TOTAL MAXIMUM DAILY LOAD (TMDL) ACTION PLAN FOR BENTHIC/SEDIMENT REDUCTION IN THE ROANOKE RIVER

Prepared in Compliance with Virginia Pollutant Discharge Elimination System (VPDES) Municipal Separate Storm Sewer System (MS4) General Permit No. VAR040060

A Plan to Address the Town of Vinton's Assigned Waste Load Allocation (WLA) for the Roanoke River Benthic/Sediment TMDL



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Revised April 26, 2021

TOWN OF VINTON, VIRGINIA
TMDL ACTION PLAN FOR SEDIMENT REDUCTION

Contents

I. EXECUTIVE SUMMARY

The Town of Vinton Total Maximum Daily Load (TMDL) Action Plan for Sediment Reduction in the Roanoke River (Sediment Action Plan) has been prepared and revised as required by the Virginia Department of Environmental Quality's (DEQ) "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 discharge of sediment from the Town's MS4 towards meeting the DEQ-assigned waste load allocation. The Town will implement BMPs over multiple state permit cycles, using an adaptive iterative approach to reduce sediment discharges.

This Sediment 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 to adoption of any specific ordinance or requirement.

It is expected that this Sediment Action Plan will be revised from time-to-time to add and/or delete BMPs, to adjust estimated implementation dates, and to reflect new information as it becomes available. Revised Sediment Action Plans and progress regarding implementation of this Plan will be submitted to DEQ with the MS4 Permit Program Annual Report that is due to DEQ by October 1st of each year.

The following is a tabulation of the Best Management Practices (BMPs) that the Town of Vinton plans to implement in this permit cycle to decrease discharges of sediment to the maximum extent practicable, along with anticipated implementation date for each.

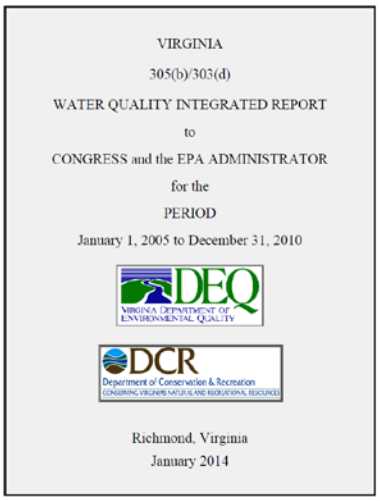
Some of the Town's modified BMPs will be aligned with Roanoke County's BMPs since the County has been the Town's Erosion Control (ESC) Program Administrator since February 14, 1984 and the Town's Virginia Stormwater Management Program (VSMP) Administrator since April 5, 2016. Additionally, the County operates the Spatial Database Engine (SDE) for the overall County including the Town of Vinton.

BMP # Designation	BMP Name/Task	Implementation Date (Start – Finish)
S-1 (New)	*Lower Threshold for Compliance: Erosion and Sediment Control Program (Roanoke County BMP # S-1)	Ongoing
S-2 (New)	Town of Vinton MS4 BMP Capital Improvement Program	Started – Initial Capital Project Identified in March 2021
T-2: Modified to S-3	*Enhanced Public Outreach (Sediment) – Roanoke County Public and Outreach include the Town Limits (County BMP # S-3)	Ongoing
T-3: Modified to S-4	Enhanced Employee Training (Sediment)	Ongoing
T-4: To be Deleted or Modified	Town Facilities Assessments and Stormwater Pollution Prevention Plan (SWPPP) for Town Identified Facilities – Five (5) Facilities	Completed in June 2019
T-5 to T-10: Deleted		N/A
S-5 (New)	*Contractor Appreciation Program (Roanoke County BMP # S-5: ESC Program Administered by Roanoke County)	Ongoing
T-11: Modified to S-6	Public Street Sweeping and Leaf Collection Programs	Ongoing
T-1: Modified to S-7	Stream Digital Assessments – Phase I 1. Glade Creek 2. Tinker Creek 3. Roanoke Rive 4. Wolf Creek Visual Stream Assessment and BMP Planning – Phase II 1. Seven (7) Stream Reaches of Tinker and Glade Creeks 2. Wolf Creek	 Completed January 2017 Completed January 2017 Completed January 2017 Completed January 2017 Completed May 2017 To be completed by May 2022

II. BACKGROUND

A. General

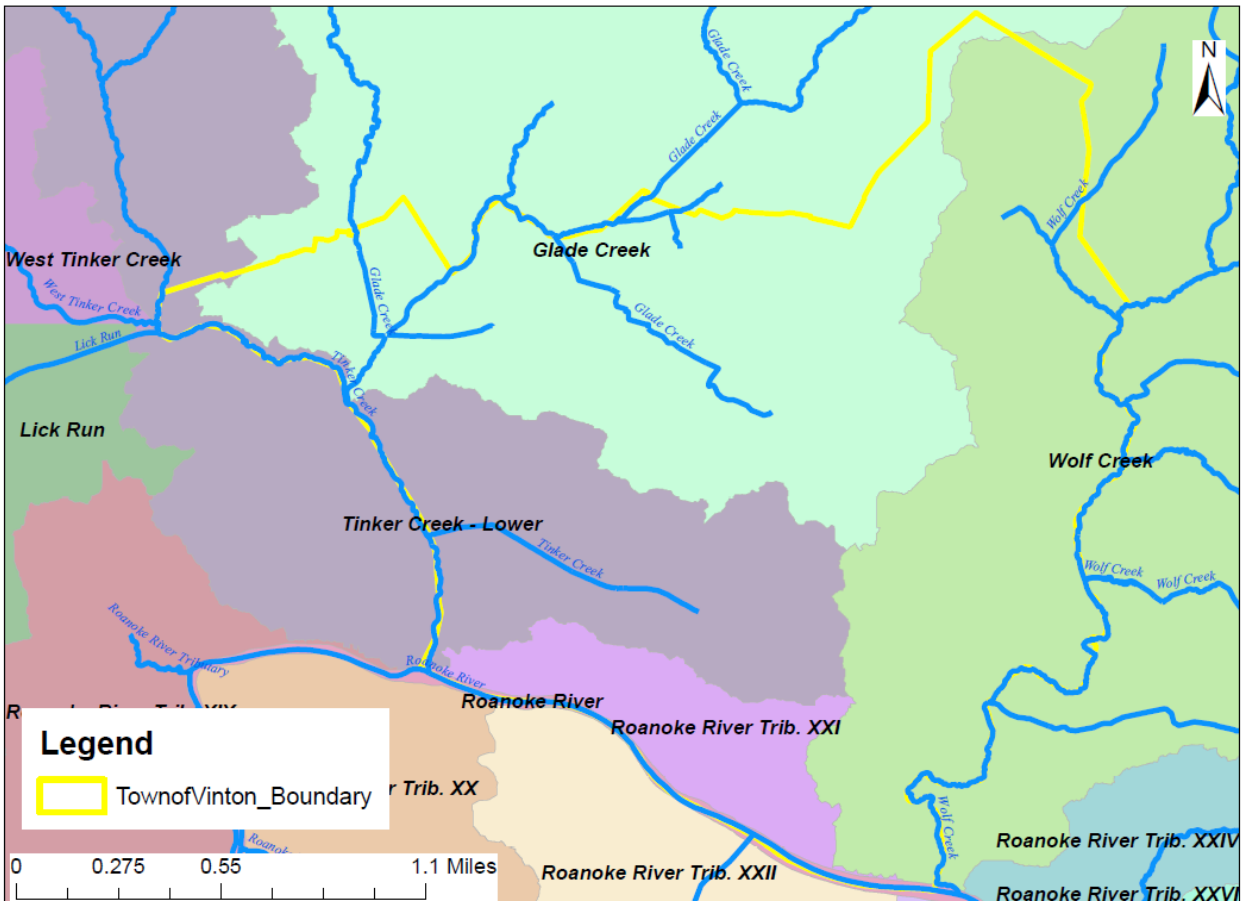
The Virginia Department of Environmental Quality (DEQ) routinely monitors and tests the Commonwealth's waters (streams, rivers, lakes, and estuaries) to confirm that they meet Virginia's water quality standards (9 VAC 25-260-10). According to Virginia Water Quality Standards, "*all state waters are designated 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-numbered 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. The Town has four (4) streams, including Roanoke River.


VIRGINIA
305(b)/303(d)
WATER QUALITY INTEGRATED REPORT
to
CONGRESS and the EPA ADMINISTRATOR
for the
PERIOD
January 1, 2005 to December 31, 2010
DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
DCR
Department of Conservation & Recreation
Richmond, Virginia
January 2014

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). This MS Permit (General Permit No. VAR040026) is effective November 1, 2018 through October 31, 2023. Pursuant to this permit, all stormwater that passes through a Town-owned or Town-operated storm drain or improved channel is considered to be a point source discharge, and, therefore, 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



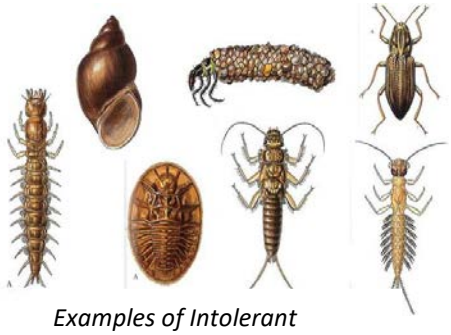
Town of Vinton Watersheds and Receiving Waters

with the provisions of an iterative MS4 Program constituting compliance with the standard of reducing pollutants to the "Maximum Extent Practicable (MEP)".

The Roanoke River from the confluence with Mason Creek to the backwater from Niagara Dam has WLAs for sediment. Within the Town, Tinker Creek is identified as impaired by excessive sediment. Tinker Creek does not have a separate WLA, but it is considered to be "nested" within the Roanoke River WLA.

The Roanoke River does not properly support aquatic life due to the excessive sediment. Excessive sediment settles over stream bottoms, removing habitat and smothering macroinvertebrates that form the foundation of the aquatic food chain for fish.

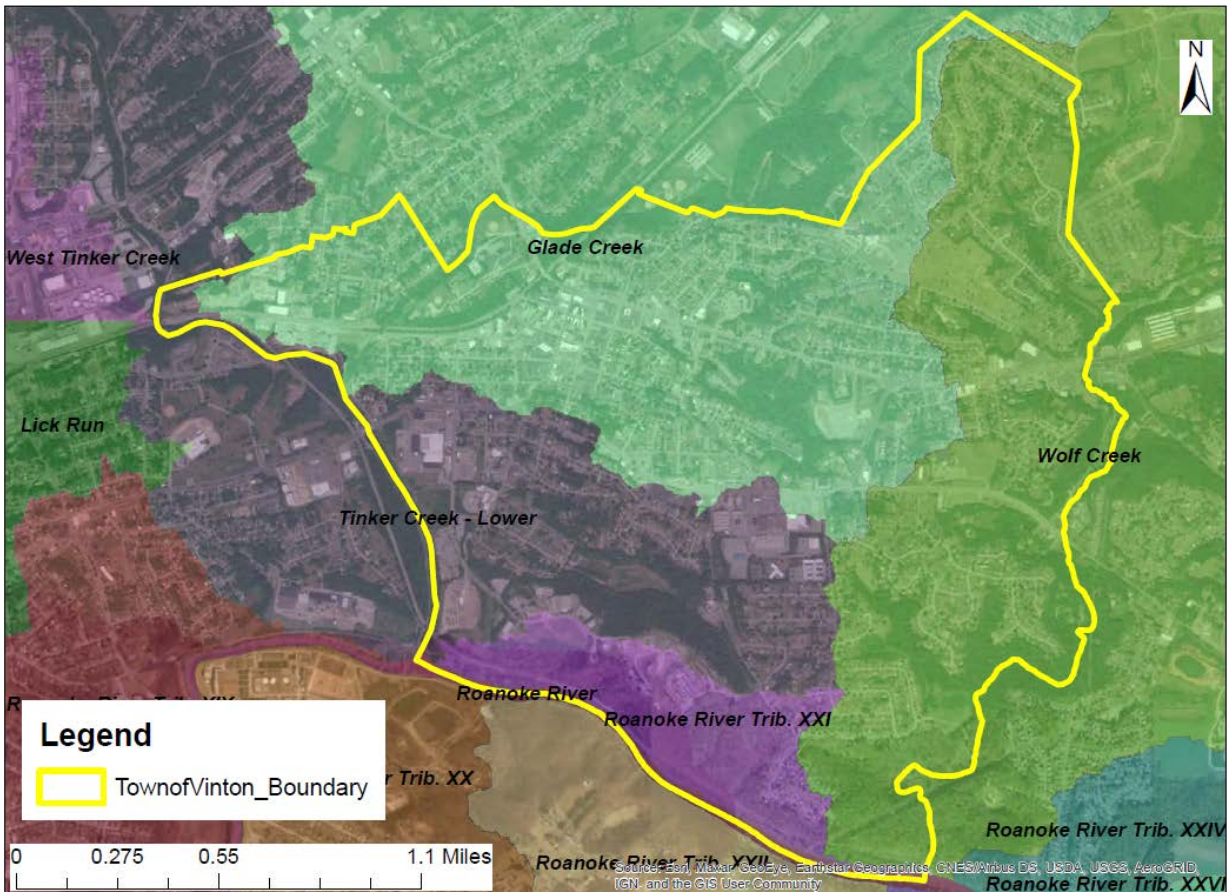
Section II.B. of the MS4 Permit requires the Town to have an updated MS4 Program Plan that includes a specific TMDL Action Plan for pollutants allocated to the MS4 in approved TMDLs.



Examples of Intolerant Benthic

This specific TMDL Action Plan addresses reduction of sediment discharged into the Roanoke River. Although only the Roanoke River has a WLA for sediment, sediment discharges into all streams that are tributary to the Roanoke River must be decreased.

This Sediment TMDL Action Plan has been prepared by Town staff. Public input was sought through public advertisement and a public meeting. The Completed Plan was 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. It is expected that this Sediment Action Plan will be revised from time-to-time to add, modify, and/or delete BMPs, to adjust estimated implementation dates, and to reflect new information as it becomes available. Progress regarding implementation of this Plan will be included in the MS4 Annual Report that is submitted to DEQ by October 1st of each year in the permit term.



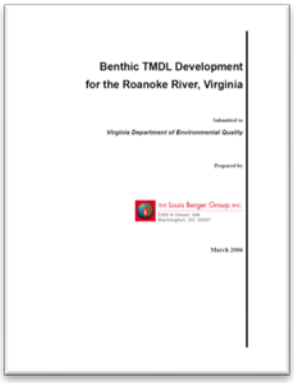
Town of Vinton Watersheds

B. Roanoke River Watershed Description

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 Vinton's entire 3.2 square mile area flows into the Roanoke River. The estimated Roanoke Rived watershed drainage area within the Town is 148 acres.

C. Impairment and TMDL Wasteload Allocation


Benthic TMDL Development
for the Roanoke River, Virginia

Submitted to
Virginia Department of Environmental Quality

Prepared by

The Louis Berger Group, Inc.

March 2006

The Roanoke River and Tinker Creek were listed as "impaired" because they did not meet the Virginia water quality standard for wildlife habitat as measured using the modified Rapid Bioassessment Protocols (EPA, 1999). Streams are required to support the propagation and growth of a balanced, indigenous population of aquatic life, including game fish, which might reasonably be expected to inhabit them. Sediment was identified as the probable stressor pollutant that is adversely impacting macroinvertebrates (benthic organisms).

A TMDL study was performed by Virginia DEQ and approved by U.S. EPA on May 10, 2006 and the Virginia State Water Control Board on September 7, 2006. This study determined that the Roanoke River has a "moderately impaired benthic community from the confluence with Mason Creek to the backwater from Niagara Dam."

The Town was assigned a WLA of 119.3 tons of sediment/year.

D. Roanoke River Bacteria and Sediment TMDL Implementation Plan, Part 1

DEQ released the draft Roanoke River Bacteria and Sediment TMDL Implementation Plan, Part 1 on May 1, 2015 for public comment. Town Staff attended meetings and provided comment during the development of this Implementation Plan. While the Town supports the goals of the Implementation Plan, it has concerns about the technical feasibility of the Implementation Plan's proposed BMPs and their related costs.

E. Significant Sources of Sediment Discharging into MS4

No specific localized significant sources of sediment were determined by the TMDL study. The MS4 area is characterized by steep slopes with flashy streams and silty and clayey soils. The most likely significant sources of anthropogenic sediment are increased erosion from developed lands due to conversion from forest to lawns and stream bank erosion during major storms.

As noted earlier, Roanoke County is the Town's ESC Administrator since 1984 and Town's VSMP Administrator since 2016, therefore, the Town's recognized that Roanoke County has chosen to focus its efforts on decreasing erosion from active construction sites by adopting a lower threshold for compliance than that used in Virginia's Erosion and Sediment Control Program.

The County's Public Education and Outreach efforts that include the Town Limits and the Town's Employee Training Program have emphasized sediment as one of the Town's primary pollutants of concern.

III. BMPs DESIGNED TO REDUCE SEDIMENT

The following BMPs have been specifically identified to reduce discharges of sediment from the Town's MS4. To the extent that they reduce sediment discharges, the BMPs listed below also reduce the discharge of E.coli that adheres to sediment surfaces. Note that the highlighted categories shown below align with the requirements outlined in section B. Local TMDL special condition, Part 5. Local sediment, phosphorus, and nitrogen TMDLs of the MS4 Permit.

*Some of the Town's modified BMPs will be aligned with Roanoke County's BMPs since the County is the Town's Erosion Control (ESC) Program Administrator since February 14, 1984 and the Town's Virginia Stormwater Management Program (VSMP) Administrator since April 5, 2016.

A. Land disturbance thresholds lower than Virginia's regulatory requirements for erosion and sediment control and post-development stormwater management

BMP S-1: Lower Threshold of Compliance: Erosion & Sediment Control Program

Roanoke County's Erosion and Sediment Control Program regulates land-disturbing activities of 2,500 square feet or more, which is less than the state's threshold of 10,000 square feet or more. This lower threshold has been implemented due to the County's (including Town of Vinton) steep terrain and highly erodible clay soils.

Roanoke County permits and inspects approximately 150 land disturbing activities per year that each disturb less than 10,000 square feet. Cumulatively, these activities disturb approximately 20 acres per year.

The amount of erosion that occurs on an uncontrolled construction site and the amount of sediment that subsequently leaves such sites is highly variable. A review of several references suggests values between 20 - 200 tons/acre/year of sediment discharges from uncontrolled construction sites. Based on the County's fairly steep slopes and erodible soils, it is assumed that uncontrolled construction sites discharge about 120 tons/acre/year.

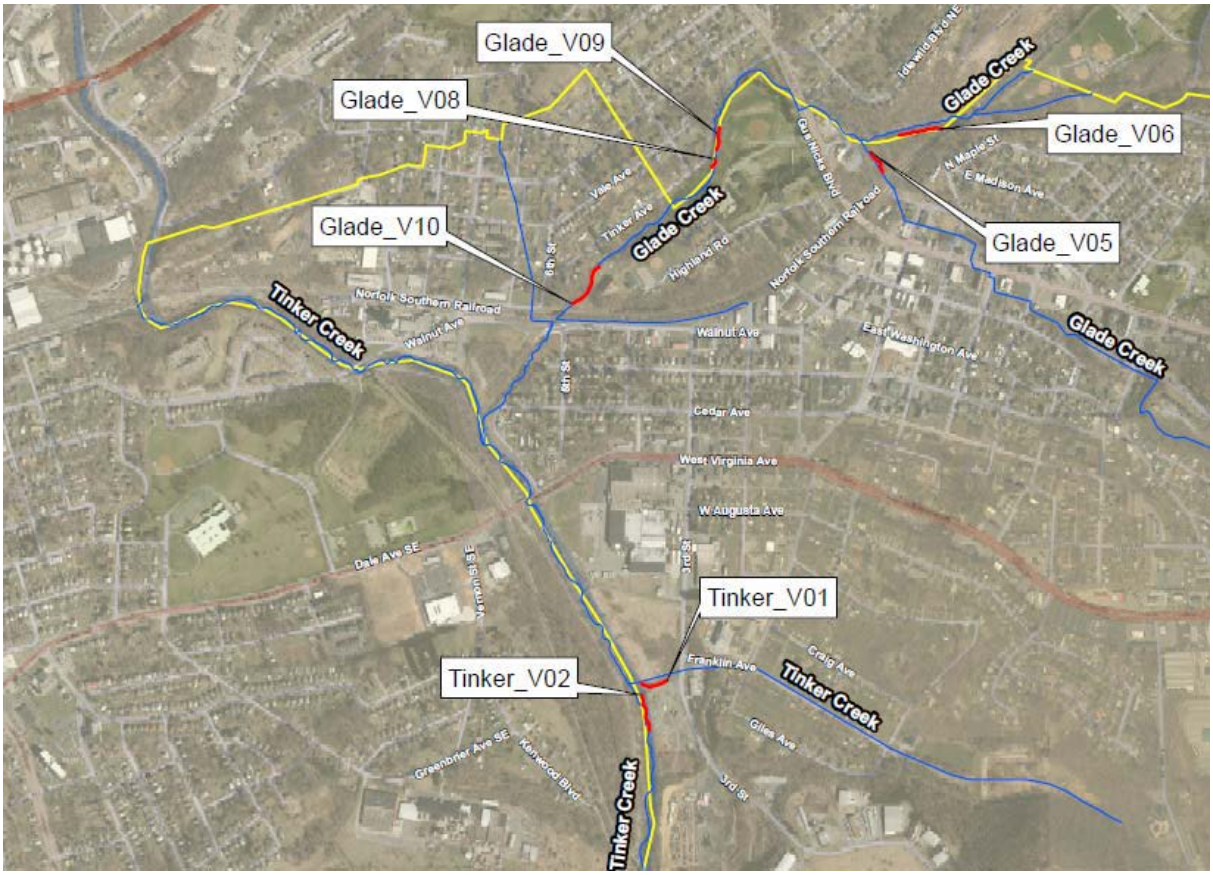
Erosion and sediment control devices are not 100% effective; however, a properly-designed and installed set of controls should retain at least 70% of sediment on the construction site.

Therefore, Roanoke County's lower threshold for compliance keeps approximately 1,680 tons/year of sediment out of waterways (120 tons/acre/year * 70% *20 acre = 1,680 tons/year).

B. BMPs Approved by the Chesapeake Bay Program

BMP S-2: BMP Capital Improvement Program

Town's consultant used existing Roanoke County Pictometry and GIS data to identify potentially eroding stream reaches along Vinton streams. This resulted in identification of 18 stream reaches that had potentially eroding streambanks. Of the 18 identified, seven (7) were located on Vinton-owned properties. The consultant also provided visual assessment and verification of the digital findings of these seven (7) stream reaches, as shown below and evaluated the stream reaches for the potential of future water quality improvement projects. The Town plans to address the reduction of sediment load by undertaking capital project as identified in the assessment study.



Site Location Map for Potential Water Quality Improvement Projects

However, it should be recognized that the Town, through its MS4 permit, is only responsible for point-source discharges from its improved storm drainage system (i.e., pipes, ditches, and swales). The Town is not responsible for streambank erosion within streams, as they are not a component of the Town's MS4 system. Currently, the Town's CIP indicates planned funding for one capital BMP project and this CIP program also assumes that 50% of the cost will be provided through the Virginia Stormwater Local Assistance Fund (SLAF) and/or Community Flood Preparedness Fund (CFPF).

Additionally, Roanoke the County has been addressing the reduction of sediment loads through the construction of stream restoration projects. The County's Stream Restoration Projects as shown in the table below, are the streams that are located upstream of the Town Limits, which might have and will continue to reduce sediment in the Town's streams that are located down streams. City of Roanoke is undertaking Glade Creek Stream Restoration Project which will address the sites identified as Glade_V08 and Glade_09 on the map as shown above.

Roanoke County's Stream Restoration Projects

Year Completed (or anticipated completion)	Stream Name	Project Location	Tons of Sediment per Year Kept out of Stream by Project*
2016	Glade Creek	Vinyard Park	831
2019	Glade Creek	Vinyard Park	378.2
2021	Wolf Creek	Goode Park	348

Values determined based on field studies using a state approved methodology. These calculations were submitted and reviewed by the Virginia Department of Environmental Quality as a part of each project's SLAF grant application.

C. Outreach strategy to enhance the public's education (including employees) on methods to eliminate and reduce discharges of the pollutants of concern

*BMP S-3: Enhanced Public Outreach (Sediment)

***Certain components of the BMPS as listed below are implemented with continued coordination with Roanoke County Stormwater Division**

In accordance with the MS4 Permit requirements, the Town's Public Education Program targets three high-priority water quality issues that contribute to the degradation of stormwater runoff and receiving waters: *excess bacteria, excess sediment, and excess nutrients.* The following BMPs, as outlined in the Town's MS4 Program Plan, address these issues:

BMP 1-1. Stormwater Educational Resources - The Town maintains a comprehensive listing of existing stormwater-related agencies and organizations along with pertinent educational programs and resources, which is made available to the public on the Town's stormwater website.

BMP 1-2. Coordination in the Development and Distribution of Roanoke County Stormwater Newsletter - Continue to coordinate with Roanoke County Stormwater Division with the development and distribution of Roanoke County Stormwater Informational Mailer to Town of Vinton Residents and Businesses.

BMP 1-3. Stream Monitoring and Education - On behalf of Town of Vinton, Clean Valley Council provides stream monitoring and informational stream seminars for Town of Vinton students and residents.

BMP 1-4. Stormwater Education Program for Schoolchildren - Through the Clean Valley Council, Town of Vinton implements a stormwater education program for its schoolchildren. Different programs target appropriate grade levels.

BMP 1-5. Stormwater Public Awareness Programs - The Town of Vinton implements a Stormwater Public Awareness Program by coordinating with Roanoke County Stormwater Division in the distribution of stormwater merchandise, public service announcements, and other high visibility educational media.

BMP 1-6. Town of Vinton Stormwater Webpage - Town of Vinton maintains a Stormwater webpage as a means to inform the public on the various ways to reduce stormwater pollution, placing priority on reducing impacts to impaired waters and addressing other local water pollution concerns**.**

***BMP 1-7. Targeted Education Program -** This BMP is a joint project with the County of Roanoke. The annual mailing and/or distribution of the educational materials for this targeted education program by the County of Roanoke included the Town of Vinton households, businesses, and contractors involved in land-disturbing activities.

BMP 2-3: MS4 Program and Stormwater Pollution Prevention Website - Town of Vinton maintains a webpage that is dedicated to the MS4 Program and Stormwater Pollution Prevention.

The aforementioned BMPs have been or will be revised, where appropriate, to include messages from the Sediment TMDL Action Plan. This effort will also extend to training materials developed for Town employees. See **BMP S-4: Enhanced Employee Training (Sediment)**.

High-Priority Water Quality Issue	Target Audiences	Means to Determine Audience Size	Estimated Audience Size	Overall Messages	Means to Deliver Messages	Rationale
#1 Sediment	Car Washing/Detail Facilities	Business Licenses/Google	3	• All wash water to sanitary sewer. • Potential damage caused to streams by wash water.	• Mailer, annually • PSAs on local cable station	Commercial car wash facilities can contribute significant sediment if wash water is discharged into the Town's MS4.
	Car Dealers	Business Licenses/Google	2	• All wash water to sanitary sewer. • Potential damage caused to streams by wash water.	• Mailer, annually • PSAs on local cable station	Vehicle washing/detailing can contribute significant sediment if wash water is discharged into the Town's MS4, which drains, untreated, to local streams. Residential car washing is specifically allowed; but, it still may contribute significant sediment if wash water is not properly handled.
	Auto Body Shops	Business Licenses/Google	1	• All wash water to sanitary sewer. • Potential damage caused to streams by wash water.	• Mailer, annually • PSAs on local cable station	
	Homeowners	Tax Records	2,756	• Potential damage caused to streams by wash water. • Direct wash water to grass area for filtration and infiltration. • Never allow wash water to flow into street or storm drains.	• County publication sent annually to homeowners • PSAs on local cable station • Handouts at local environmental events, 4 per year minimum	
	Contractors Involved in Land-Disturbing Activities	Business Licenses	15	• Damage caused to streams by sediments. • Healthy fish populations require clear stream bottoms. • Silt fence is not enough. • Limit disturbed areas. • Stabilize as quickly as possible.	• Mailer, annually • Brochure given to land-disturbance permittee when permit is issued • Brochure given with enforcement actions	Erosion and sediment control is required by regulations; however, more effective implementation may occur with additional education.

BMP S-4: Enhanced Employee Training (Sediment)

In accordance with the MS4 Permit requirements, the Town's Public Education Program targets three high-priority water quality issues that contribute to the degradation of stormwater runoff and receiving waters: *excess bacteria, excess sediment, and excess nutrients*. Thus, the Town's employee training program has been enhanced to recognize sediment as a "high-priority water quality issue." Training courses include the following, as outlined in the MS4 Program Plan:

- **Recognition and Reporting Illicit Discharges** - 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.
- **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 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 are required to take Good Housekeeping and Pollution Prevention Practices are also 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 volunteers, in Fire and Rescue. As of July 1, 2019, the Town's EMS services are provided by Roanoke County. 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. The Town's Public Works employees receive their training through VA Risk Sharing.

The aforementioned BMPs (as outlined in **BMP S-3)** and the Town's Water-Quality Related SOPs have been or will be revised, where appropriate, to include messages from the Sediment TMDL Action Plan.

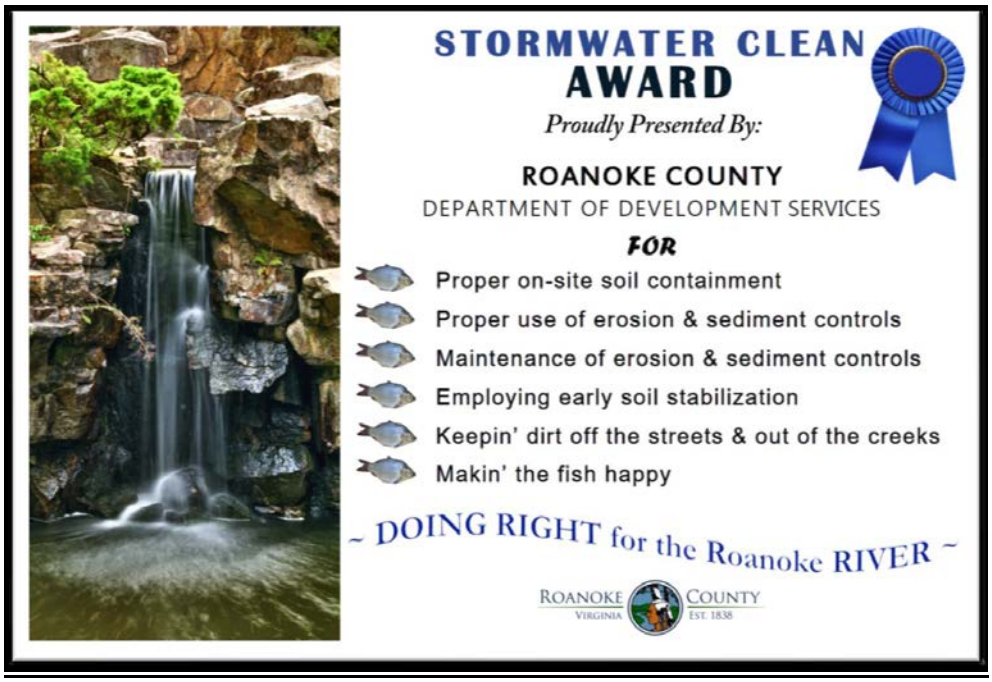
*BMP S-5: Contractor Appreciation Program

*** This BMP has and will continue to be implemented by Roanoke County since the County is the Town's ESC and VSMP Administrator.**

In accordance with the MS4 Permit requirements, the Town's Public Education Program targets three high-priority water quality issues that contribute to the degradation of stormwater runoff and receiving waters: *excess bacteria, excess sediment, and excess nutrients.* Roanoke County has implemented the Contractor Appreciation Program to recognize those contractors that are proactive in implementing proper erosion and sediment controls and who are employing stormwater management measures to "keep their dirt on their project and out of the creeks."

As previously mentioned, erosion and sediment control devices are not 100% effective; however, a properly-designed and properly-installed set of controls will likely retain at least 70% of sediment on the construction site.

For more information on this well-received program, visit the Roanoke's County's stormwater website at:
https://www.roanokecountyva.gov/1780/Stormwater-Contractor-Appreciation



D. OTHER BMPs

BMP S-6: Public Street Sweeping and Leaf Collection Program

The street sweeping program offers the greatest benefit to capture roadway contaminants, debris, and sediment before entering the Town's storm sewer collection system.

The street sweeping program to target weekly sweeping of all primary streets will return the greatest benefit of collecting and thus preventing roadway contaminants, sediment and debris, from entering the stormwater collection system. Other streets are swept bi-weekly, every third week, every fourth week, and on as needed basis (once a while) for one street.

The leaf collection program, which is normally done in the months of November and December, also minimizes leaf and yard waste from entering the stormwater collection system.

Additionally, with the street sweeper being configured to vacuum debris from drainage inlet continues to optimize both the use and effectiveness of the Town single street sweeper and achieves desired results. Success of this BMP is measured mileage of streets swept; amount of debris vacuumed from drainage inlets; amount of leaf collected; and total expanses of street sweeping and leaf collection programs.

The amount of debris collected by the street sweeping program has and will continue to be tracked, and from July 1, 2019 to June 30, 2020, 93.50 cubic yards of debris was collected under the street sweeping program. The Town will continue to maintain the street sweeping and the leaf collection program. This program of collections of roadway contaminants, sediment, debris, leaf, yard waste, prevents them from entering the Town's storm sewer collection systems, and is of aesthetic benefit.

The leaf collection program minimizes leaf and yard debris that contaminated with pet waste (bacteria) from entering storm sewer system.

The calculation for estimated sediment removed from street sweeping is as shown below in Table 1:

Land Use	WLA, T/yr	Total WLA, T	% of Total WLA	Percent Reduction	Existing Load, T/yr
DF	79.0	4,573.3	1.7%	0.0%	79.0
EF	6.1	4,573.3	0.1%	0.0%	6.1
MF	29.3	4,573.3	0.6%	0.0%	29.3
P/H	160.7	4,573.3	3.5%	69.5%	231.2
RC	62.3	4,573.3	1.4%	69.5%	89.6
LIR	38.1	4,573.3	0.8%	69.5%	92.9
HIR	22.1	4,573.3	0.5%	69.5%	53.9
C/I	988.9	4,573.3	21.6%	69.5%	2411.8
OW	0.0	4,573.3	0.0%	0.0%	0.0
WW	0.0	4,573.3	0.0%	0.0%	0.0
EH	0.0	4,573.3	0.0%	0.0%	0.0
Q/SM/GP	122.6	4,573.3	2.7%	69.5%	299.0
T	98.1	4,573.3	2.1%	69.5%	239.3
U/RG	9.7	4,573.3	0.2%	69.5%	23.7
ISE	2,956.4	4,573.3	65%	69.5%	7210.2
Total	**4,573.3**			**Total**	**10,766.0**

Vinton Existing	Vinton WLA	% WLA Non-ISE	Runoff WLA, T	ISE WLA, T	Existing Runoff	Existing ISE
391.15	119.3	0.25	30.2	89.1	97.8	293.4
Street Sweeping, Mass Load	**CY**	**Lbs/CY**	**Total lbs.**	**W to D**	**Particle Size**	**Tonnage**
	93.50	865.00	80,877.50	56,614.25	16,984.28	8.49

Vinton Existing	Vinton WLA	Required Reduction, T	Street Sweeping, T	Remaining Reduction, T
391.1	119.3	271.8	8.49	263.4
	ISE	203.9	-	203.9
	SW Runoff	68.0	8.49	59.5

Table 1. Sediment Removed by Street Sweeping from July 1, 2019 – June 30, 2020

BMP S-7: Stream Assessments – Digital and Physical Assessments

GKY & Associates, Inc., the Town' s consultant completed a digital assessment (Phase 1) of approximately 10 miles of streams in the four (4) watersheds located in the Town's MS4 Area in January 2017. The digital assessment was designed to identify stream reaches with eroding streambanks as well as other potential sediment and bacterial sources. Data collected as part of the digital assessment was entered directly into Roanoke County's Spatial Database Engine (SDE) for use in future pollutant reduction activities (Roanoke County operates the SDE for the overall County including the Town).

Stream reaches with eroding stream banks were prioritized using a priority ranking methodology that evaluated the potential sediment contribution of the eroding streambank and the potential for the Town to successfully complete a project to mitigate the sediment load from the streambank. The results of the priority ranking methodology, along with inherent Town knowledge of its streams, were used to identify sites for visual assessment. The visual assessment involved a detailed evaluation of the selected eroding streambank sites to further determine its potential sediment contribution to the Roanoke River and for implementation of a successful project based on site conditions.

The documentation of potential sources of pollutants of concern was difficult in stream reaches with heavy vegetative canopy as the digital assessment relied on the imagery available in Roanoke County's SDE. However, the following potential sources of pollutants of concern were identified:

- 18 eroding streambanks;
- 1 armored streambank;
- 10 other potential sediment sources;
- 0 animal sources; and
- 4 other pollutant sources.

Table 2 provides a summary of the potential pollutant sources, by watershed, identified in the SDE, as well as a corresponding Map Number. The Map Numbers correspond to a set of two summary map groups. The first map in the map group identifies the general location of the identified eroding streambanks. The second map provides the general location of the remaining potential pollutant sources including animal sources, sediment sources and other pollutant sources, and identifies the potential additional MS4 outfalls when applicable.

Stream Reach	Miles Assessed	Eroding Stream Reach Segments	Armored Stream Reach Segments	Other Sediment Sources	All Animal Sources	Potential Other Sources	Potential Additional Outfalls	Attachment 1 Map Group #
Glade Creek	3.96	12	1	6	0	2	0	01
Roanoke River	2.27	0	0	0	0	0	0	02
Tinker Creek	2.71	2	0	4	0	2	1	03
Wolf Creek	0.73	5	0	0	0	0	0	04
Total	9.67	19	1	10	0	4	1	

Table 2. Summary of Potential Pollutant of Concern Sources by Watershed

The goal of the visual assessment component of the project was to identify and prioritize eroding stream reaches for potential future design and restoration based on a defensible and logical procedure. In order to do so, a priority ranking methodology was developed to rank the 321 eroding sites identified as part of the digital assessment. The prioritization methodology was based on a weighted score of five parameters:

- Ownership
- Potential damage to infrastructure
- Accessibility
- Length of eroding stream reach
- Distance between the eroding reaches

Each parameters' importance factor and their associated ranking criteria are outlined in **Table 3** below**.**

Parameter	Parameter Importance Factor	Ranking Factor	Ranking Points	Weighted Ranking Points
Ownership	30	Town Owned Property	10	300
		Other Publicly Owned Property	8	240
		Private Property: Commercial <4 Owners	6	180
		Private Property: Commercial >4 Owners or Residential Vacant	4	120
		Private Property Residential	2	60
Potential Damage to Infrastructure	30	Public Infrastructure: Severe	10	300
		Private Infrastructure: Severe	8	240
		Public Infrastructure: Moderate	6	180
		Private Infrastructure: Moderate	4	120
		Private Property: Residential	2	60
		Slight or No	2	60
Accessibility	25	Easy Access	10	250
		Moderate Accessibility	6	150
		Difficult Accessibility	3	75
Length of Erosion	10	>300 feet	10	100
		100-300 feet	7	70
		<100 feet	4	40
Distance Between Eroding Segment	5	<300 feet	10	50
		300-1,000 feet	6	30
		>1000 feet	1	5

Table 3: Priority Ranking Methodology Parameters and Scoring for Eroding Streambanks

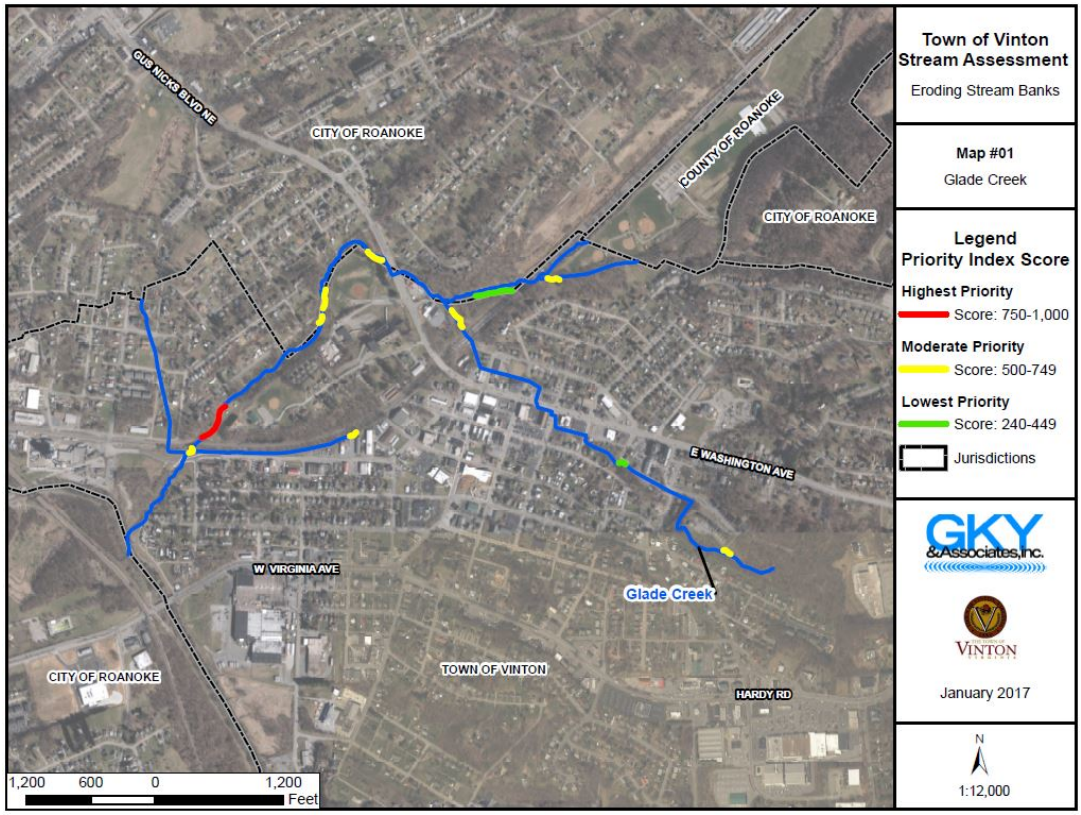
Table 4 provides a summary of each eroding stream bank with the corresponding Priority Ranking score. The general location of the identified eroding streambanks, color-coded by the Priority Ranking Score can be found in the maps below.

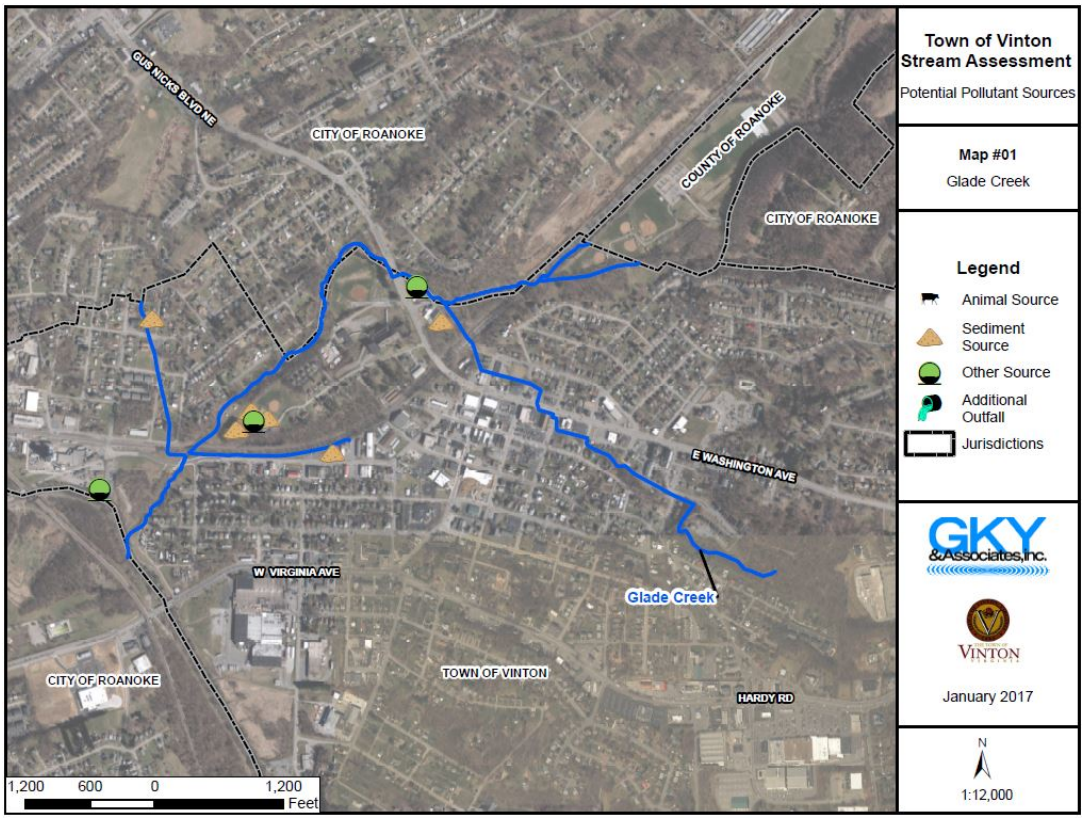
Reach ID	Owner	Ownership Score	Damage	Damage Score	Access	Access Score	Length Erosion	Length Score	Distance Erosion	Distance Score	Final Score
Glade_V01	Other Publicly Owned	240	Slight or No	60	Easy	250	112	70	490	30	650
Glade_V02	1-4 Private Owners	180	Slight or No	60	Easy	250	79	40	1778	5	535
Glade_V03	1-4 Private Owners	60	Slight or No	60	Moderate	150	67	40	476	30	340
Glade_V05	Vinton	240	Slight or No	60	Moderate	150	197	70	476	30	550
Galde_V06	Vinton	240	Slight or No	60	Difficult	75	349	40	490	30	445
Glade_V07	Other Publicly Owned	240	Slight or No	60	Easy	250	161	70	510	30	650
Glade_V08	Vinton	300	Slight or No	60	Easy	250	76	40	90	50	700
Glade_V09	Vinton	300	Slight or No	60	Easy	250	184	70	90	50	730
Glade_V10	Vinton	300	Slight or No	60	Easy	250	389	100	172	50	760
Glade_V11	Other Publicly Owned	240	Slight or No	60	Easy	250	75	40	172	50	640
Glade_V12	1-4 Private Owners	180	Slight or No	60	Easy	250	72	40	1875	30	560
Tinker_V01	Vinton	300	Slight or No	60	Easy	250	218	70	208	50	730
Tinker_V02	Vinton	300	Slight or No	60	Easy	250	298	70	208	50	730
Wolf_V01	1-4 Private Owners	60	Slight or No	60	Moderate	150	241	70	250	50	390
Wolf_V02	1-4 Private Owners	60	Slight or No	60	Moderate	150	70	40	145	50	360
Wolf_V03	1-4 Private Owners	60	Slight or No	60	Moderate	150	65	40	145	50	360
Wolf_V04	1-4 Private Owners	60	Slight or No	60	Moderate	150	106	70	55	50	390
Wolf_V05	1-4 Private Owners	60	Slight or No	60	Moderate	150	95	40	55	50	360

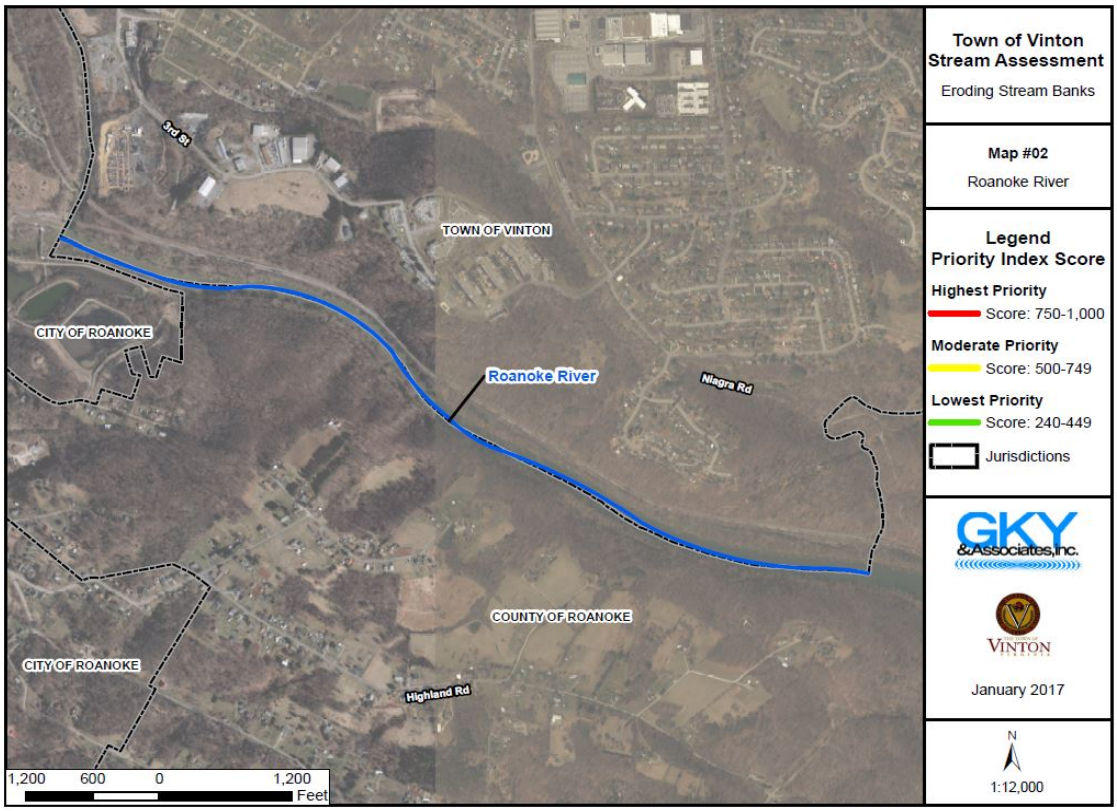
*Information from this table can be found in the "Streambank Source" feature class within Roanoke County's SDE

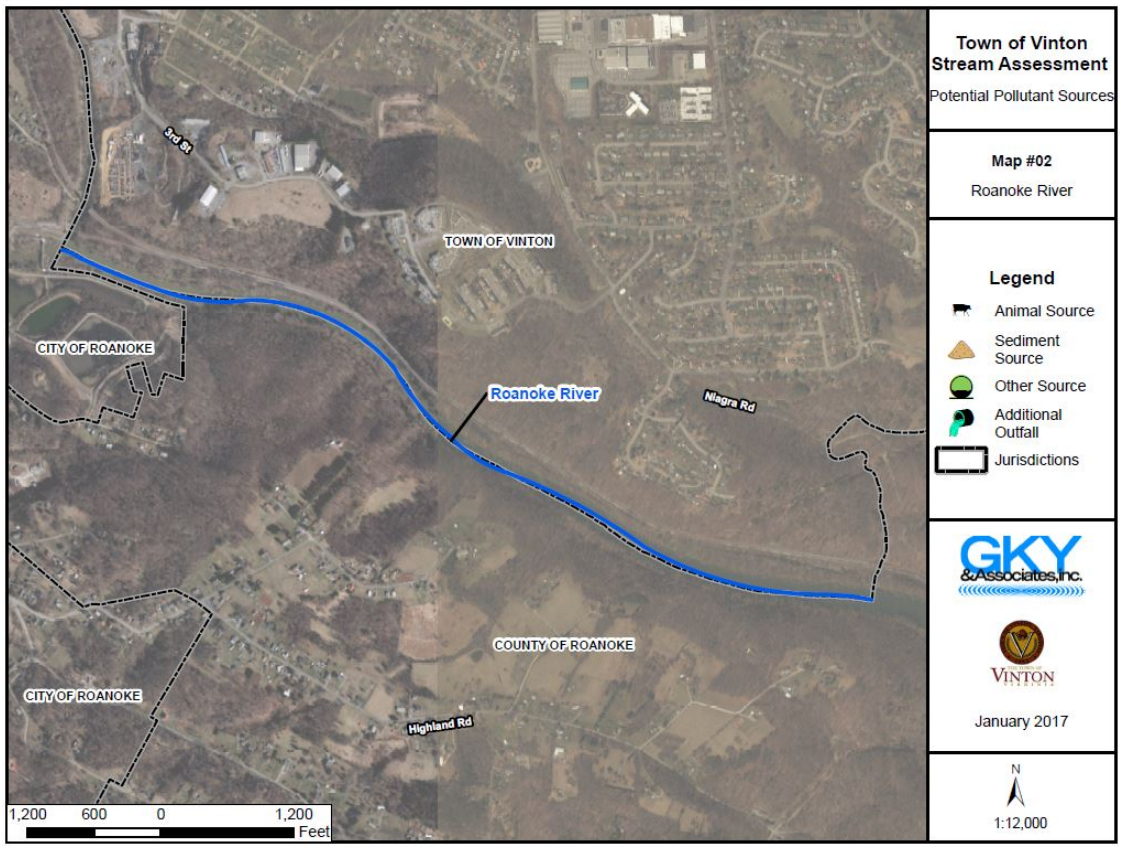
Table 4. Eroding Stream Bank Summary with Priority Ranking Scores

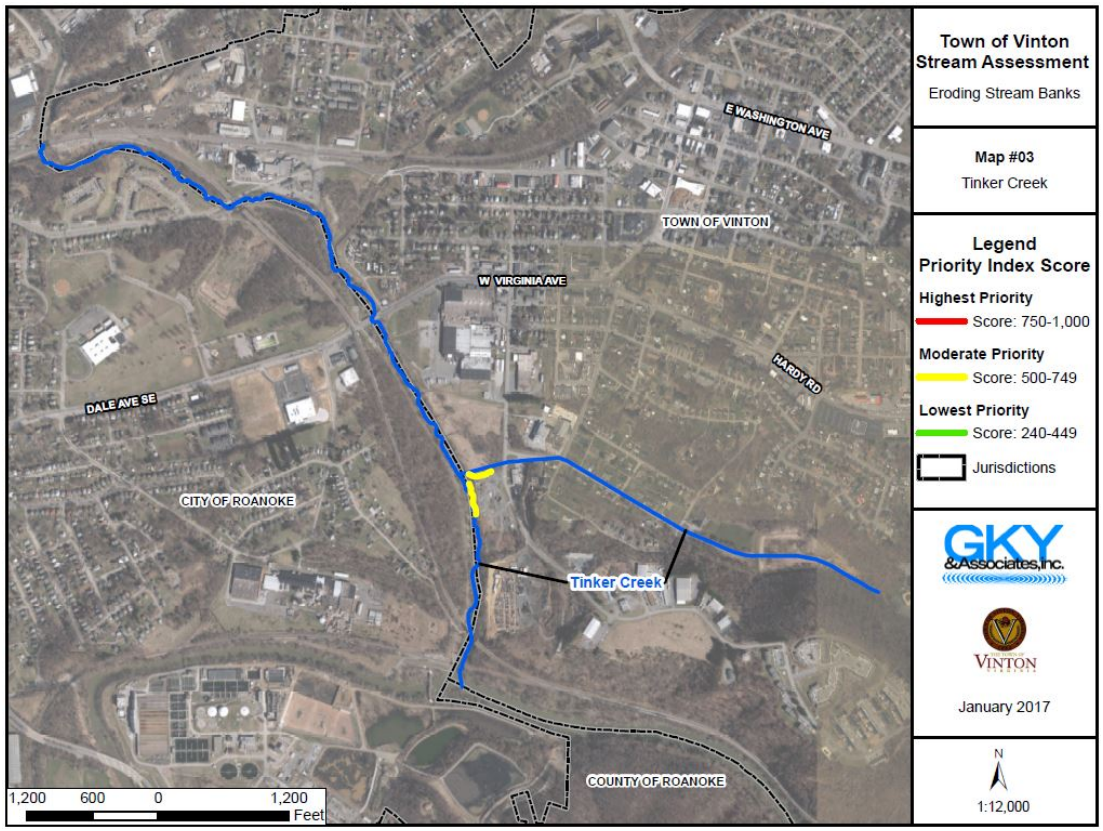
Below are the digital assessment maps showing the potential pollutant sources and eroding stream banks of the four (4) streams including Roanoke River.

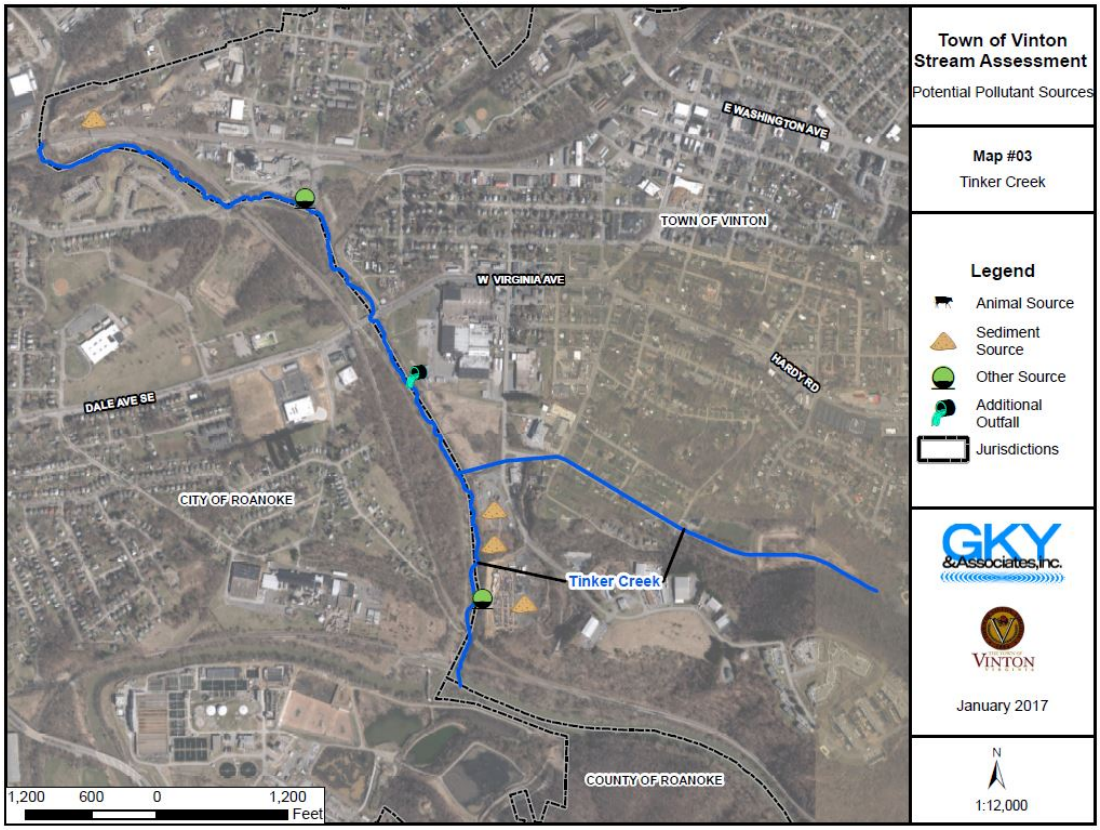

GUS NICKS BLVD NE
CITY OF ROANOKE
COUNTY OF ROANOKE
CITY OF ROANOKE
E WASHINGTON AVE
W VIRGINIA AVE
Glade Creek
CITY OF ROANOKE
TOWN OF VINTON
HARDY RD
1,200 600 0 1,200
Feet
Town of Vinton
Stream Assessment
Eroding Stream Banks
Map #01
Glade Creek
Legend
Priority Index Score
Highest Priority
Score: 750-1,000
Moderate Priority
Score: 500-749
Lowest Priority
Score: 240-449
Jurisdictions
GKY &Associates,Inc.
VINTON
January 2017
N
1:12,000

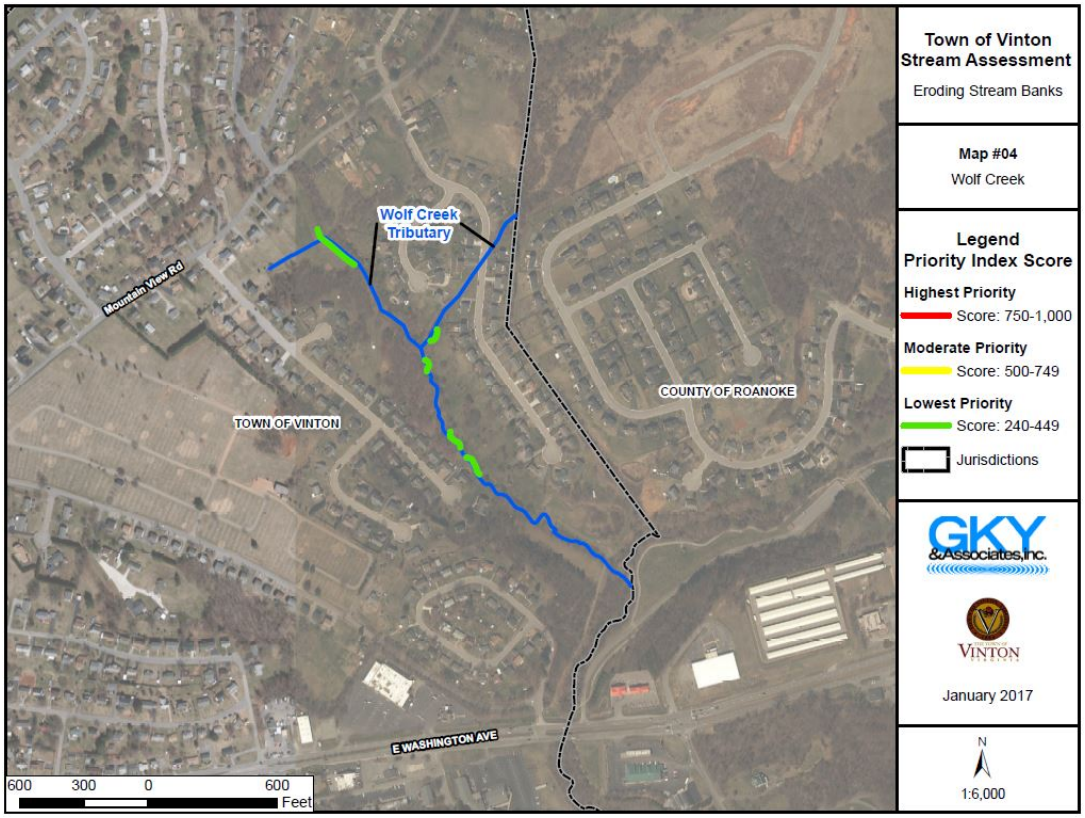

GUS NICKS BLVD NE
CITY OF ROANOKE
COUNTY OF ROANOKE
CITY OF ROANOKE
E WASHINGTON AVE
W VIRGINIA AVE
Glade Creek
CITY OF ROANOKE
TOWN OF VINTON
HARDY RD
1,200 600 0 1,200
Feet
Town of Vinton
Stream Assessment
Potential Pollutant Sources
Map #01
Glade Creek
Legend
Animal Source
Sediment Source
Other Source
Additional Outfall
Jurisdictions
GKY &Associates,Inc.
VINTON
January 2017
N
1:12,000

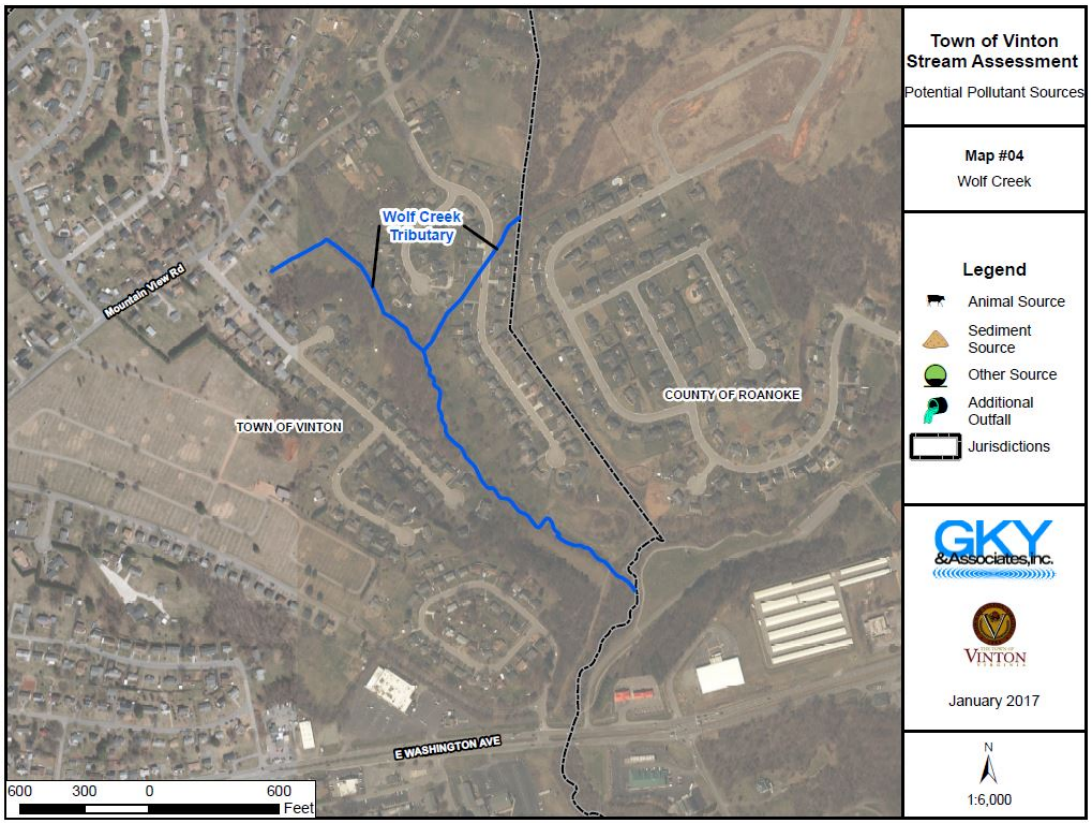

Town of Vinton
Stream Assessment
Eroding Stream Banks
Map #02
Roanoke River
Legend
Priority Index Score
Highest Priority
Score: 750-1,000
Moderate Priority
Score: 500-749
Lowest Priority
Score: 240-449
Jurisdictions
GKY
&Associates,Inc.
VINTON
January 2017
N
1:12,000
3rd St
TOWN OF VINTON
CITY OF ROANOKE
Roanoke River
Niagra Rd
COUNTY OF ROANOKE
CITY OF ROANOKE
Highland Rd
1,200 600 0 1,200
Feet


Town of Vinton
Stream Assessment
Potential Pollutant Sources
Map #02
Roanoke River
Legend
Animal Source
Sediment Source
Other Source
Additional Outfall
Jurisdictions
GKY
&Associates,Inc.
VINTON
January 2017
N
1:12,000
3rd St
TOWN OF VINTON
CITY OF ROANOKE
Roanoke River
Niagra Rd
COUNTY OF ROANOKE
CITY OF ROANOKE
Highland Rd
1,200 600 0 1,200
Feet


Town of Vinton
Stream Assessment
Eroding Stream Banks
Map #03
Tinker Creek
Legend
Priority Index Score
Highest Priority
Score: 750-1,000
Moderate Priority
Score: 500-749
Lowest Priority
Score: 240-449
Jurisdictions
GKY &Associates,Inc.
VINTON
January 2017
N
1:12,000
E WASHINGTON AVE
TOWN OF VINTON
W VIRGINIA AVE
HARDY RD
DALE AVE SE
CITY OF ROANOKE
Tinker Creek
COUNTY OF ROANOKE
1,200 600 0 1,200
Feet


Town of Vinton
Stream Assessment
Potential Pollutant Sources
Map #03
Tinker Creek
Legend
Animal Source
Sediment Source
Other Source
Additional Outfall
Jurisdictions
GKY &Associates,Inc.
VINTON
January 2017
N
1:12,000
E WASHINGTON AVE
TOWN OF VINTON
W VIRGINIA AVE
HARDY RD
DALE AVE SE
CITY OF ROANOKE
Tinker Creek
COUNTY OF ROANOKE
1,200 600 0 1,200
Feet


Wolf Creek Tributary
Mountain View Rd
TOWN OF VINTON
COUNTY OF ROANOKE
E WASHINGTON AVE
600 300 0 600
Feet
Town of Vinton Stream Assessment
Eroding Stream Banks
Map #04
Wolf Creek
Legend
Priority Index Score
Highest Priority
Score: 750-1,000
Moderate Priority
Score: 500-749
Lowest Priority
Score: 240-449
Jurisdictions
GKY & Associates, Inc.
VINTON
January 2017
N
1:6,000


Wolf Creek Tributary
Mountain View Rd
TOWN OF VINTON
COUNTY OF ROANOKE
E WASHINGTON AVE
600 300 0 600
Feet
Town of Vinton Stream Assessment
Potential Pollutant Sources
Map #04
Wolf Creek
Legend
Animal Source
Sediment Source
Other Source
Additional Outfall
Jurisdictions
GKY & Associates, Inc.
VINTON
January 2017
N
1:6,000

BMPs Implemented in Coordination with Roanoke County

The Town of Vinton and Roanoke County recognize that addressing water quality in post construction runoff is an important way to prevent deposition of sediment and other pollutants into our streams and river. As noted earlier, Roanoke County is the Town's ESC Administrator since February 14, 1984 and the Town's VSMP Administrator since June 1, 2016, therefore the following BMPs in Roanoke County's MCM-5: Post Construction Stormwater Management for New Development and Development on Prior-Developed Lands help to address these concerns:

BMP 5-1: Stormwater Management Legal Authorities - Roanoke County utilizes certain legal authorities to comply with Virginia's Stormwater Management Act and Stormwater Management Program (VSMP) Regulations.

BMP 5-2: Post-Construction Inspections for Existing Stormwater Management Facilities - Roanoke County maintains and implements written inspection and maintenance procedures for post-construction stormwater management facilities (SWMFs) that discharge to the MS4 to address the long-term operation and maintenance requirements of these facilities.

BMP 5-3: Stormwater Management Facility Tracking - Roanoke County maintains and implements a GIS-based system to track stormwater management facilities to address the long-term operation and maintenance requirements of these facilities.

BMP 5-4: Strategies to Encourage Long-Term Maintenance of Stormwater Control Measures on Single Family Residential Lots - Roanoke County implements strategies to promote the long-term maintenance of stormwater control measures that are designed to treat stormwater runoff solely from the individual single-family residential lot. These strategies are used in lieu of recorded maintenance agreements and post-construction inspections by the County.

BMP 5-5: Storm Sewer System Maintenance - Roanoke County implements a program to maintain and repair its storm sewer system within its MS4 program area. Such maintenance helps to keep the system working as designed, which minimizes the risk of surcharging and overflows; it also helps to minimize street flooding associated with clogged inlet structures and conveyances.

While these BMPs have been created to address the MS4 Permit requirements, they are also effective in helping the Town achieves its TMDL goals for sediment: reducing excessive stream bank erosion and preventing the deposition of sediment and other pollutants into local streams and rivers.

IV. ANNUAL REPORTING REQUIREMENTS

The MS4 Annual Report will include a summary of actions conducted to implement this Sediment TMDL Action Plan during the reporting period of July 1st - June 30th for each year of the permit term.

In accordance with the MS4 Permit, the report is submitted to DEQ by October 1st of each year.