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## **TOTAL MAXIMUM DAILY LOAD (TMDL) ACTION PLAN FOR BACTERIA REDUCTION FOR ROANOKE RIVER WATERSHED AND FECAL COLIFORM FOR TINKER CREEK AND GLADE CREEK**

**Prepared in Compliance with Virginia Pollutant Discharge Elimination  
System (VPDES) Municipal Separate Storm Sewer Systems General  
Permit No. VAR040060**

**A Plan to Address the Town of Vinton's Assigned Waste Load  
Allocation (WLA) for the Roanoke River, Tinker Creek and Glade Creek  
Bacteria TMDL**

July 1, 2015

Revised October 23, 2015

Revised December 3, 2015

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## CERTIFICATION

"I certify under penalty of the 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 gather 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."

  
\_\_\_\_\_  
Christopher S. Lawrence

Town Manager  
\_\_\_\_\_  
Title

10/23/15  
\_\_\_\_\_  
Date

# TOWN OF VINTON, VIRGINIA

## TMDL ACTION PLAN FOR E.COLI REDUCTION

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## I. EXECUTIVE SUMMARY

The Town of Vinton's Total Maximum Daily Load (TMDL) Action Plan for E.coli Reduction in the Roanoke River, Tinker Creek, and Glade Creek (Bacteria Action Plan) has been prepared as required by Town of Vinton's General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4s) General Permit No. VAR040026.

The Town's strategy is to progressively implement Best Management Practices (BMPs) to decrease the amount of E.coli that is discharged into the waterways in order to meet Virginia state water quality standards for bacteria to the maximum extent practicable. The Town will implement BMPs over multiple state permit cycles and demonstrate that adequate progress is being made to reduce E.coli discharges. As additional information is obtained from Virginia Department of Environmental Quality (DEQ) monitoring or other sources, an adaptive iterative approach will be used to modify BMPs implementation as appropriate.

Following is a tabulation of the Best Management Practices (BMPs) that the Town currently has in place under the MS4 General Permit MCMs BMPs and plans to implement to decrease discharges of E.coli, to the maximum extent practicable, along with their anticipated estimated implementation schedule. \*Note that some of these BMPs are also effective in addressing the Town's sediment wasteload allocations and are also included in the Town of Vinton TMDL Action Plan for Benthic/Sediment Reduction in the Roanoke River.

<b>BMP Designation</b>	<b>BMP Name/Task</b>	<b>Implementation Dates (Start – Finish)</b>
<b>BMP 3-3</b>	<b>MS4 Outfall Inspection</b>	<b>Underway</b>
<b>BMP 3-4</b>	<b>Illicit Discharge Detection and Elimination Program</b>	<b>Underway</b>
<b>BMP 5-1</b>	<b>Stormwater Management (SWM) Ordinance and Manual</b>	<b>Underway</b>
<b>BMP 5-2</b>	<b>Stormwater Management (SWM) Plan Review</b>	<b>Underway</b>
<b>BMP 5-3</b>	<b>Stormwater Management Facility (SWMF) Construction Inspection</b>	<b>Underway</b>
<b>BMP 5-4</b>	<b>Stormwater Management Facility (SWMF) Post-Construction Inspection</b>	<b>Underway</b>
<b>BMP 5-6</b>	<b>Strategies to Encourage Long-Term Maintenance of Single-Family Residential Structure Stormwater Control Measures</b>	<b>Underway</b>
<b>T-1*</b>	<b>Initial Streams Assessment and BMP Planning</b>	<b>Begin Fall of 2016 Anticipated Completion Fall of 2018</b>
<b>BMP 1-1 to BMP 1-6:T2*</b>	<b>Enhanced Public Education and Outreach (Bacteria)</b>	<b>Underway</b>

BMP Designation	BMP Name/Task	Implementation Dates (Start – Finish)
BMP 6-4: T-3*	Enhanced Stormwater Training Program for Town Employees	Underway
BMP 6-6	Standard Operating Procedures (SOPs)	Underway
BMP 6-7:T-4	<p><b>Stormwater Pollution Prevention Plans (SWPPPs) for Municipal Facilities</b></p> <p><u>Town Facilities Assessments and Corrections</u></p> <p><u>Screen Facilities/Schedule Assessments</u></p> <p>Perform 1 Assessment – Public Works Building: Facility # 1</p> <p>Perform 2 Assessments – Outdoor Storage of Construction Materials: Facility # 2 and Road Salt &amp; Vehicle/Equipment Storage: Facility # 3</p> <p>Perform 2 Assessments – Organic Materials Collection Site: Facility # 4 and Vehicles &amp; Equipment Storage: Facility # 5</p>	<p>Underway</p> <p><u>Completion Date:</u></p> <p>By June 2015</p> <p>By June 2016</p> <p>By June 2017</p>
BMP 6-9	Responsible Land Disturber	Underway – Town of Vinton/Roanoke County
T-5	Enhanced Illicit Discharge Detection and Elimination Program	Begin July 2017
T-6*	<p>Erosion and Sediment Control Enhanced Enforcement (Roanoke County Schedule)</p> <p>Evaluate Policies</p> <p>Implement Changes (If Needed)</p>	<p>By June 2017</p> <p>To Be Determined by Roanoke County</p>
T-7	<p>Dog Waste Stations</p> <p>Determine Needs</p> <p>Installation at Wolf Creek Greenway</p> <p>Installation at Gladetown Trail</p> <p>Installation at Vinton Farmers Market</p>	<p>Underway/Ongoing</p> <p>Completed</p> <p>By June 2016</p> <p>By June 2017</p>
T-8	<p>Dog Waste Ordinance</p> <p>Research Ordinances and Obtain Public Input</p> <p>Discuss with Town Council</p> <p>Prepare Ordinance for Town Council Consideration</p>	<p>By June 2016</p> <p>By December 2016</p> <p>By June 2017</p>
T-9	<p>Onsite Sewage Disposal System Ordinance</p> <p>Research Ordinances and Obtain Public Input</p> <p>Discuss with Town Council</p> <p>Prepare Ordinance for Town Council Consideration</p>	<p>By June 2017</p> <p>By December 2017</p> <p>By June 2018</p>

BMP Designation	BMP Name/Task	Implementation Dates (Start – Finish)
T-10*	Stream Buffers Research Ordinances Identify Possibly Impacted Properties Obtain Public Input Discuss with Town Council Prepare Ordinance for Town Council Consideration	By June 2017 By July 2017 By December 2017 By December 2017 By June 2018
T-11*	Street Sweeping	Ongoing
*	Capital Improvements Identify Feasible Capital Projects  Construction	Identify Initial Capital Project by July 2017  To Be Determined

\* Also included in the Town of Vinton TMDL Action Plan for Sediment Reduction in the Roanoke River.

This Bacteria TMDL Action Plan has been prepared by Town Staff and approved by the Town Manager. However, nothing in this Action Plan shall be construed as binding the Town to any action until such time that the Vinton Town Council provides final approvals and/or appropriate funding for implementation.

This Plan commits to the study of, and consideration of new ordinances, but it does not commit the Vinton Town Council to the adoption of any specific ordinance or requirement.

It is expected that this Bacteria Action Plan will be revised from time-to-time to add and/or delete proposed BMPs, revise estimated implementation dates, and to reflect new information. Revised Bacteria Action Plans will be submitted to the DEQ with the MS4 Permit Program Annual Report that is due to DEQ by October 1<sup>st</sup> of each year.

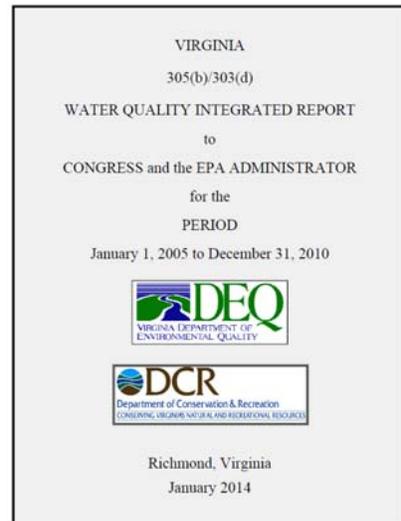
## II. BACKGROUND

### A. General

The Virginia Department of Environmental Quality (DEQ) routinely monitors and tests the Commonwealth’s waters (streams, rivers, lakes, and estuaries) to confirm that they meet Virginia’s water quality standards (9 VAC 25-260-10). According to Virginia Water Quality Standards, “*all state waters are designated for the following uses: recreational uses (e.g., swimming and boating); the propagation and growth of a balanced indigenous population of aquatic life, including game fish, which might be reasonably expected to inhabit them; wildlife; and the production of edible and marketable natural resources (e.g., fish and shellfish).*”

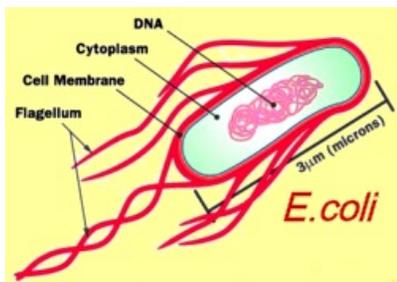
Where DEQ determines that a body of water does not meet Virginia’s water quality standards, the water is termed “impaired”. Impaired waters are listed on the Virginia Water Quality Assessment 305(b)/303(d) Integrated Report that is issued on even-number years to meet the requirements of the U.S. Clean Water Act sections 305(b) and 303(d) and the Virginia Water Quality Monitoring, Information and Restoration Act.

DEQ performs studies on impaired waters to determine the “total maximum daily load” that the water can assimilate and still meet water quality standards. These studies are called TMDL studies. TMDL studies assign “waste load allocations” (WLAs) to permitted point sources of pollution. WLAs are numerical limits of a pollutant of concern that a permitted point source must meet by implementing appropriate strategies, or Best Management Practices (BMPs) using the adaptive iterative approach. BMPs may be implemented over multiple state permit cycles as long as adequate progress to reduce the pollutant of concern is documented.



The Town of Vinton has coverage under the VPDES General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4 General Permit); General Permit No. VAR040026. Through this permit, all stormwater that passes through a Town-owned or operated storm drain or improved channel are considered to be a point source discharge and are subject to WLAs, where appropriate. As part of the MS4 General Permit authorization, the Town developed and implemented a MS4 Program Plan with Best Management Practices (BMPs) to address the six Minimum Control Measures (MCMs) and the special conditions for applicable Total Maximum Daily Loads (TMDLs), as outlined in the MS4 General Permit. Implementation of these BMPs is consistent with the provisions of an iterative MS4 Program constituting compliance with the standard of reducing pollutants to the “Maximum Extent Practicable (MEP)”.

The Town has three streams, including Roanoke River with E.coli WLAs; the Roanoke River, Tinker Creek, and Glade Creek. E.coli is a bacterium that is commonly found in the lower intestine of people and warm-blooded animals. It can survive for a limited time outside of the body, and it is used as an indicator organism for fecal contamination.



*E.coli diagram*

Section I.B. of the MS4 Permit requires the Town to have an updated MS4 Program Plan that includes a specific TMDL Action Plan for pollutants allocated to the MS4 in approved TMDLs.

This specific TMDL Action Plan addresses reduction of E.coli discharged into the three streams with E.coli WLAs. It is required by the MS4 permit to be prepared no later than July 1, 2015, and to be provided to the DEQ in the MS4 annual report due by October 1, 2015.

This TMDL Action Plan becomes effective and enforceable under the Town of Vinton’s MS4 Permit 90-days after it is received by DEQ, unless DEQ specifically denies it in writing.

This Bacteria TMDL Action Plan has been prepared by Town Staff and approved by the Town Manager. However, nothing in this Action Plan shall be construed as binding the Town to any action until such time that the Vinton Town Council provides final approvals and/or appropriates funding for implementation.

This Plan commits to the study of, and consideration of new ordinances, but it does not commit the Vinton Town Council or the Roanoke County Board of Supervisors to adoption of any specific ordinance or requirement.

It is expected that this Bacteria TMDL Action Plan will be revised from time-to-time to add and/or delete proposed BMPs, revise estimated implementation dates, and to reflect new information. Revised Action Plans will be submitted to the DEQ with the MS4 Permit Program Annual Report that is due to DEQ by October 1<sup>st</sup> of each year.

## **B. Watershed Descriptions**

### **1. Roanoke River**

The Roanoke River originates in Montgomery County; flows through Roanoke County, Salem City, Roanoke City, and Town of Vinton; then flows through Roanoke County again; and continues into Bedford and Franklin Counties and Smith Mountain Lake.

The Town of Vinton borders the Roanoke River for 1.6 miles and the Town’s entire 3.2 square mile area flows into the Roanoke River.

Two streams flow into the Roanoke River that has their own E.coli WLAs – Tinker Creek and Glade Creek. For the purposes of this description, the watersheds of these two streams are nested within the Roanoke River Watershed. More detailed descriptions of the two tributary streams are contained further within this section.

### **2. Tinker Creek**

Tinker Creek originates in Botetourt County on Tinker Mountain, flows through the Hollins area of Roanoke County, then enters City of Roanoke and discharges into the Roanoke River just downstream from the discharge point at the Western Virginia Water Authority’s Roanoke Regional Water Pollution Control Plant. Tinker Creek forms the western boundary between the Town of Vinton and the City of Roanoke. Tinker Creek’s estimated drainage area is 489 acres.

### **3. Glade Creek**

Glade Creek originates in Botetourt County near Curry Gap, flows through northeastern Roanoke County including Vinyard Park, a small portion of the City of Roanoke, northwestern

Town of Vinton, and discharges into Tinker Creek across from Roanoke City's Fallon Park. Glade Creek's estimated drainage area is 711 acres.

### **C. Impairment and TMDL Wasteload Allocation**

The Roanoke River, Tinker Creek, and Glade Creek were originally listed as "impaired" because they did not meet the Virginia water quality standard for fecal coliform bacteria. Since the initial listing, the state water quality standard has been changed from fecal coliform bacteria to E.coli bacteria.

The current Virginia water quality standard for E.coli to protect primary contact recreation (swimming) is a monthly geometric mean of 126 colony forming units per 100 milliliters (CFU/100 ml), based on a minimum of four monthly samples in a month. If insufficient samples are available to determine a valid geometric mean, then no more than 10% of the samples may exceed 235 CFU/100ml.

#### **1. Roanoke River**

The Roanoke River was initially listed as impaired in 1998 for fecal coliform. The likely sources were identified as discharges from municipal separate storm sewer systems, livestock grazing, runoff from urbanized high density areas, septic and other onsite treatment systems, sanitary sewer overflows, wet weather discharges (non-point source), and wildlife other than waterfowl. The Roanoke River is listed as impaired from the Spring Hollow Reservoir water intake, in west Roanoke County, to Smith Mountain Lake.

A TMDL study was performed and approved by U.S. EPA on August 2, 2006 and the Virginia State Water Control Board on June 27, 2007. During the TMDL study, the pollutant of concern was changed from fecal coliform to E.coli due to changes in the Virginia water quality standards.

The TMDL study determined that Vinton was contributing 2,770,000,000,000 (2.77E+12) colony forming units per year and that an approximate **98.8% reduction** was required to remove the impairment. *Vinton's WLA was set at 33,200,000,000 (3.32E+10) colony forming units per year. The WLAs for Tinker Creek and Glade Creek are nested within the Roanoke River WLA.*

#### **2. Tinker Creek**

Tinker Creek was initially listed as impaired in 1996 for fecal coliform. The likely sources were identified as discharges from municipal separate storm sewer systems, livestock grazing, runoff from urbanized high density areas, sanitary sewer overflows, wastes from pets, unspecified domestic waste, and wildlife other than waterfowl. Tinker Creek is impaired for its entire length.

A TMDL study was performed and approved by U.S. EPA on August 5, 2004 and the Virginia State Water Control Board on December 2, 2004. During the TMDL study, the pollutant of

concern was changed from fecal coliform to E.coli due to changes in the Virginia water quality standards.

The TMDL study determined that Vinton required an approximate **98% reduction** from developed lands. *Vinton's WLA was set at 342,000,000,000 (3.42E+11) colony forming units per year. The WLA for Glade Creek is nested within the Tinker Creek WLA.*

### 3. Glade Creek

Glade Creek was initially listed as impaired in 1998 for fecal coliform. The likely sources were identified as discharges from municipal separate storm sewer systems, livestock grazing, runoff from urbanized high density areas, sanitary sewer overflows, wastes from pets, unspecified domestic waste, and wildlife other than waterfowl. Glade Creek is impaired for its entire length.

A TMDL study was performed and approved by U.S. EPA on August 5, 2004 and the Virginia State Water Control Board on December 2, 2004. During the TMDL study, the pollutant of concern was changed from fecal coliform to E.coli due to changes in the Virginia water quality standards.

The TMDL study determined that Vinton required an approximate **96% reduction** from developed lands. *Vinton's WLA was set at 87,800,000,000 (8.78E+10) colony forming units per year.*

## III. IMPLEMENTATION STRATEGY

For this permit cycle (July 1, 2013 – June 30, 2018), implementation largely consists of the development of this TMDL Action Plan, study of the Town's streams, consideration of changes to existing ordinances, preparation and adoption of new ordinances, and enhancements to existing MS4 Program BMPs required by the minimum control measures.

The special conditions for the TMDL listed in the MS4 General Permit require the Town to develop a TMDL Action Plan that identifies the BMPs and other interim milestone activities to be implemented during the remaining terms of this state permit that specifically includes:

- A list of legal authorities applicable to reducing discharge of E.coli from the MS4
- A list of management practices and controls, beyond those required within the six MCMs of the MS4 General Permit, that are implemented as part of the Town's MS4 Program and applicable to reductions in E.coli discharge from the MS4
- Enhancement of the Town Public Education and Outreach Program and employee training program to promote methods to eliminate and reduce discharges of E.coli into the Town's MS4
- An identification and assessment of facilities that are owned and operated by the MS4 not covered under a separate VPDES permit, with the potential (greater than the average expected loading) to be significant sources of E.coli discharge to the MS4

- A methodology to assess the effectiveness of the Town's Action Plan in reducing the discharge of E.coli from the Town's MS4.

A detailed estimated implementation schedule for this permit cycle is provided in Section VI of this TMDL Action Plan. Further implementation in this permit cycle is constrained by lack of information (which will be addressed through our proposed stream assessments), and staff and budget constraints. The Town is also coping with the fiscal impacts from implementing the new stormwater management regulations and serving as the Virginia Stormwater Management Program (VSMP) local authority, effective July 1, 2014; and the impacts from implementing additional MS4 Permit requirements that became effective with the current permit.

The overarching implementation strategy is to progressively implement BMPs to decrease the amount of E.coli that enters Town waterways. The Town will implement BMPs over multiple state permit cycles, using the adaptive iterative approach, and will demonstrate that adequate progress is being made to reduce E.coli containing discharges.

As additional information is obtained from DEQ monitoring or other sources, an adaptive iterative approach will be used to modify the implementation of BMPs as appropriate.

## IV. ONGOING AND PLANNED STUDIES AND MONITORING

The goal of this Bacteria Action Plan is to reduce E.coli discharged into the Roanoke River, Tinker Creek, and Glade Creek to meet the Virginia water quality standards. The TMDL WLAs are a numeric tool used to gauge progress toward reaching this goal. Therefore, ongoing DEQ monitoring is an important tool to assess long-term progress in decreasing bacteria loads.

### A. Outfall Inspections

The Town, as a part of its MCM 3: Illicit Discharge Detection and Eliminations will continue to inspect and field screen the stormwater outfalls. These outfalls are dispersed throughout the MS4 regulated portion of the Town. Where illicit discharges are detected, appropriate follow-up investigations will take place to locate and eliminate them. While this program will continue, it is unlikely that it will locate significant bacteria sources. To date, all of our outfalls have been dry when inspected, and no illicit discharges have been detected.

### B. Street Sweeping

The Town, as part of its MCM 6: Pollution Prevention and Good Housekeeping for Municipal Operations, continues its street sweeping program and sweeps all of the primary streets on a weekly basis. Other streets are swept biweekly or at three week intervals. Street sweeping is an effective strategy for removing bacteria and sediment loads prior to them being transported in stormwater runoff. Frequent sweeping of prioritized areas is an effective strategy to receive pollutant reduction credits to meet TMDL targets.

## C. DEQ Monitoring

The DEQ has a number of monitoring stations set up in the Roanoke Valley that are periodically sampled and tested under various programs. These monitoring stations are indicated on the individual watershed maps. Many monitoring station locations are used by multiple sampling and testing programs.

The analytical information from these programs are assessed every 2-years (i.e. even numbered years) to identify and list “impaired and threatened waters” as required by Section 303(d) of the federal Clean Water Act. Each bi-annual assessment uses analytical information gathered over a 6-year sampling and testing cycle; with a 2-year lag (i.e. the 2014 assessment is based on data from 2012 – 2007). Long-term progress toward meeting state water quality standards will be based on the ongoing results of DEQ’s monitoring programs.

Following is a brief discussion of DEQ’s various monitoring programs.

### 1. Ambient Watershed Network

The ambient watershed network was originally established to monitor point source problems (primarily municipal wastewater treatment plants and industries). It has evolved into a watershed monitoring network. Monitoring stations are typically at bridges, or other locations, where convenient access is present for sampling. There is typically one station for each 6 digit Hydrologic Unit Code (HUC). These stations are used for screening level information. Only limited testing is performed including: **E.coli**, temperature, pH, conductivity, nitrogen, and phosphorus. Ideally, each station is sampled bimonthly over a two-year period (12 data points) within a 6-year assessment window. If sampling and testing are performed at a location under another program (e.g. biological or probabilistic), then sampling and testing under the Ambient Watershed Network may be skipped.

### 2. Trend Monitoring Stations

The trend monitoring stations have the longest continuous data records. Some of the monitoring stations were originally established in the 1940’s. These stations are useful for looking for long-term trends. Testing includes: pH, temperature, dissolved oxygen, conductivity, fecal and **E.coli** bacteria, nitrogen, phosphorus, total suspended solids, total solids, and turbidity. They are sampled bimonthly every year.

### 3. Biological Monitoring



Benthic Macroinvertebrates Monitoring 1

Biological monitoring consists of sampling and characterizing benthic macroinvertebrates. Benthic macroinvertebrates are organisms without backbones that are visible to the eye without the aid of a microscope, that live on, under, and around rocks and sediment on the bottoms of lakes, rivers, and streams. Many of the benthic macroinvertebrates have complex life cycles of one-year or

more and they are extremely sensitive to pollutants. In essence, benthic macroinvertebrates are virtual “living recorders” of water quality conditions over time. By analyzing the presence, or absence, of various organisms, the overall ecological health of a stream can be assessed.

The Roanoke River, in the Roanoke Valley has 5 biological stations that are usually monitored each year, once in the spring and once in the fall. Other biological stations in the Roanoke Valley are monitored very infrequently.

This monitoring program does not measure for E.coli; therefore, it is not applicable to this TMDL Action Plan.

#### **4. Freshwater Probabilistic Monitoring**

The other monitoring programs are biased to finding and defining problems (i.e. monitoring stations are set up near industries or wastewater treatment plants). In order to obtain unbiased statewide water quality statistics, the freshwater probabilistic monitoring program was established. Fifty to sixty locations are randomly selected across the state for sampling in the spring and fall. This program performs the most comprehensive testing, including: pH, temperature, dissolved oxygen, conductivity, fecal and E.coli bacteria, nitrogen, phosphorus, dissolved metals, total suspended solids, total solids, turbidity, ions, cations, fish community, algae community, biological assessment, and quantitative physical habitat.

#### **5. Citizen Monitoring**

Various citizen groups volunteer to perform stream monitoring in various streams across the state. In most cases, the monitoring is biological and the results do not meet DEQ’s rigorous quality control requirements. Therefore, these results are not used by DEQ in listing or delisting streams for impairments; but they might be useful to identify a potential problem that warrants further DEQ investigation.

In most cases, E.coli is not measured for; therefore, this program is not applicable to this TMDL Action Plan.

#### **6. Fish Tissue Monitoring**

Fish tissue monitoring is performed for special studies to determine if fish are accumulating any toxics, such as mercury or PCBs, which would warrant consumption advisories.

This program is not applicable to this TMDL Action Plan.



*Fish Tissue Monitoring*

## **7. TMDL Monitoring**

TMDL monitoring stations are established when special studies are performed to set a Total Maximum Daily Load (TMDL). The Roanoke Valley has TMDL monitoring stations that were used to set E.coli TMDLs.

Once a TMDL is established, this program becomes inactive.

## **8. Implementation Monitoring**

A TMDL Implementation Plan is performed by the DEQ after a TMDL has been established. Once a TMDL Implementation Plan is completed, the DEQ performs implementation monitoring to assess progress towards meeting the TMDL. Usually the same stations that were used in the TMDL study are used for implementation monitoring.

Currently, the DEQ is completing an Implementation Plan for the Upper Roanoke River Basin for sediment and E.coli. It is anticipated that implementation monitoring will occur after the Implementation Plan is completed.

This program will be the most important is accessing the progress toward lowering E.coli to meet the stream water quality standards.

## **9. United States Geologic Survey (USGS) Monitoring**

The USGS has several monitoring stations that record stream flow.

## **D. Stream Assessments**

Lowering pollutant loadings to meet the waste load allocations will require significant public investment. In order to properly prioritize spending, the Town proposes performing field and office investigations to document existing physical conditions and to identify opportunities for BMPs.

Since all of the waterways in the Town drain to the Roanoke River, it is important to understand the conditions of all of these waterways in order to properly address the Town's TMDL WLAs.

Stream Assessments are discussed further in Section VI.

## **V. TOWN LEGAL AUTHORITIES**

Section I.B. of the MS4 Permit requires the Town to maintain a list of its legal authorities, such as ordinances, state and other permits, orders, specific contract language, and interjurisdictional agreements applicable to reducing pollutants contained in a WLA. Following is the Town's list:

- Virginia General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4 Permit); General Permit No. VAR040026
- Town of Vinton Code of Ordinances
  - Chapter 10 – Animals
  - Chapter 14 – Buildings and Building Regulations
  - Chapter 15 – Stormwater Management
  - Chapter 15.1 – Erosion and Sediment Control and Steep Slope Development
  - Chapter 15.3 – Storm Sewer System Illicit Discharge
  - Chapter 46 – Health and Sanitation
  - Chapter 58 – Manufactured Homes and Trailers
  - Appendix A – Subdivisions
  - Appendix B – Zoning
- Town of Vinton Contract Agreement with Clean Valley Council (CVC) to provide Stormwater Education Programs and Public Participation and Involvement services to facilitate compliance with MCM 1 and MCM2 of the MS4 Permit.
- Town of Vinton Agreement with County of Roanoke
  - Roanoke County will be the Town of Vinton’s VSMP Authority and administer it, which will cover the Town MCM 4: Construction Site Stormwater Runoff Control and MCM 5: Post-Construction Stormwater Management in New Development and Redevelopment
- County of Roanoke Contract with GKY & Associates, Inc. to provide Street Assessments and Evaluation for Retrofits includes the Town of Vinton
- Stormwater Management (SWM) Facility (BMPs) Maintenance Agreements

## VI. TMDL SPECIFIC BEST MANAGEMENT PRACTICES WITH IMPLEMENTATION SCHEDULE

The following BMPs have been specifically identified to reduce discharges of E.coli into Town waterways. Also, many of the BMPs listed below are also effective in reducing sediment discharges. BMPs that specifically address TMDLs are designated with a “T” prefix.

### A. Streams Assessment and BMP Planning

#### **BMP T1 – Initial Streams Assessment and BMP Planning**

The Town of Vinton has approximately 7.36 miles of streams draining 100 acres or more.

When funding is made available, the Town proposes to assess these streams to better understand their condition and to assist with determining the most cost-effective means of lowering pollutant loads.

In permit year 2014 – 2015, a consultant was hired by Roanoke County to begin assessing streams in the County. We propose to use the County’s consultant to begin assessing the Town’s streams starting in the fall of 2016. This work includes office assessment using existing

information, field assessment where appropriate, and prioritized recommendations for BMP implementation.

At this time, the Town anticipates that an initial assessment of the streams could be completed by fall of 2018.

Once the initial stream assessments are completed, the Town will be better able to plan BMP capital improvements.

## B. Enhanced Public Education and Outreach

### **BMP T2 – Enhanced Public Education and Outreach (Bacteria)**

This BMP will be implemented Town-wide as an enhancement to the BMPs performed to satisfy Minimum Control Measure 1. Public Education and Outreach on Stormwater Impacts.

The Town's Public Education and Outreach Programs and materials have been enhanced by reshaping the programs and materials to focus on the Town's three high-priority water quality issues: excess bacteria, sediment, and nutrients. BMP 1-2. Development and Distribution of Stormwater Educational Materials, describes the planned strategies that will be used to reach various target audiences. The following table identifies the target audiences for bacteria reduction, messages to be delivered, the planned delivery means, and the rationale for selecting the identified audiences.

This BMP was implemented beginning with the 2014 – 2015 permit year.

High-Priority Water Quality Issue	Target Audiences	Means to Determine Audience Size	Estimated Audience Size	Overall Messages	Means to Deliver Messages	Rationale
<b>#2 Bacteria</b>	Restaurants	Business Licenses  Yellow Pages  Google	23	<ul style="list-style-type: none"> <li>• An excessive bacterium hinders stream usage and contributes to algae overgrowth, which hurts aquatic life.</li> <li>• All wastewater to sanitary sewers.</li> <li>• Keep exterior trash receptacles and dumpsters covered and do not wash out into storm drain.</li> <li>• Clean kitchen hoods and floor mats; properly dispose of wastewater.</li> </ul>	<ul style="list-style-type: none"> <li>• Mailer, annually</li> <li>• PSAs on local cable station</li> </ul>	Uncovered dumpsters containing garbage and dumpsters and greasy floor mats that are rinsed out onto the pavement can contribute bacteria to our MS4, which discharges directly to our streams.
	Pet Owners (Dogs/Cats)	Pet Licenses	610 dogs and 48 cats	<ul style="list-style-type: none"> <li>• An excessive bacterium hinders stream usage.</li> <li>• Dog waste ends up in streams.</li> <li>• Pick up after your pet and properly dispose of waste.</li> </ul>	<ul style="list-style-type: none"> <li>• Town publication sent annually to home/pet owners</li> <li>• PSAs on local cable station</li> </ul>	Dog waste is a major source of bacteria in our streams.
	Town Police, EMS, Animal Control Officer	Town Records	n/a	<ul style="list-style-type: none"> <li>• An excessive bacterium hinders stream usage.</li> <li>• Dog waste ends up in streams.</li> <li>• Pick up after your pet and properly dispose of waste.</li> </ul>	<ul style="list-style-type: none"> <li>• In-house training</li> </ul>	Dog waste is a major source of bacteria in our streams; these Town employees own or handle dogs/cats as part of their work.
	Veterinarian Offices and other Pet related businesses	Business Licenses  Yellow Pages  Google	4	<ul style="list-style-type: none"> <li>• An excessive bacterium hinders stream usage.</li> <li>• Dog waste ends up in streams.</li> <li>• Pick up after pets and properly dispose of waste.</li> </ul>	<ul style="list-style-type: none"> <li>• Brochures placed in veterinarian office annually</li> <li>• PSAs on local cable station</li> </ul>	Dog waste is a major source of bacteria in our streams.

## C. Enhanced Employee Training

### **BMP T3 – Enhanced Employee Training (Bacteria)**

This BMP will be implemented as an enhancement to the Town employee training performed to satisfy Minimum Control Measure 6: Pollution Prevention and Good Housekeeping for Municipal Operations.

The Town's employee training program has been enhanced to recognize bacteria (E.coli) as a "high-priority water quality issue". Training courses included the following, as discussed in the Annual Report in BMP 6-4:

- Recognition and Reporting Illicit Discharges - all applicable field personnel will receive training on a biennial basis in the recognition and reporting of illicit discharges. Among many potential illicit discharges, sediment and bacteria are identified as potential pollutants in this training.
- Good Housekeeping and Pollution Prevention Practices - all employees that perform road, street, and parking lot maintenance, or are employed in and around maintenance and public works facilities and at greenway/trail facilities will receive biennial training in good housekeeping and pollution prevention practices. Sediment and bacteria are identified as potential pollutants in this training.

*NOTE: All employees who were required to take Good Housekeeping and Pollution Prevention Practices were required to read and follow the Town's Standard Operating Procedures (SOPs). These procedures were designed to eliminate or minimize pollutant discharges in stormwater.*

- Contractor Oversight for Environmental Compliance – all supervisors who oversee Contractors that perform work for the Town or employees involved in developing contracts for Contractors will take this training on a biennial basis. The training explains that all Contractors must have their own written good housekeeping and pollution prevention program, or they must comply with the Town's written policies and SOPs. This training discusses the significance of soil erosion from construction sites, the potential harm to receiving waters, and the need to use effective erosion and sediment controls. It also discusses the need to carefully place and maintain portable toilets onsite to ensure bacterial wastes do not enter stormwater runoff. Town employees who oversee Contractors working for the Town must ensure compliance by Contractors.
- Hazardous Materials (HAZ-MAT) Training – although not directly related to sediment reduction, the County of Roanoke currently maintains basic hazardous materials training for its employees including Town of Vinton employees, volunteers, in Fire and Rescue. All career (paid) staff are certified to HAZ-MAT Operations. HAZ-MAT certification does not expire from the Virginia Department of Fire Programs; however all career personnel receive annual, internal training on this topic as part of their career development training.

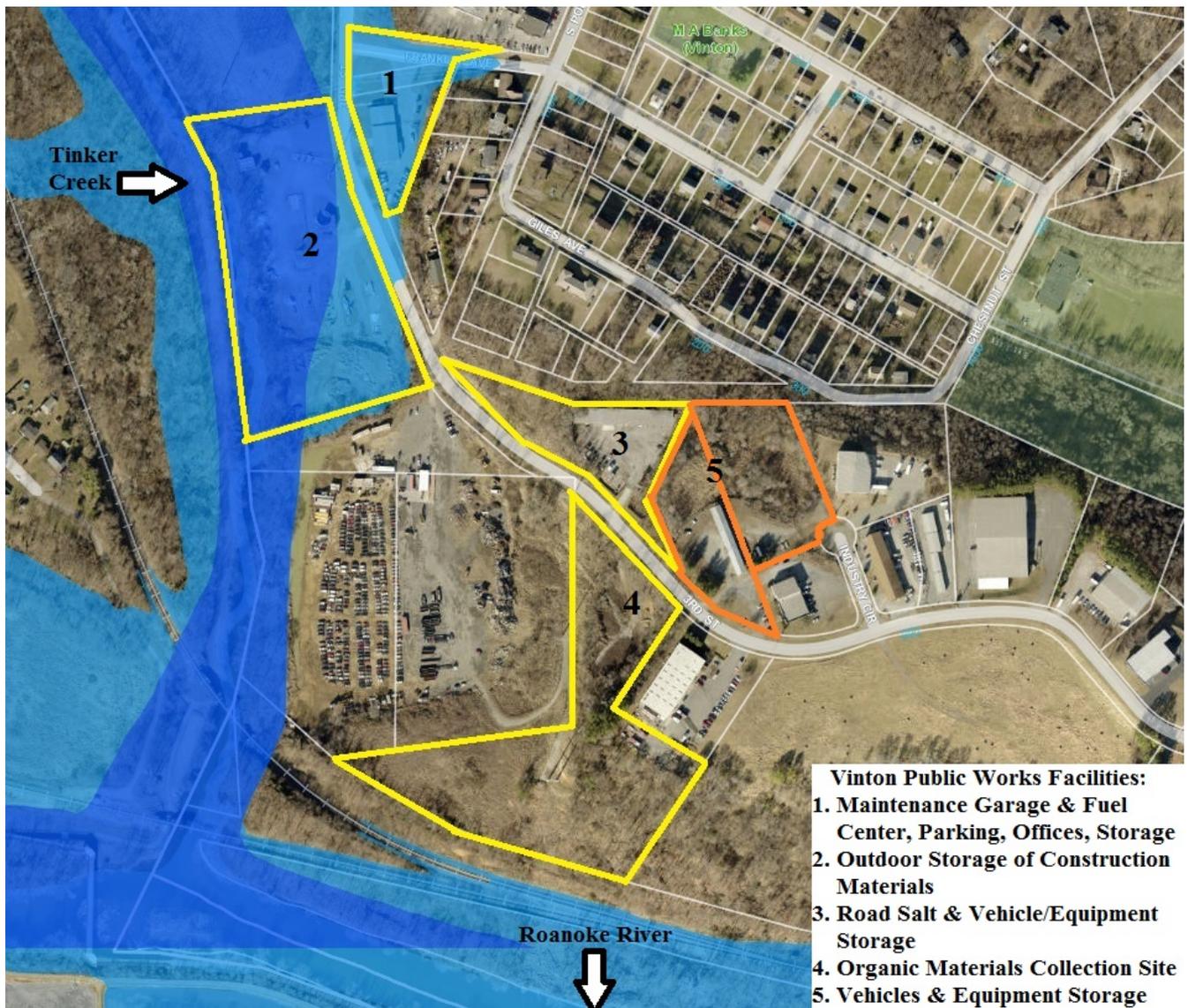
This BMP was implemented beginning with the 2014 – 2015 permit year.

## D. Assess Town Facilities

## BMP T4 – Town Facilities Assessments and Corrections

All Town-owned properties have been screened for conditions that could result in elevated discharges of bacteria. Those that have been determined to have a high potential will be inspected in the field and a site specific Stormwater Pollution Prevention Plan (SWPPP) will be prepared. Any potential sources of elevated E.coli discharge will be eliminated and steps taken to assure that they do not reoccur. Possible sources of E.coli are sanitary sewer overflows and pet waste along greenways/trails which are adjacent to waterways.

The initial screening of properties, and estimated inspection schedule has been developed and included in the MS4 Program Plan.



Name of High-Priority Facility	Activities that Make It High-Priority	High Potential of Discharging	Reasons for High Potential/Or Not	Scheduled SWPPP Development
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		Pollutants (Yes or No)		
1. Public Works Building: Fueling Center; Parking Areas; Secondary Containment Areas; Garage/Service Bay; Workshop/Maintenance Area	Fueling Area; Parking Areas; Inside/Outside Storage Areas; Vehicle/Equipment; Maintenance Area	Yes	Fueling activities; parking areas; storage areas; vehicle/equipment maintenance;	By July 1, 2015
2. Outdoor Storage of Construction Materials	Outdoor Storage	Yes	Outdoor storage of construction materials	By July 1, 2016
3. Road Salt and Vehicle/Equipment Storage	Storage of salt and vehicle/equipment	Yes	Chemical and storage of vehicle/equipment	By July 1, 2016
4. Organic Materials Collection Site	Outdoor storage	Yes	Organic leachate	By July 1, 2017
5. Vehicles/Equipment Storage	Indoor and outdoor storage	Yes	Storage of vehicles/equipment	By July 1, 2017

For Permit Year Two – July 1, 2014 – June 30, 2015, SWPPP was completed for Facility # 1: Public Works Main Building that include the Town’s Fueling Center, Parking Areas, Secondary Containment Areas, Garage/Service Bay, and Workshop/Maintenance Area

The site inspections and SWPPP preparation will be performed over a 3-year period beginning with the 2015 – 2016 permit year with final inspections completed by the permit year 2017 – 2018.

E. Enhanced Illicit Discharge Detection and Elimination Program

**BMP T5 – Enhanced Illicit Discharge Detection and Elimination Program (Bacteria)**

The Town currently operates a state-compliant illicit discharge detection and elimination program. The Town currently surveys the known outfalls per year, employees are trained to spot and report illicit discharges, and all reported illicit discharges are investigated for corrective actions. We propose to enhance our program by selecting sites with elevated potential to discharge bacteria and performing site surveys to observe conditions from public right-of-ways and to speak with operators. Veterinary clinics, kennels, pet stores, and restaurants are businesses which will be targeted. Beginning permit year 2017 – 2018 and continuing thereafter, a minimum of 5 businesses will be visited each permit year.

As noted in BMP T3, all applicable field personnel receive training on a biennial basis in the recognition and reporting of illicit discharges. Among many potential illicit discharges, sediment and bacteria are identified as potential pollutants in this training to ensure that field personnel are able to recognize and identify them in the field when such pollutants are encountered

F. Erosion and Sediment Control Enhanced Enforcement

## **BMP T6 – Erosion and Sediment Control Enhanced Enforcement**

Roanoke County has administered the Erosion and Sediment Control (ESC) program in the Town of Vinton since February 1984. Roanoke County currently operates a state-compliant erosion and sediment control program. When violations are observed, the County's priority is to work with the site operators to get the site back into compliance. Most of the time, deficiencies are corrected within a mutually agreed upon time-schedule without any formal compliance activities or fines. In permit year 2016 – 2017, the County proposes to evaluate the current enforcement policies to determine if they should be stricter with shorter allowable correction periods and more frequent civil penalties. The annual report submitted by October 1, 2017, will depict the results of this evaluation by Roanoke County and provide the implementation schedule for enhanced enforcement, when and if appropriate.

### **G. Addressing Dog Waste**

It is believed that dog waste is one of the most significant sources of controllable bacteria. Nationally, there are 0.58 dog per household (according to the American Veterinary Medical Association), and each dog, on average, generates 0.42 pounds of fecal material per day. Applying these national averages to the Town, with 3,494 households based on 2010 Census, gives a total of approximately 2,026 dogs that generate approximately 151 tons of fecal material per year.

The Town currently has ordinances that prohibit dogs running at large, requires that house dogs be kept free of flies and nuisance odors, and prohibits depositing waste in public space or on other's property.

Four areas have been identified where additional actions may be taken to decrease the discharge of bacteria from dog waste. The first area is to provide public education, which is addressed in **BMP T2**. The second area is to enhance the illicit discharge detection and elimination program, which is addressed in **BMP T5**.

### **BMP T7 – Dog Waste Stations**

The third area is to increase the number of dog waste stations in public areas such as the Vinton Farmers Market, and along Wolf Creek Greenway, Gladetown Trail and future greenway trails and/or recreational areas that the Town plans to construct. We propose in permit year 2015 – 2016 to document where existing dog waste stations exist; determine locations where additional dog waste stations are needed; and develop internal policies for waste pickup.

The additional dog waste stations would be provided over a 5 year period, beginning in permit year 2016 – 2017.

### **BMP T8 – Dog Waste Ordinance**

There is no **Poop Fairy** ...



*Proposed Upcoming Poop Fairy Campaign*

The fourth would be to consider a new dog waste ordinance. This ordinance will require time to research what has been successful in other Virginia localities and time to communicate with the Town Council and the public. We propose in permit year 2015 – 2016 that Town staff will research other Virginia localities’ ordinances and discuss them with the Town Council to obtain their general direction. If the Town Council gives general concurrence, staff will prepare a draft ordinance and hold public meetings to obtain public input. We anticipate that a proposed dog waste ordinance may be presented to the Town Council for their consideration during the permit year 2016 – 2017.

## H. Addressing Improperly Operating Onsite Sewage Disposal Systems

### **BMP T9 – Onsite Sewage Disposal System Ordinance**

Onsite sewage disposal systems predominately consist of septic tanks with drain fields. The Town has approximately 70 septic tanks or other onsite sewage disposal systems.

Malfunctioning or poorly maintained onsite sewage disposal systems result in discharges of bacteria from human waste. Some localities in Virginia have enacted septic system pump out programs that require onsite systems to be inspected and pumped out at a stated frequency. The closest such program is in Franklin County, around Smith Mountain Lake.

We propose in permit year 2016 – 2017 for staff to perform additional research to further quantify onsite sewage disposal systems’ locations in relationship to streams, research other Virginia localities’ ordinances, and to discuss the issue with the Town Council to obtain their general direction. If the Town Council gives general concurrence, staff will prepare a draft ordinance and hold public meetings to obtain public input. We anticipate that a proposed Onsite Sewage System Disposal ordinance may be presented to the Town Council for their consideration during the permit year 2017 – 2018.

## I. Stream Buffers/ No Mow Strips

### **BMP T10 – Stream Buffers/ No Mow Strips**

Stream buffers can be effective in filtering stormwater runoff that sheet flows through the buffer, removing sediments, bacteria, and other pollutants. Unfortunately, much of the land along streams in the Town has already been developed, which limits where stream buffers could be provided. We propose to consider means to establish and protect stream buffers in cooperation with Roanoke County and City of Roanoke.



*No Mow Stream Buffers*

We propose in permit year 2016 – 2017 to research similar ordinances, identify properties that border waterways, develop possible stream buffer criteria for new development, and to discuss the issue with the Town Council to obtain their general direction. If the Town Council gives general concurrence, Staff will prepare a draft ordinance and hold public meetings to obtain

public input. We anticipate that a proposed Stream Buffer/No Mow Strip ordinance may be presented to the Vinton Town Council for their consideration during the permit year 2017 – 2018. In the event that Vinton Town Council decides not to enact any Stream Buffer/No Mow Strip ordinance, stream buffers/no mow strips will still be encouraged on a voluntary basis.

Additionally, in permit year 2017 – 2018, **BMP T2** will be expanded to include targeted education of the value of stream buffers/no mow strips to property owners who are located along our waterways.

## J. Capital Improvements

At this time, the Town does not have enough information on its waterways to develop a valid capital improvement plan to identify future projects. We anticipate that, by the end of permit year 2017 – 2018, enough evaluation of County streams may have been done by the County’s consultant to assist Town Staff in identifying and prioritizing projects.

## VII. PLAN ASSESSMENT METHODOLOGY

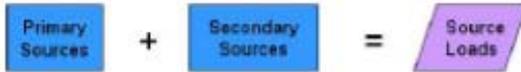
Section I.B. of the MS4 Permit requires the Town of Vinton to develop and implement a method to assess this Bacteria TMDL Action Plan for its effectiveness in reducing the pollutant (E.coli) identified in the WLA. The evaluation shall use any newly available information, representative and adequate water quality monitoring results, or modeling tools to estimate pollutant reductions of sediment from implementation of the MS4 Program Plan.

The Town has been assessing pollutant loads using the Simple Method and watershed land uses as presented in its MS4 Annual Report.

The Town plans on changing its plan assessment methodology to the Watershed Treatment Model, developed by the Center for Watershed Protection, for the submission of the annual report due by October 1, 2017.

The Town will also continue to review and evaluate any newly available information; including results of the DEQ’s ongoing water monitoring program, outfall inspections, and the Stream Assessments.

Step 1. Calculate Pollutant Source Loads



Step 2. Calculate the benefits of Existing Management Practices



Step 3. Calculate the benefits of Future Management Practices



Step 4. Account for Future Growth



*Watershed Treatment Model Structure*

## VIII. ANNUAL REPORTING REQUIREMENTS

The MS4 Annual Report covers activities that occur from July 1st to June 30<sup>th</sup>, and it is due to the DEQ by October 1<sup>st</sup> of each year.

The MS4 Annual Report will be updated to include this Bacteria Action Plan, a description of implementation activities, and an assessment of their effectiveness in lowering E.coli discharges.

## IX. PERMIT REAPPLICATION REQUIREMENTS

Reapplication for coverage is due to the DEQ at least 90 days before the expiration of the current General Permit on June 30, 2018. As a part of the reapplication submittal, this Bacteria TMDL Action Plan will be revised and submitted to indicate the BMPs that will be implemented in the next permit cycle.

At that time, the Bacteria TMDL Action Plan will be revised to include an estimated end date for achieving the applicable wasteload allocation. This estimate will be for planning purposes only and shall not be binding.