2, 2006. The TMDL was developed as required by Section 303(d) of the Clean Water Act (CWA) and the EPA's Water Quality Planning and Management Regulations (40 CFR Part 130) since Wilson Creek, Ore Branch and Roanoke River had been listed as impaired on Virginia's 1998 Section 303(d) TMDL Priority List and Report (see Figure 1 for watershed and campus location). The impairment designation is the result of violations of the state's water quality standard for fecal coliform bacteria.

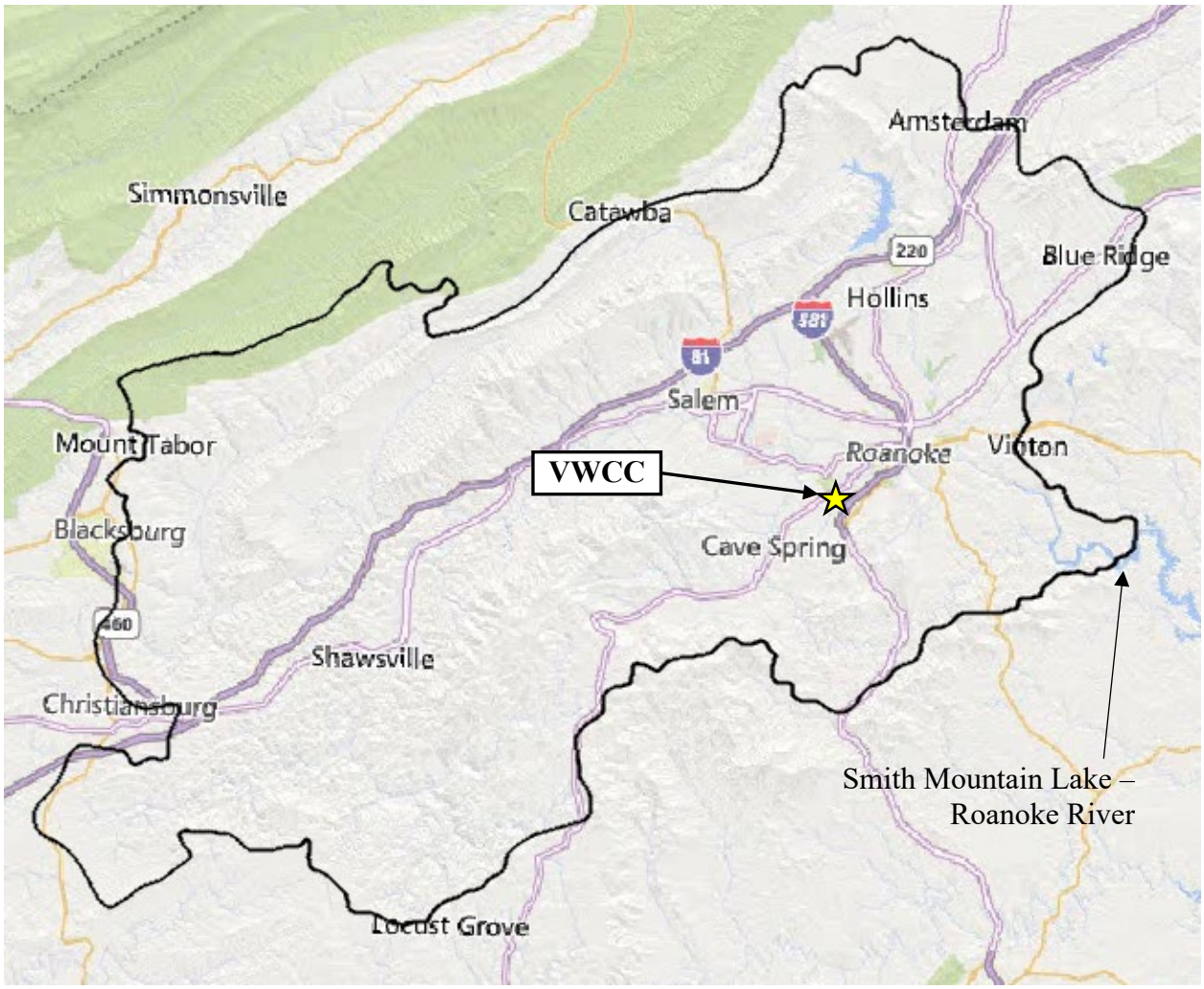

Figure 1. TMDL watershed.

As a result of the assignment of a WLA, the college is required to develop and implement a TMDL Action Plan. For consistency with the MS4 General Permit, this Action Plan is required to include the following:

- ✓ TMDL Project Name and EPA approval date (Project name is the name of this Action Plan and EPA approval date is provided on the Cover and Page 1);
- ✓ The WLA allocation and the corresponding percent reduction (Section 2.2);
- ✓ Identification of any significant sources of sediment discharging to the college's MS4 (Section 2.3);
- ✓ The BMPs designed to reduce the pollutant of concern, including a calculation of the anticipated load reduction achieved from BMP(s) and the anticipated end date that the WLA will be achieved (Section 3);

- ✓ Schedule of anticipated actions planned for implementation during the permit term (Section 3.4); and an
- ✓ Outreach strategy to enhance the public's education on methods to eliminate and reduce discharges of sediment (Section 3.3).

In addition, this updated Action Plan also provides:

- ✓ An evaluation of the results achieved by the previous action plan (Section 4); and
- ✓ Any adaptive management strategies incorporated into updated action plans based on action plan evaluation (Section 4.3).

2.0 MS4 Bacteria Discharge Characterization

The annual bacteria load discharged from VWCC's MS4 and the required annual reduction per the TMDL are characterized in this Section. Additional discussion is available within the "*Bacteria TMDLs for Wilson Creek, Ore Branch and Roanoke River Watersheds, Virginia,*" referred to as the Roanoke River Bacteria TMDLs for the remainder of this Action Plan.

2.1 Bacteria Loadings

TMDL studies use modeling efforts to estimate pollutant loadings from the land surfaces within a watershed, as is the case with the Roanoke River Bacteria TMDLs. The Hydrologic Simulation Program-Fortran (HSPF) model was selected and used as a tool to predict in-stream water quality conditions of Wilson Creek, Ore Branch, and the Roanoke River under varying scenarios of rainfall and fecal coliform loadings. HSPF is a hydrologic, watershed-based water quality model. Generally, this means that HSPF accounts for the specific watershed conditions, the seasonal variations in rainfall and climate conditions, and activities and uses related to bacteria loading. Land use data used for the model was consolidated from the U.S. Geological Survey' National Landcover Dataset to include water/wetlands, urban, agriculture, forest and other land cover types, the latter including quarries/mines, transitional (ongoing development) and urban/recreational grasses. The majority of the watershed is forest (73.2%) and agriculture (15.4%). The model was calibrated with adjustments to flow components and to make simulated values match observed flow conditions, with validation comparing model output to the observed data set. Bacteria sources within the TMDL watershed consisted of wildlife, human (i.e. failed septic), livestock and pets. VWCC's campus accounts for less than 0.03% of the of the impaired watershed, with the regulated MS4 areas within the impaired watershed modeled simulated likely based on urban land use. The modeled existing (baseline) bacteria loadings presented in the TMDL for VWCC is 1.44E+11colony forming units (CFU) as a measure of bacteria loading.

2.2 Waste Load Allocation

Modeling results from the TMDL provides a WLA for VWCC within the Roanoke River watershed of 1.73E+09, representing a 98.8% reduction from the baseline loading. The TMDL states the TMDL WLAs may be addressed by MS4 permittees through the iterative implementation of programmatic BMPs.

2.3 Identification of Significant Sources of Bacteria

The MS4 General Permit requires this Action Plan identify significant sources of bacteria discharging to VWCC's MS4. The permit defines a "significant source" as a discharge where the expected bacteria loading is greater than the average bacteria loading for the land use identified in the TMDL. Annual field inspection of the VWCC campus has not identified any significant source of bacteria where bacteria discharge would be expected to be greater than the average bacteria loading for any urban land use identified in the TMDL. This is consistent with annual high-priority area field assessments. However, potential sources on campus may include those listed in Table 3.

Table 1. Potential bacteria sources to surface waters from the VWCC Hampton Campus.

Potential Source of Bacteria Discharge to Surface Waters*
Sanitary sewer overflow
Leaky or broken sanitary sewer infrastructure
Illicit discharge to MS4
Domestic pet waste
Urban wildlife

* No significant sources identified on campus.

3.0 Methods to Achieve the WLA

Pollutant reductions from stormwater discharge can be achieved using a variety of practices and methods. Selection of the appropriate strategies is dependent on variables such as physical opportunities, the scale of required reductions and cost effectiveness. Per the TMDL itself, it is the intention of the Commonwealth that the TMDL be implemented using existing regulations and programs. In the case of VWCC, this would be with continued compliance with the MS4 General Permit. The following sections describe the applicable BMPs incorporated into the VWCC MS4 Program Plan to minimize bacteria discharges to surface waters from the VWCC campus.

3.1 MS4 Program BMPs Applicable to Reduction of Bacteria Loadings

Implementation of the VWCC MS4 Program Plan BMPs constitutes compliance with the standard of reducing pollutants to the maximum extent practicable, provides adequate progress in meeting water quality standards, and satisfies the appropriate water quality requirements of the State Water Control Law and its attendant regulations. VWCC's MS4 Program Plan includes a description of each BMP, the necessary standard operating procedures (SOPs) or policies necessary to implement each BMP, the measurable goal by which each BMP or strategy will be evaluated; and the persons, positions, or departments responsible for implementing each BMP. The BMPs applicable to addressing bacteria discharges are listed in Table 4, along with any changes implemented to supporting program materials to incorporate bacteria as a local TMDL pollutant of concern.

Table 2. VWCC MS4 Program Plan BMPs with potential to reduce bacteria loadings.

BMP ID	BMP Description	Bacteria TMDL Action
BMP 1A	Public Education and Outreach Plan - Water Quality Issue # 3 - Increase staff knowledge regarding pollutants of concern for TMDLs.	Educational materials modified to include discussion of bacteria as a local pollutant of concern.
BMP 2A	Publicly accessible VWCC Stormwater Management Webpage.	The VWCC Bacteria Action Plan is maintained on the webpage for public access and solicitation for comment.
BMP 2B	Procedures for Receipt/Response to Public Comment.	Address any public comment received on the Action Plan. Comments/responses will be incorporated into Appendix A of this Action Plan, as appliable.
BMP 3A	Maintain MS4 Map and Info Table.	Maintain map updates per the MS4 Program Plan. Use to track potential bacteria illicit discharges, if observed.
BMP 3B	Prohibition of Unauthorized Nonstormwater Discharges.	Continue enforcement per the MS4 Program Plan and VWCC policy.
BMP 3C	IDDE Written Procedures.	Continue implementation per the MS4 Program Plan and MS4 Staff Handbook.
BMP 4A	Address Discharge from Construction Activities.	Continue implementation of VCCS Standards and Specifications for ESC and SWM for land disturbance activities, as applicable. This includes VAR10 SWPPP implementation for applicable land disturbance.
BMP 4B	Controls to prevent nonstormwater discharges during construction activities.	
BMP 5A	Address post-construction stormwater runoff.	
BMP 5B	Inspection/maintenance of stormwater management facilities.	Continue implementation per the MS4 Program Plan.
BMP 6A	Written procedures for good housekeeping/pollution prevention.	Includes information on bacteria as a local TMDL pollutant of concern.
BMP 6B	Stormwater Pollution Prevention Plan for High Priority/High Potential Facilities.	Continue implementation per the MS4 Program Plan, as applicable. Annual SWPPP assessments inherently identify potential bacteria discharge to the MS4.
BMP 6D	Contractor requirements to utilize controls to minimize pollutant discharges.	
BMP 6E	Training Plan for Applicable Employees.	Bacteria is incorporated into training material as a local TMDL pollutant of concern.
BMP SC2	VWCC Roanoke River Bacteria Action Plan.	This Action Plan is incorporated into the MS4 Program Plan.

3.2 Bacteria-Specific Strategy

The MS4 General Permit requires VWCC select to implement at least one of the bacteria-specific strategies listed in Table 3 and incorporate it into the TMDL Action Plan.

Table 3. Strategies for bacteria loading reduction per the MS4 General Permit. One strategy must be selected and implemented as part of this Action Plan.

Source	Strategies (provided as examples - not all-inclusive or limiting)[1]	Action Plan Note
Domestic pets (dogs/cats)	Provide signage to pick up dog waste, providing pet waste bags and disposal containers.	Not applicable as an issue on campus (i.e. no dog parks).
Urban wildlife	Educate the public on how to reduce food sources accessible to urban wildlife	Urban wildlife not applicable as an issue on campus.
	Install storm drain inlet or outlet controls.	
	Clean out storm drains to remove wildlife waste.	
	Implement a program for removing animal carcasses and properly disposing of the same.	
Illicit connections or illicit discharges	Implement an enhanced dry weather screening and illicit discharge, detection, and elimination program beyond the requirements of Part E 3 of the MS4 General Permit to identify and remove illicit connections and identify leaking sanitary sewer lines infiltrating to the MS4 and implement repairs	Illicit connections and leaking sanitary sewer lines have not been observed as a contributor/concern on campus. VWCC will continue the current implementation of annual dry-weather outfall screening.
	Implement an educational program beyond any requirements in Part I E 1 though E 6 of the MS4 General Permit to explain to citizens why they should not dump materials into the MS4	Current educational program addresses dumping. Dumping has not been observed as a contributor/concern on campus.
Dry weather urban flows	Inspect commercial trash areas, grease traps, washdown practices.	**Selected strategy, includes biannual campus dumpster inspections.**
Birds (Canadian geese, gulls, pigeons, etc.)	Identify areas with high bird populations and evaluate deterrents, population controls, habitat modifications and other measures that may reduce bird associated bacteria loading.	Not applicable as an issue/concern on campus.
	Prohibit feeding of birds.	
Other sources	Enhance maintenance of stormwater management facilities.	Stormwater management facilities are inspected and maintained to maximize functionality (BMP 5B).

[1] Only the strategies applicable to VWCC, as a non-traditional MS4, are listed.

As described in the "Action Plan Notes" column in Table 3, VWCC implements practices consisted with all of the *applicable* strategies listed in the Table. However, VWCC explicitly identifies the strategy to address dry weather urban flows to meet the permit requirement that requires the selection of at least one of the strategies. This strategy was selected based on dumpsters being the most likely potential sources of bacteria from campus. VWCC has already implemented, and will continue to implement, the strategy to address bacteria sources from leaky dumpsters. Specifically, VWCC will continue inspections twice annually. Inspections include completion of the VWCC Dumpster Inspection Form (see Appendix B) for each campus dumpster location. Maintenance will continue to be implemented in the case of trash leachate is observed, or has the potential, to be discharging from a dumpster and subsequently transport via stormwater to the MS4.

3.3 Enhanced Public Education Outreach Strategy

VWCC, as a non-traditional MS4, describes the college's public as students, faculty and staff in the VWCC MS4 Program Plan. As required during the previous permit cycle, modifications have been made to applicable program BMP supporting materials that incorporate bacteria as a local TMDL pollutant of concern (see also Table 4). These modifications inherently enhance the public education and outreach program with:

- ✓ inclusion of bacteria as a local TMDL pollutant in educational materials and
- ✓ dissemination of the materials to the VWCC public, as described in the MS4 Program Plan.

3.4 Implementation Schedule

VWCC will continue implementation of the MS4 program bacteria-loading associated BMPs (refer to Table 2), including dumpster inspections, as described in the MS4 Program Plan available on the college's stormwater webpage.

4.0 Evaluation of Results Achieved

Evaluation of the VWCC implementation of BMPs associated with reduction of bacteria loadings finds program implementation consistent with achieving the goals and requirements of the TMDL and MS4 General Permit to the MEP. The evaluation is based on successful implementation of MS4 Program Plan BMPs, including the bacteria-specific BMP to inspect campus dumpsters.

4.1 Applicable MS4 Program Plan BMPs

VWCC will continue implementation of MS4 Program BMPs as described in the college's MS4 Program Plan and in MS4 annual reporting. As noted in Table 4, VWCC has modified MS4 program BMPs to incorporate bacteria as a local pollutant of concern.

Table 4. Action plan implementation to address bacteria with MS4 program BMPs.

BMP ID	Action Item	Date for Completion
BMP 1A	Modify educational materials to include bacteria as a local pollutant of concern in the WQ Issue #3 brochure.	Completed. Annually distributed to the VWCC public.
BMP 2A	Post Action Plan on the VWCC Stormwater Webpage for Public Access and Solicitation for Comment	Completed and ongoing.
BMP 2B	Address any public comment received on the Action Plan. Comments and responses will be incorporated into Appendix A of this Action Plan, as appliable.	Completed and ongoing.
BMP 6A	Update Staff MS4 Handbook to include bacteria as a local TMDL pollutant of concern.	Completed. Handbook utilized in training.
BMP 6E	Incorporate bacteria as a local TMDL pollutant of concern into training materials.	Completed and included in all trainings.
BMP SC2	Incorporate this Action Plan into the MS4 Program Plan and provide annual reporting per Program Plan.	Completed.
BMP SC2	Implement twice yearly dumpster inspections.	Completed. To be continued annually. See also Section 4.2.

4.2 Dumpster Inspections

VWCC has annually implemented the dumpster inspection program described herein and as reported in MS4 annual reports since the 2020-2021 reporting period. Dumpster inspections have documented and provided characterization of overall structural integrity that could contribute to illicit discharge, including dent or hole detection, plug presence, and lid integrity and functionality. Implementation of this strategy has minimized waste leachate, potentially bacteria laden, from being introduced into the storm sewer system due to damaged or misused dumpsters. As an issue has been observed during inspection, maintenance repairs have been made, indicating VWCC is effectively implementing this strategy.

4.3 Adaptive Management Strategies

Based on a continued lack of significant sources of bacteria loadings from the VWCC and continued successful implementation of MS4 program BMPs, including twice-annual dumpster inspections, no adaptive strategies are necessary at the time of development of this action plan. VWCC will continue annual reporting of implementation of BMPs intended to address bacteria loadings to the MEP.

Appendix A- Summary of Public Comments & VWCC Response

VWCC will maintain this TMDL Action Plan with request for solicitation and means for public comment on the college's stormwater management webpage. The latest version of the action plan will continue to be maintained on the webpage, along with the solicitation for comment throughout the permit cycle.

VWCC will update the action plan annually as part of the annual reporting process, as applicable and necessary, to include any public comment(s) and plan modifications(s). A summary of any comments received from the public will subsequently be provided in this Appendix with a response from the college and a description of any modifications to the plan.

Appendix B- VWCC Dumpster Inspection Form

VWCC Dumpster Inspection Form (Version 1.0, Sept. 2021)

For use with conducting biannual inspections provided in support of addressing the VWCC assigned waste load allocations as described in the VWCC Action Plan for Roanoke River, Wilson Creek, and Ore Branch Bacteria TMDL, dated 4/15/20.

Protocol:

1. Conduct inspection of all dumpsters and trash compactors on campus twice annually (6 months apart) using this inspection form. Attach photos to reflect identified issues. Complete the "Field Investigation" columns of the form for each dumpster identified on the VWCC Dumpster Location Mapping. Provide completed inspection forms to the VWCC Director of Facilities Planning and Development.
2. Complete the "Follow-up" columns of the form once any identified issues have been addressed. Maintain documentation for a minimum of 5-years.

Dumpster ID:	
Date of Inspection:	**Inspector:**
General Notes:	
Photo #s *(if issue(s) identified)*:	

Field Investigation				**Follow-up**	
Inspection Issue	**Problem? (Y/N)**	**How to Fix Problem**	**Inspector's Comments and Recommended Time Frame to Correct any Identified Issues**	**Action taken? (Y/N)**	**Date of Any Action and Description of Remedy**
Dumpster Leaking Leachate (trash juice) cannot be allowed to discharge to the storm sewer or surface waters. (1) Active leaking. (2) Stains on pavement indicate leaking has occurred.		✓ Place berm(s) to contain leaks and cleanup with absorbent and dispose of properly. Do not hose off area. Use a wet vacuum system, if needed. ✓ Repair or replace leaky dumpster or compactor **as soon as possible** (Call your waste management contractor for a replacement if not college-owned).			

Field Investigation				Follow-up	
Inspection Issue	**Problem? (Y/N)**	**How to Fix Problem**	**Inspector's Comments and Recommended Time Frame to Correct any Identified Issues**	**Action taken? (Y/N)**	**Date of Any Action and Description of Remedy**
Inappropriate Use (1) Ensure the dumpster is only being used for acceptable waste by authorized users. (2) Ensure waste is contained inside dumpsters.		✓ If being used for hazardous waste or by unauthorized users, provide lock on lid. ✓ Post signage indicating material types that can be placed in the container. ✓ Use signage to ensure waste is placed in dumpster. Sweep and place sweepings in trash.			
Dumpster Not Covered Contents should be protected from exposure to rainfall		✓ If no cover, replace receptacle with one that has cover or otherwise provide a functional cover; or ✓ If cover left open, provide signage at location that states, "Close Lid After Use" or similar instruction; or ✓ Place under a covered area.			
Maintenance Needed Container should be maintained in good condition to ensure functionality, prevent leakage and ensure tight cover to prevent exposure to rainfall.		✓ Contact waste management contractor for replacement; or ✓ Provide maintenance as needed (i.e., replace rusty metal close to breaking, fix dumpster lid in disrepair.) ✓ Increase inspections, if needed. ✓ Do not hose out dumpsters.			

(Insert Photo for any Identified Issue) *3.2" x 5" maximum picture size*	*(Insert Photo for any Identified Issue)* *3.2" x 5" maximum picture size*
Photo 1: *(Provide photo description, if applicable)*	***Photo 2***: *(Provide photo description, if applicable)*
(Insert Photo for any Identified Issue) *3.2" x 5" maximum picture size*	*(Insert Photo for any Identified Issue)* *3.2" x 5" maximum picture size*
Photo 3: *(Provide photo description, if applicable)*	***Photo 4***: *(Provide photo description, if applicable)*