J. Sargeant Reynolds
Community College

# Bacteria TMDL Action Plan

Prepared for:
**J. Sargeant Reynolds Community College**
**Parham Road Campus**
Facilities Management & Planning
1651 E. Parham Road
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# Section 1 Introduction

J. Sargent Reynolds Community College (JSR) has developed this Bacteria TMDL Action Plan (Action Plan) pursuant to the Local TMDL Special Condition (General Permit Section II.B) as required by JSR's Municipal Separate Storm Sewer System (MS4) Permit. JSR utilized the following documents to assist with the development of this Action Plan:

| Full Name | Short Name | Source | Date |
|---|---|---|---|
| General VPDES Permit for Discharges of Stormwater from Small MS4s | General Permit | DEQ | 2018 |
| E.coli TMDL Development for Chickahominy River and Tributaries, VA (A Nested TMDL Approach) | TMDL Development | MapTech, Inc | 2012 |
| Chesapeake Bay TMDL Special Condition Guidance (Guidance Memo No. 15-2005) | Chesapeake Bay Guidance | DEQ | 2015 |
| Pathogens in Urban Stormwater Systems | Pathogen Paper | Urban Water Resources Research Council | 2014 |
| Bacterial Implementation Plan Development for the Chickahominy River and Tributaries Technical Report | Bacteria Implementation Plan | MapTech, Inc | 2013 |
| MS4 Program Plan | Program Plan | JSR | 2019 |
| Nutrient Management Plan | NMP | JSR | 2017 |

JSR also utilized the Virginia Geographic Information Network (VGIN), Virginia Environmental Geographic Information Systems (VEGIS), Henrico County GIS data and GIS data developed by JSR to meet the technical requirements of the Action Plan. This Action Plan includes the following components as required by the General Permit:

**Table 1-1: Permit Requirements**

| Permit Section | Requirement | Plan Section |
|---|---|---|
| II.B.3.a-c | TMDL Project Name, EPA Approval Date of TMDL, Wasteload Allocation | 2.0 |
| II.B.3.d | Identify the Significant Sources of the Pollutant of Concern | 3.0 |
| II.B.3.e | Best Management Practices to Reduce the Pollutant of Concern | 4.0 |
| II.B.3.f | Any Calculations Required | 5.0 |
| II.B.3.g | Outreach Strategy for Enhancement of Public and Employee Education | 6.0 |
| II.B.3.h | Schedule of Anticipated Actions Planned for Implementation | 7.0 |
| II.B.4.b | Strategies for Bacteria Reduction Stormwater Control/Management Strategy | 8.0 |

# Section 2 TMDL Background Information

JSR was assigned a Waste Load Allocation (WLA) under the approved Total Maximum Daily Load (TMDL) report entitled *E. coli TMDL Development for Chickahominy River and Tributaries, VA (A Nested TMDL Approach)* dated August 2012 by Map Tech, Inc. and New River-Highlands RC&D. EPA approved the TMDL on September 19, 2012.

A 7.54-mile stream segment (Segment ID: VAP-G06R_CHK01A98) along the Chickahominy River, located downstream from JSR in Henrico County, is listed as impaired on Virginia's Section 303(d) Total Maximum Daily Load Priority List and Report due to water quality violations of the general standard for fecal coliform. The impaired segment was added to the 2008 impaired waters list for not supporting the recreation/swimming use.

A bacteria TMDL was developed to address the fecal coliform in the Chickahominy River. The TMDL development model calculated bacteria loadings based on several factors such as wildlife populations, the rate of failure of septic systems, domestic pet populations, numbers of livestock, and permitted point sources. The model also considered characteristics of the watershed drainage area such as land use, slopes, stream networks, soil properties, precipitation data. The model was then calibrated based on field monitoring where available. The following permit holders were assigned annual WLAs in the TMDL Development report as follows:

**Table 2-1: Final Bacteria TMDL Waste Load Allocations**

| Permit | WLA | |
|---|---|---|
| | (cfu/yr) | (billion cfu/yr) |
| *Tyson Foods (VA0004031)* | 2.18E+12 | 2,180 |
| ***J. Sargeant Reynolds Community College MS4 (VAR040107)*** | **3.50E+08** | 0.35 |
| *MS4 Henrico County (VA0088617)* | 1.77E+11 | 177 |
| *MS4 VDOT in Henrico County* | | |
| *MS4 Hanover County (VAR040012* | 6.52E+10 | 65.2 |
| *MS4 Town of Ashland (VAR040011)* | | |
| *MS4 VDOT in Hanover County* | | |
| *MS4 Richmond City (VAR040005)* | 2.58E+10 | 25.8 |
| *MS4 VDOT in Richmond City* | | |

Note: cfu = colony forming units

The goal of the TMDL program is to establish a path that will lead to attainment of water quality standards for a stream's intended use.

**Figure A-1** in Appendix A shows JSR's Parham Road Campus property boundary, the Campus's contributing drainage area (approximately 114 acres or 0.18 square miles) to Upham Brook (a Tributary of the Chickahominy River) and the location of the impaired reach in comparison to the property limits.

# Section 3 Sources of POC (Bacteria)

## 3.1 Potential Sources

Sources of bacteria can include humans, livestock, wildlife, pets and permitted point sources.

JSR evaluated the entire Parham Road Campus property for potential sources of pollutants for which the College was assigned a WLA in an approved TMDL. Utilizing best available Geographic Information System (GIS) data, an initial potential pollutant source desktop evaluation was completed to identify and characterize the property within the regulated MS4 boundary. Potential pollutant sources were evaluated based on the *Local Guidance* as well as the *Pathogen Paper*.

Several on-site field reconnaissance visits to assess the condition of the property were conducted by the College's engineering consultant. Potential bacteria generating activities such as material and equipment storage, transfer, transport, or disposal were documented for each site. The property was specifically assessed to identify areas that would potentially contain elements that are a source of bacteria such as pet wastes and uncovered and/or leaking dumpsters. Stormwater pollution potential and location of outfalls for each site were also documented. A site map of the JSR Parham Road Campus is shown on **Figure A-2**.

The following table lists typical sources of pathogenic pollutants as discussed in the *Local Guidance* and the *Pathogen Paper*. Potential sources that were found to have at a low to significant risk level for the JSR Parham Road Campus are individually addressed in this plan.

**Table 3-1: Potential Sources of E. coli**

| General Category | Source/Activity | JSR Risk | Note | Significant? |
|---|---|---|---|---|
| Municipal Sanitary Infrastructure (piped) | Sanitary sewer overflows (SSOs) | Low | No SSOs reported to date. | No |
| | Combined sewer overflows (CSOs) | NA | No CSOs on property. | No |
| | Leaky sewer pipes (exfiltration) | Low | No evidence of leaky sewer pipes to ground/surface. | No |
| | WWTPs | NA | No WWTPs on property. | No |
| MS4 Infrastructure | Illegal dumping | Medium | Addressed further. | No |
| | Illicit sanitary connections to MS4 | Low | No evidence of illicit sanitary connections. | No |
| | Leaky sewer pipes | Low | Addressed further. | No |
| | Biofilms/regrowth | Low | No evidence of bacteria in drinking water. | No |
| | Decaying plant matter, litter and sediment in the storm drain system | Medium | Addressed further. | No |
| Other Human Sanitary Sources (some also attract wildlife) | Leaky or failing septic systems | NA | No septic systems on property. | No |
| | Homeless encampments | Low | No evidence of encampments on property. | No |
| | Porta-Potties | Medium | Addressed further. | No |
| | Dumpsters (e.g. diapers, pet waste, urban wildlife) | Medium | Addressed further. | No |
| | Trash cans | Medium | Addressed further. | No |
| | Garbage trucks | Medium | Addressed further. | No |
| Domestic Pets | Pets belonging to students/visitors | Low | Addressed further. | No |
| | Pets belonging to faculty/staff | Low | Addressed further. | No |
| | Pets belonging to neighbors | Medium | Addressed further. | No |
| Urban Wildlife (naturally-occurring and human attracted) | Rodents/vectors (rats, raccoons, squirrels, opossums) | Medium | Addressed further. | No |
| | Birds (gulls, pigeons, swallows, etc.) | Medium | Addressed further. | No |
| | Open space (coyotes, foxes, beavers, feral cats, etc.) | Medium | Addressed further. | No |
| | Geese (ponds) | Medium | Addressed further. | No |

| General Category | Source/Activity | JSR Risk | Note | Significant? |
|---|---|---|---|---|
| Other Urban Sources (including areas that attract vectors) | Landfills | NA | No landfills on property. | No |
| | Food processing facilities | NA | No food processing facilities on property. | No |
| | Outdoor dining | Medium | Addressed further. | No |
| | Restaurant grease bins | Medium | Addressed further. | No |
| | Bars/stairwells (wash-down areas) | NA | No wash-down areas no property. | No |
| | Piers/docks | NA | No piers on property. | No |
| Urban Non-stormwater Discharges (potentially mobilizing surface-deposited bacteria) | Power washing | NA | No power washing allowed on property. | No |
| | Excessive irrigation/overspray | NA | No irrigation on property | No |
| | Car washing | NA | No car washing allowed on property. | No |
| | Pools/hot tubs | NA | No pools/hot tubs on property. | No |
| | Reclaimed water/graywater | NA | No reclaimed water/graywater use on property. | No |
| Recreational Sources | Bathers and/or boaters | NA | No evidence of bathers and/or boaters. | No |
| | RVs (mobile) | NA | No RVs allowed on property. | No |
| | Outdoor public areas | Medium | Addressed further. | No |
| Agricultural Sources | Livestock | NA | No livestock on property. | No |
| | Manure spreading | Low | Addressed further. | No |
| | Municipal biosolids re-use | NA | No biosolids re-use on property. | No |
| | Reclaimed water | NA | No reclaimed water used on property. | No |
| | Irrigation tailwater | Low | Addressed further. | No |
| | Slaughterhouses | NA | No slaughterhouses on property. | No |
| Natural Open Space/Forested Area | Wildlife population | Medium | Addressed further. | No |
| | Grazing | NA | No grazing on property. | No |
| Other Naturalized Sources | Beach rackline | Low | Addressed further. | No |

## 3.2 Non-significant Sources

The following potential bacteria sources were identified as being applicable to JSR's Parham Road Campus in **Table 3-1**, even if only presenting a low to medium risk to contributing to *E. coli* contamination of the impaired reach of the Chickahominy River. Each source is addressed in the following sections.

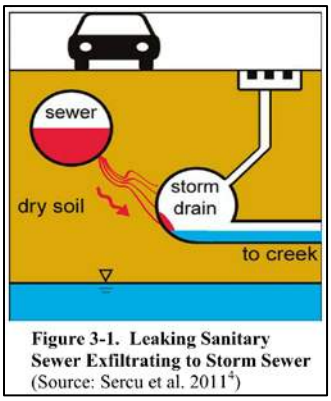
### 3.2.1 Illegal dumping

To date there has been no evidence of illegal dumping anywhere within the property limits. However, the southern half of the property is the J. S. Reynolds Recreation and Athletic Area, which is owned by JSR but is fully operated and managed by Henrico County Division of Recreation & Parks. The athletic area is normally unstaffed, surrounded by wooded areas with trail along North Run, not visible to adjacent properties or streets, open to the public, and typically only in use during certain days at certain times. The factors increase the likelihood that the athletic area may be target for illegal dumping, however, the only access to the athletic area requires driving through the middle of the Parham Campus and passing directly by the Facilities and Operations building. Any vehicle with obvious illegal dumping material would be quickly spotted and asked to leave the property. The College also maintains a phone hotline so anyone can report illegal dumping. Information about the hotline is available on the college's website and is regularly distributed as part of the College's MS4 program.

### 3.2.2 Leaky sanitary sewers

Leaky sanitary sewer pipes can contribute to bacteria pollution when sewage waste leaks through sanitary sewer and into storm sewer. As shown in **Figure A-2**, Parham campus does have approximately 1.5 miles of sanitary sewer mains. Several of these mains are near or cross stormwater sewer pipes. Most sanitary sewer pipes throughout the campus are 8" PVC. A large segment of 10" concrete sanitary sewer does run directly along the *Unnamed Tributary* that flows west through the middle of the property.

**Figure 3-1: Leaky Sanitary Sewers**




Source: *Pathogen Report*

Reynolds minimizes the risk of bacteria entering its stormwater infrastructure by implementing an *Illicit Discharge Detection and Elimination* (IDDE) program as part of their MS4 Program Plan. This program includes regular stormwater outfall inspections Additionally, the College performs annual stream cleanups along the length of the *Unnamed Tributary*. More information on stream cleanup activities, the IDDE program, and outfall inspections can be found in the *MS4 Program Plan* and related *Annual Reports*. Evidence of leaky sanitary sewers would be quickly identified and corrected.

### 3.2.3 Homeless encampments

To date there has been no evidence of homeless encampments within the property limits. However, the southern half of the property (J. S. Reynolds Recreation and Athletic Area), is owned by JSR but is fully operated and managed by Henrico County Division of Recreation & Parks. The area is closed at sundown and opened at sunrise. It is patrolled by JSR Police, JSR security and Henrico Police. Henrico Recreation and Parks cleans the area on a daily basis.

### 3.2.4 Portable toilets

The college typically only has very few portable toilets on the property and only during short-term construction projects. Portable toilets are addressed in the college's MS4 *Program Plan* which includes a *Standard Operating Procedure* for their proper use. Additionally, Portable toilets are kept in good working condition as they are normally visible to students and guests of the college.

### 3.2.5 Dumpsters/trash cans

There are several large dumpsters and trash cans on campus as shown in the figures below.

**Figure 3-2: Dumpsters (typ.)**


**Figure 3-3: Trash Can (typ.)**

The dumpsters are in good working condition and are kept closed. There are also several small trash cans around the campus. These trash cans are also in good working conditions, without holes, and kept covered as shown in the figure above. Additionally, cinder blocks are placed in the bottom of the trash cans to prevent them from tipping over in strong winds. It is not likely that rodents or other nuisance wildlife are able to get into the dumpsters or trash cans or will be attracted to those areas.

### 3.2.6 Garbage trucks

Garbage and recycling are picked up by either Waste Management or Henrico County. Garbage trucks travel through the main area of campus so any spills would be noticed and cleaned up quickly. No garbage trucks are kept on site.

### 3.2.7 Pets

The College does not have specific policies regarding pets on campus for students, staff, or neighbors. There are several trails and areas across campus (including the Henrico County Recreation and Athletic Area) that may be attractive for walking pets. The College has installed two pet waste stations to encourage proper disposal of pet waste and to provide public education.

These pet waste station as shown in the figures below and the location of each pet waste station is shown in **Figure A-2**. Additionally, as discussed in the College's MS4 *Program Plan* and *Annual Reports*, the college distributes approximately 200 post card mailers to upstream residents who occasionally walk their pets near or on College property. These measures reduce the bacteria contributing load from the College's property.

**Figure 3-4: Pet Station 1 - Located by "H" Parking Lot**

**Figure 3-5: Pet Station 2 - Located by "A" Parking Lot**

### 3.2.8 Wildlife

Wildlife sources of bacteria runoff pollution to the Chickahominy River and Tributaries as modeled in the *Bacteria Implementation Plan* include deer, raccoon, muskrat, beaver, turkey, and geese.

As shown in **Figure A-3**, approximately 55% of the Parham campus is forested (approximately 63 acres). This includes the Recreation and Athletic area operated by Henrico County.

The *Bacteria Implementation Plan* does not call for wildlife bacteria reductions. However, the plan does suggest nuisance wildlife planning where needed. JSR does not reduce natural wildlife but does discourage practices that contribute to the over-population of nuisance and other wildlife, such as open trash piles and feeding wildlife.

There are three stormwater basins on campus property. Overall photos of each basin are shown in the following figures. BMP 4 has a vegetated perimeter that discourages geese and other birds by making water-to-land access more difficult. The other two basins (BMP 3 and BMP 5) are in areas that are close to human activity. Their proximity to human activity does make them less desirable habitats for nuisance wildlife. Additionally, BMP 5 is normally dry which makes it a less desirable habitat for nuisance wildlife.

**Figure 3-6: BMP 4**

**Figure 3-7: BMP 3**

**Figure 3-8: BMP 5**

### 3.2.9 Outdoor dining

The College does not have any designated outdoor dining areas. However, there are several areas where students, faculty and staff are allowed to and often eat outdoors between classes or

during breaks. These areas typically have small trash cans as discussed in Section 3.2.5. Additionally, Facilities Management staff routinely inspect these areas to make sure trash is not left on the ground.

### 3.2.10 Restaurant grease bins

There is a café on campus that generates a small amount of used kitchen grease. This kitchen grease is disposed of and collected in an approved container that is pumped out by a contractor regularly for off-site disposal.

**Figure 3-9: Kitchen Grease Container**

### 3.2.11 Manure spreading and irrigation

Facilities Management does not spread manure or irrigate any of the landscaping within Parham Campus. All fertilizing is conducted according to the facility's *Nutrient Management Plan*.

## 3.3 Significant Sources

The Bacteria POC analysis for this property did not identify any *significant* sources of bacteria that would result in a loading that is *greater* than the average pollutant loading for the identified land uses at the College.

# Section 4 Best Management Practices

JSR leaders and staff have incorporated several Best Management Practices (BMPs) into their MS4 *Program Plan* (revised in 2019), and their subsequent *Annual Reports*, that specifically target bacteria and focus on source control.

The following is a table of BMPs that meet the Minimum Control Measures (MCMs) set forth in the College's MS4 *Program Plan*, and further developed in their MS4 *Annual Reports*, that specifically address the reduction of bacterial pollutant loads for the College's MS4:

**Table 2-1: BMPs Designed to Reduce Bacteria Pollutant Discharges**

| BMP | Title | Description |
|---|---|---|
| 1.1 | Dumpster and Litter Management on Campus | The college reviews dumpster best management practices with facilities management, planning staff, and bookstore and café managers. The fact sheet is also available on the college's MS4 website. |
| 1.2 | Faculty and Staff Stormwater Education Outreach | A fact sheet is emailed to all faculty and staff. |
| 1.3 | Pet Waste Containment | Pet waste receptacles are maintained near adjacent neighbors and a fact sheet is mailed to adjacent neighbors. |
| 2.1 | Public Utilizing the College's Stormwater Website | The College routinely updates its webpage to inform students, staff, faculty, and the public on activities regarding the College's Stormwater Program, including uploading their MS4 Program Plan and Annual Reports: http://www.reynolds.edu/who_we_are/about/environmental_sustainability/ms4.aspx |
| 2.2 | Community Creek Clean-up | The college organizes an annual creek clean-up. |
| 2.3 | Storm Drain Marker Program | The College installs markers on storm drain inlets that read "Drains to Bay, No Dumping". |
| 2.4 | Faculty and Staff Professional Development Opportunity (PDO) | The College presents on Stormwater Awareness during at least one faculty and/or staff PDO session per year. |
| 3.1 | Illicit Discharge Detection and Elimination (IDDE) | The College conducts annual screening on their outfalls for the presence of illicit discharges. |
| 3.2 | Storm Sewer System Map | The College continues to update and revise their Storm Sewer System Map. |
| 5.1 | Stormwater Management (SWM) Facility Tracking | The College maintain a database of all permanent SWM facilities discharging into their regulated MS4 area. |

| BMP | Title | Description |
|---|---|---|
| 5.2 | Stormwater Management (SWM) Facility Inspection | The College regularly inspects SWM Facilities to ensure they are operating effectively and as designed. |
| 5.3 | Stormwater Management (SWM) Facility Maintenance | The College maintains all SWM Facilities as designed. |
| 6.1 | Pollution Prevention and Good Housekeeping Standard Operating Procedures | The College has written standard operation procedures for pollution prevention and good housekeeping to be incorporated into daily operational activities. The following SOPs specifically address practices that may reduce bacteria pollutants:<br>5.1 – General Good Housekeeping Practices<br>5.3 – Parking Lot Maintenance<br>5.12 – Grounds Maintenance |
| 6.2 | Stormwater Pollution Prevention Plan (SWPPP) | The College has developing a SWPPP and continues to implement. This includes annual inspections and revisions as necessary. |
| 6.3 | Turf and Landscape Nutrient Management Plans (NMP) | The College has identified two areas on the Parham Road Campus that require NMPs and has developed and implemented an NMP for each area. |

More detailed descriptions for each practice can be found in the College's MS4 Program Plan and Annual Reports, which are available for download at: http://www.reynolds.edu/who_we_are/about/environmental_sustainability/ms4.aspx.

The College plans to continue implementation of these BMPs to address the bacteria WLA listed in the aforementioned TMDL.

## Section 5 Any Calculations Required

There are no calculations required in accordance with Part II.B.4 (Bacteria TMDLs).

## Section 6 Outreach Strategy for Public and Employee Education

JSR continues to implement a public education and outreach program as part of its MS4 program plan. The College's MS4 webpage is one public education and outreach tool utilized for reaching the program's targeted audiences and providing for distribution of educational materials to convey the appropriate messages. The College's MS4 webpage can be found at the below link: http://www.reynolds.edu/who_we_are/about/environmental_sustainability/ms4.aspx

The college also reaches the public through regularly distributing email factsheets to all students, faculty, and staff. Additionally, the college annually mails educational material regarding the important of cleaning up after pets to apartment complexes that are adjacent to the college and upstream of the unnamed tributary that runs west to east through the campus.

Per MCM 6 of the College's MS4 *Program Plan*, the College has set guidelines on employee training to prevent and reduce stormwater pollution from activities such grounds maintenance, building maintenance, and stormwater system maintenance. The College regularly trains employees on its *Standard Operating Procedures for Pollution Prevention and Good Housekeeping*.

## Section 7 Actions for Implementation

As permitted in Section II.B.1 of the *General Permit* and referred to in the *Chesapeake Bay Guidance*, the College is proposing to implement this *Action Plan* in multiple stages over multiple permit cycles using an adaptive approach. This approach will allow the College to gather the necessary data and information to determine the most effective BMPs/management strategies for controlling POC loads along with identifying targeted areas for their implementation to meet the TMDL WLA for bacteria. The following schedule is proposed for implementation of the BMPs and

milestone activities included in this *Action Plan* for the current permit cycle ending on June 30, 2023:

**Table 3-1: Schedule for BMP Implementation and Milestone Activities**

| BMP | Activity | Schedule |
|---|---|---|
| 1.1 | Dumpster Fact Sheet | Annually |
| 1.2 | Faculty and Staff Stormwater Education Outreach | Annually |
| 1.3 | Pet Waste Mailer | Annually |
| 2.1 | Public Education Utilizing the JSR's Stormwater Website | On-going |
| 2.2 | Community Creek Clean-up | Annually |
| 2.3 | Storm Drain Marker Program | On-going |
| 2.4 | Faculty and Staff Professional Development Opportunity | Annually |
| 3.1 | Illicit Discharge Detection and Elimination | Annually |
| 3.2 | Storm Sewer System Map | On-going |
| 5.1 | Stormwater Management Facility Tracking | On-going |
| 5.2 | Stormwater Management Facility Inspection | Annually |
| 5.3 | Stormwater Management Facility Maintenance | As needed |
| 6.1 | Staff SOP Training | Biennial/as needed |
| 6.2 | Stormwater Pollution Prevention Plan (SWPPP) | Complete, update as needed |
| 6.3 | Turf and Landscape Nutrient Management Plans (NMP) | Complete, update as needed |

# Section 8 Strategies for Bacteria Reduction Stormwater Control/Management Strategy

JSR intends to address the bacteria load from domestic pets by applying several of the strategies outlined in Table 5 of the *General Permit*. This includes providing signage to pick up dog waste and providing pet waste bags and disposal containers for public use as outlined in Section 3.2.7 of this document.

# Appendix A
# Additional Figures

**Figure A-1: Chickahominy River and Tributaries Watershed**

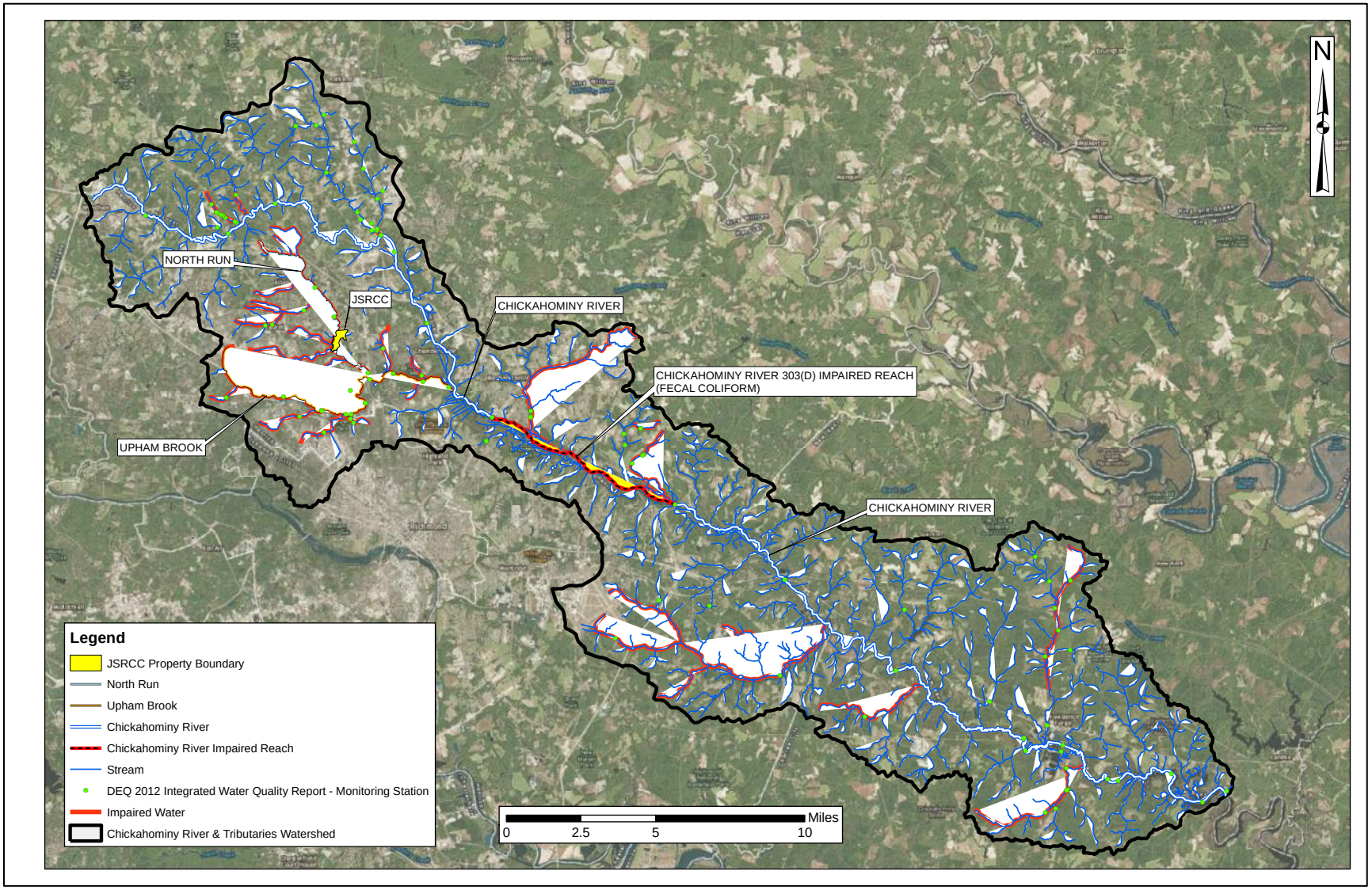


**Figure A-2: Site Map**

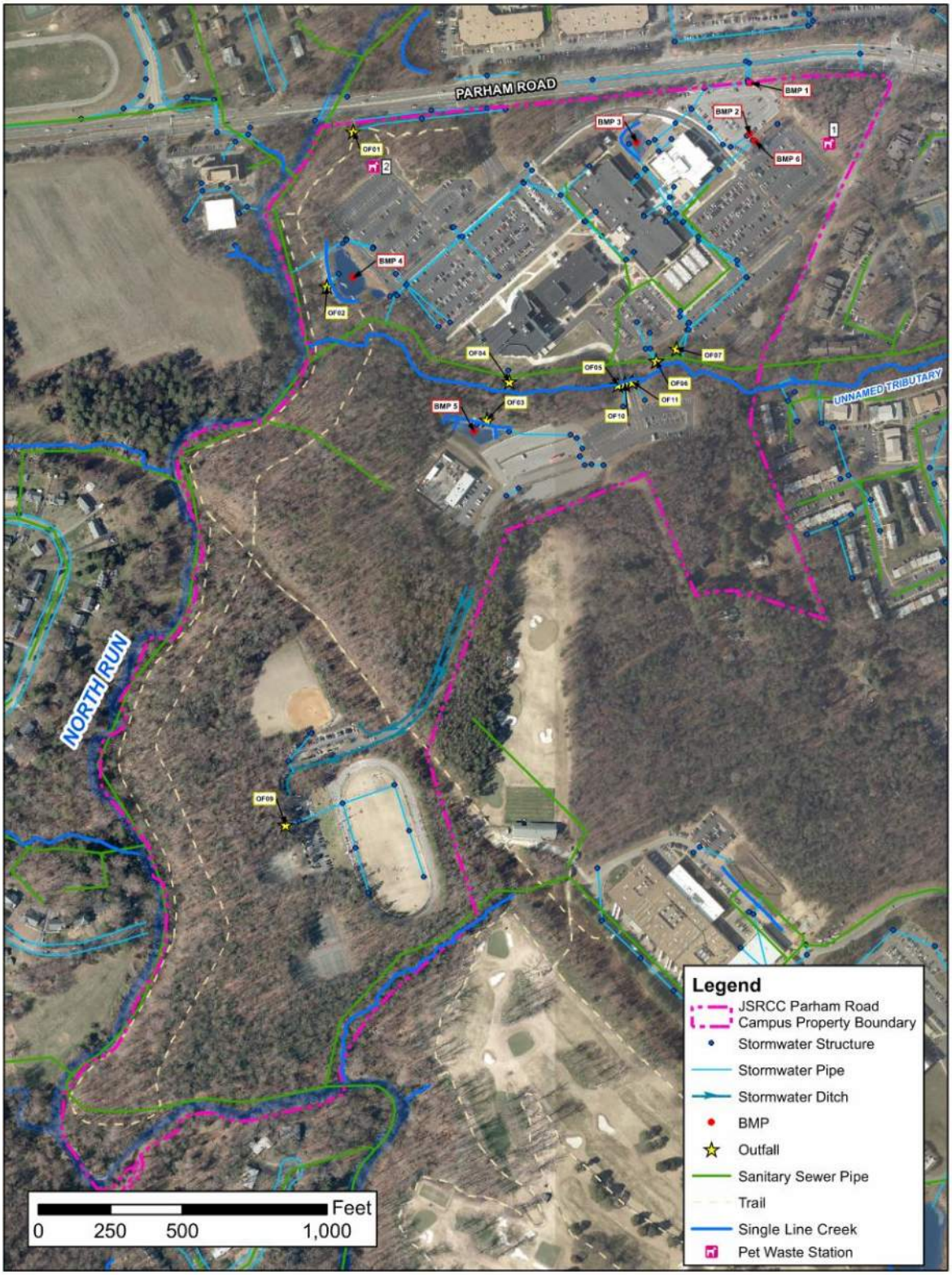


**Figure A-3: Land Cover**