MS4 ANNUAL REPORT
PERMIT NUMBER VAR040106

September 2015

Subject: GEORGE MASON UNIVERSITY MS4 ANNUAL REPORT, PERMIT NUMBER VAR040106

Dated: October 1, 2015

I certify under penalty of law that all documents and all attachments related to the submission and updating of the GEORGE MASON UNIVERSITY MS4 ANNUAL REPORT were prepared under my direction or supervision in 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 a fine and imprisonment for knowing violations.

Sincerely,

Thomas G. Calhoun

Thomas G. Calhoun, P.E.
Vice President of Facilities

TABLE OF CONTENTS

I. ABBREVIATIONS and ACRONYMS

Abbreviation/ Acronym	Term
BMP	Best Management Practice
DEQ	Virginia Department of Environmental Quality
EHS	George Mason University's Environmental, Health, & Safety
ESC	Erosion and Sediment Control
FM	Facilities Maintenance
Mason CEED	George Mason University Facilities Civil and Environmental Engineering Division
MS4	Municipal Separate Storm Sewer System
OoS	Office of Sustainability
SWM	Stormwater Management
VESCL&R	Virginia Erosion and Sediment Control Law and Regulations
VESCP	Virginia Erosion and Sediment Control Plan
VSMP	Virginia Stormwater Management Program

II. SUMMARY

As legislated by the Virginia Stormwater Management Program (VSMP) Permit Regulations (9VAC25-870-400 et. seq.), the Virginia Department of Conservation and Recreation (DCR) issued a VSMP General Permit (VAR040106) for small Municipal Separate Storm Sewer Systems (MS4) to George Mason University (Mason) on 09 July 2008. This permit was updated and extended effective 01 July 2013 by Virginia Department of Environmental Quality (DEQ). This permit holds Mason accountable for developing and implementing an MS4 Program. The program guides Mason's design, construction, maintenance, and management of its facilities and campuses.

Mason's MS4 Program applies to all activities undertaken by Mason, either by its internal workforce or contracted to external entities, where such activities are regulated by VSMP Permit Regulations. Compliance with the permitted MS4 Program (and all parts thereof) will be verified during inspections of Mason's land disturbing activities, whether internal or by DEQ, Environmental Protection Agency (EPA), or other applicable environmental agencies. This MS4 permit only covers the Fairfax campus and Science and Technology Campus (previously Prince William campus). The remote campuses are included under the MS4 permits for each of their respective local jurisdictions.

Mason's MS4 Report is submitted to the DEQ for review and approval on an annual basis. Mason will ensure compliance with the VSMP General Permit for MS4s issued 01 July 2013. This submittal constitutes Mason's commitment to execute all provisions contained herein on regulated land disturbing activities, land development projects, and operation and maintenance of installed stormwater management facilities. As such, this report will be made available to all appropriate Mason and DEQ personnel and is available for download as a PDF file at: http://facilities.gmu.edu/ProjMgmtConst/LandDevelopment/ms4.cfm. Specifics on compliance with the updated MS4 permit are included in Appendix A, where the general permit is broken down and a more detailed review of Mason's compliance within the permit for the reported year is provided.

Mason remains compliant with the previously submitted Annual Reports in addition to this 2015 Annual Report. During this permit cycle, Mason began collecting and analyzing water samples at the Fairfax Campus and the Science and Technology Campus. Refer to Appendix B for more information on the sample locations and results.

Information regarding Mason's public outreach and education programs for stormwater management on campus can be found in Appendix C. A list of campaigns and activities conducted during this reporting is provided.

The MS4 permit effective 01 July 2013 requires compliance on a structured timeline throughout the duration of the permit. The schedule of MS4 program plan updates can be found in Appendix D and will be further elaborated in future Annual Reports.

Mason Civil and Environmental Engineering Division (CEED) (previously Mason Land Development) collaborates with Mason's Environmental, Health, and Safety Department (EHS) to adopt an Illicit Discharge Detection and Elimination Policy to report spills. One reportable illicit discharge incident occurred in the permit year which can be found in Appendix E.

Mason CEED conducts outfall reconnaissance every summer to evaluate the conditions of the outfalls and assess and report illicit discharges if any. Maps depicting the outfall locations within the permitted areas are

included as Appendix F.

All stormwater interconnections with outside stormwater systems are currently depicted on the MS4 maps in Appendix G for both Fairfax and Science and Technology Campuses. Copies of the letters sent to all potential interconnected MS4s are located within Appendix G.

Mason strives to provide a bright and innovative environment for our growing campus community. As a result, our campuses continue to expand through new construction projects. A list of the current and future land disturbing projects can be found in Appendix H.

Mason did not issue Notice of Corrective Action during this permit cycle (Appendix I).

There is an array of stormwater facilities on campus including structural BMPs like rain gardens, vegetative swales, pervious surfaces, and a green roof, as well as nonstructural BMPs including retention and detention ponds. A list of the University's permanent stormwater facilities can be found in Appendix J.

The Nutrient Management Plans for Mason were approved by Department of Conservation and Recreation (DCR). More information on this plan can be found in Appendix K.

The TMDL Action Plan outlines potential steps to comply with the required pollutant load reductions in this permit term and can be found in Appendix L.

III. ANNNUAL REPORT ADMINISTRATION

3.1 *George Mason University Annual MS4 Report* submitted to DEQ includes the following background information as required by the General Permit:

3.1.1 The name and permit number of the program submitting the annual report.

This report is submitted under permit number VAR040106 by Zhongyan Xu under the supervision of Thomas Calhoun, Vice President of Facilities.

3.1.2 The annual report permit year.

This Annual Report is for the year from 01 July 2014 to 30 June 2015.

3.1.3 Modifications to any operator's department's roles and responsibilities.

There are no changes in Mason CEED MS4 related roles and responsibilities.

3.1.4 Number of new MS4 outfalls and associated acreage by HUC added during the permit year.

There are no new MS4 outfalls added during this reporting year. All outfalls can be found on Mason's MS4 database and internal MS4 maps. Refer to Appendix F

3.1.5 A signed certification.

Refer to Page 1 of this report.

3.1.6 The status of compliance with permit conditions, an assessment of the appropriateness of the identified BMPs and progress towards achieving the identified measureable goals for each of the minimum control measures.

Mason continues to implement Best Management Practices in order to meet all requirements of the general permit. A summary of BMPs implemented by Mason is included in Appendix A of this document. As a result of the annual program evaluation of the University's MS4, Mason CEED has identified no program deficiencies or areas that need immediate improvements.

3.1.7 Results of information collected and analyzed, including monitoring data, if any, during the reporting cycle.

Mason CEED began a quality monitoring program for surface waters within campuses. Refer to Appendix B for monitoring locations and results.

3.1.8 A summary of the stormwater activities the operator plans to undertake during the next reporting cycle.

Refer to Appendix H for a list of the projects expected to begin during the next reporting cycle. Each project includes a stormwater portion.

3.1.9 A change in any identified BMPs or measureable goal for any of the minimum control measures including steps to be taken to address any deficiencies.

No changes have been made during this permit year.

3.1.10 Notice that the operator is relying on another government entity to satisfy some of the permit obligations (if applicable).

Mason identified several points where Mason discharges into other regulated MS4. A notification of potential interconnected stormwater system was addressed to respective jurisdictions. Refer to Appendix G. This MS4 permit only covers the Fairfax and Science and Technology campuses. Since the permit does not cover the other campuses or properties owned by Mason, these areas are automatically included under the local

jurisdictions' MS4s and no additional notifications are necessary (9VAC25-870-400-D.7.c.5). The campuses and properties not covered in this permit include Loudoun campus, Arlington campus, Potomac Science Center (Prince William County), and Point of View (Fairfax County).

3.1.11 The approval status of any programs pursuant to Section II C (if appropriate), or the progress towards achieving full approval of these programs.

There are no programs waiting for approval.

3.1.12 Information required pursuant to Section I B 9.

No TMDL or WLA are calculated for this permit duration. More information is intended to be provided as the revised program develops.

3.1.13 The number of illicit discharges identified and the narrative on how they were controlled or eliminated pursuant to Section II B 3 f.

Mason responded to one incident this calendar year 2014 with no potential to impact the environment. One incident required Mason to notify Virginia DEQ of the incident, which required Mason to supplement its response with contractor assistance. Refer to Appendix A for details.

3.1.14 Regulated land-disturbing activities data tracked under Section II 4 c.

Refer to Appendix H for the table of tracked land-disturbing activities.

3.1.15 All known permanent SWM facility data tracked under Section II B 5 b (6) submitted in database format to be prescribed by the department. Upon filing of this list, subsequent reports shall only include those new SWM facilities that have been brought online during the reporting period.

Refer to Appendix J for a list of permanent stormwater management facilities.

3.1.16 A list of new or terminated signed agreements between the operator and any applicable third parties where the operator has entered into an agreement in order to implement minimum control measures or portions of minimum control measures.

There are no new or terminated agreements with third parties.

3.1.17 Copies of any written comments received during a public comment period regarding the MS4 Program Plan or any modifications.

No written comments were received by the public concerning the MS4.

Appendix A:

Minimum Control Measures

Minimum Control Measure No. 1: Public Education and Outreach on Stormwater Impacts							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
1.a -2008-2013 Program	1.a.1 Implement Old Program	Continue to implement the public education and outreach program until the program is updated to meet the conditions of this state permit.	Comply with the 2008-2013 General Permit.	FM/ Mason CEED	-	Complete	Information on the old program is available at the Facilities website http://facilities.gmu.edu/ProjMgmtConst/LandDevelopment/ms4.cfm
1.b -Public Education and Outreach Program	1.b.1 Increase Pollution Awareness	Increase target audience knowledge about the steps that can be taken to reduce stormwater pollution, placing priority on reducing impacts to impaired waters and other local water concerns.	Provide public information on how to reduce Stormwater pollution, impaired waters and other local pollution concerns.	Mason CEED	Yes	Complete	During freshman and transfer orientation, Mason CEED hands out brochures, flyers, and dog bags from the Clean Water Partners (CWP) to raise awareness of faculty and staff, current and future students, and their guardians.
	1.b.2 Hazards Waste Management	Increase target audience knowledge of hazards associated with illegal discharges and improper disposal of waste, including pertinent legal implications	Provide information on proper hazardous material handling, storage and disposal during students and staff training sessions.	EHS/Mason CEED	Yes	Complete	Annual training to non-academic and academic personnel is provided by EHS to ensure proper disposal of hazardous waste. A total of 460 students and staff members received the Chemical Safety and Hazard Communication training and 664 received Laboratory Safety training this year. Both trainings include spill response and notification. Information on hazards wastes is also available thought EHS website.

Minimum Control Measure No. 1: Public Education and Outreach on Stormwater Impacts							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
	1.b.3 Diverse Program	Implementing a diverse program with strategies that are targeted towards audiences most likely to have significant stormwater impacts.	Develop and Implement a diverse program with strategies that are targeted towards audiences most likely to have significant stormwater impacts.	Mason CEED /OoS	Yes	Complete	Mason CEED works with Engineering Department and becomes classroom outreach to targeted students. Refer to Appendix C for outreach activities.
1.c - Program Design	1.c.1 Water Quality Issues	Identify high-priority water quality issues, and a rationale for the selection of these issues	Indicate three high priority water quality issues on campus and how to treat them.	Mason CEED	Yes	Complete	Refer to Appendix B for Mason Water Quality Monitoring program. Mason CEED tests contaminants including phosphorus, nitrogen, and total suspended solids.
	1.c.2Population Size	Identify and estimate the population size of the target audience or audiences who is most likely to have significant impacts of the three high-priority water quality issues.	20% of all on campus students, faculty, and staff.	Mason CEED	Yes	Complete	The 2014 headcount for both full and part time students was 33, 723. As of October 2013, Fairfax campus had 3,318 fulltime faculty/staff; 986 part-time faculty/staff and Science and Technology campus had 211 fulltime faculty/staff; 39 part-time faculty/staff. https://irr.gmu.edu/FastFacts/
	1.c.3 Messages	Develop relevant message or messages and associated educational and outreach materials targeting the selected audiences.	Develop and distribute educational materials for public outreach.	Mason CEED	Yes	Complete	Mason CEED has developed and handed out brochures around campus through the year. These brochures are attached in Appendix C. Mason has BMP signage and electronic flyers in commonly toured areas around the campus. Mason teams up Northern Virginia Clean Water Partners

Minimum Control Measure No. 1: Public Education and Outreach on Stormwater Impacts							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
							and participates in the Stormwater education campaign.
	1.c.4 Public Participation	Provide for public participation during public education and outreach program development.	Reach out to students/faculty/staff on the importance of stormwater management.	Mason CEED	Yes	Complete	Mason CEED hosts stream cleanups events twice a year to promote public involvement and participation. Refer to Appendix C for a list of current and future education and outreach activities.
	1.c.5 Target Audience	Annually conduct sufficient education and outreach activities designed to reach 20% of each high-priority issue target audience.	Reach out to students /faculty/staff on our high-priority stormwater issues.	Mason CEED	Yes	Complete	Mason CEED partners with the Northern Virginia Clean Water Partners (CWP) to raise awareness through a regional Stormwater education campaign.
	1.c.6 Adjusting Target Audience	Provide for the adjustment of target audiences and messages including educational materials and delivery mechanisms.	Campus life changes every year and. Mason LD plans to evaluate target audience based on enrollment profile of students, faculty, and staff and adjust target audience if necessary	Mason CEED	Yes	Complete	Mason CEED makes necessary adjustment on delivery mechanisms based on student's profiles provided by Office of Institution Research and Reporting.
1.d - Other Operators	1.d.1 Public Outreach and Outreach Efforts	Coordinate the public education and outreach efforts with other MS4 operators	Coordinate between other MS4 operators on public education and outreach efforts.	Mason CEED	Yes	Complete	Mason is an active member of Northern Virginia Clean Water Partners.
1.e - Evaluation	1.e.1 Education and Outreach Program	Appropriateness of High-priority stormwater issues.	Update the Program based on the evaluation.	Mason CEED	Yes	2018	Mason will evaluate the appropriateness of the high priority Stormwater issues prior to application for

Minimum Control Measure No. 1: Public Education and Outreach on Stormwater Impacts							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
	Evaluation						continued state permit coverage
	1.e.2 Education and Outreach Program Evaluation	Appropriateness of the selected target audiences for each high priority stormwater issue.	Update the Program based on the evaluation.	Mason CEED	Yes	2018	Mason will evaluate the appropriateness of the selected target audiences prior to application for continued state permit coverage
	1.e.3 Education and Outreach Program Evaluation	Effectiveness of the message or messages being delivered.	Update the Program based on the evaluation.	Mason CEED	Yes	2018	Mason will evaluate the effectiveness of the message prior to application for continued state permit coverage
	1.e.4 Education and Outreach Program Evaluation	Effectiveness of the mechanism or mechanisms of delivery employed in reaching the target audiences.	Update the Program based on the evaluation.	Mason CEED	Yes	2018	Mason will evaluate the effective of delivery mechanism prior to application for continued state permit coverage
1.f - MS4 Program Plan Updates	1.f.1 Table 1	Describe how the conditions of this permit shall be updated in accordance with Table 1.	Update the program plan.	Mason CEED	Yes	2018	Refer to Appendix D for an updated Schedule of MS4 Program Plan Updates for the 2013-2018 Permit.
1.g - Annual Reporting	1.g.1 Education and Outreach Activities- Current Reporting Period	Maintain a list of education and outreach activities.	Maintain a list of education and outreach activities conducted during the reporting period, the estimated number of people reached, and an estimated percentage of the target audience or audiences that will be reached.	Mason CEED	Yes		Mason partners with Northern Virginia Clean Water Partners which provides the summary of regional stormwater education ion campaign. In addition, Mason CEED leads several campus outreach activities including: bi-annual stream clean-ups, escorting classes, and freshman and transfer orientation. Refer to Appendix C for a complete list

Minimum Control Measure No. 1: Public Education and Outreach on Stormwater Impacts							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
							of activities.
	1.g.2 Education and Outreach Activities- Next Reporting Period	Maintain a list of future education and outreach activities for each high priority water quality issue.	Maintain a list of education and outreach activities that will be conducted during the next reporting period for each high-priority water quality issue, the estimated number of people reached, and an estimated percentage of the target audience or audiences that will be reached.	Mason CEED	Yes	Complete	Refer to Appendix C for a list of current and future education and outreach activities.

Minimum Control Measure No. 2: Public Involvement and Participation							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
2.a - Public Involvement	2.a.1-2 Compliance	Comply with any applicable federal, state, and local public notice requirements.	Maintain an updated MS4 Program Plan. Copies of each MS4 program plan shall be posted on its website at a minimum of once a year and within 30 days of submittal of the annual report to the department.	Mason CEED	Yes	Complete	All previous and current MS4 Annual Reports are available online at http://facilities.gmu.edu/ProjMgmtConst/LandDevelopment/ms4.cfm
2.b - Public Participation	2.b.1 Participation	Participate in a minimum of four local activities annually.	Involve campus life in a minimum of four activities around campus yearly.	Mason CEED	Yes	Complete	Mason CEED leads two stream clean ups (one in spring and one in fall), and attends Northern Virginia Clean Water Partners meetings regularly.
2.c. - Procedures for Implementation	2.c.1 Written Procedures	The MS4 Program Plan shall include written procedures for implementing the program.	Address how Mason considered the comments received in the development of its MS4 Program Plan.	Mason CEED	Yes	Complete	Mason MS4 Program Plan includes written procedures for implementation
2.d - Annual Report	2.d.1 Website	A web link to the MS4 Program Plan and annual report.	Keep the website up to date and upload annual MS4 report when available.	Mason CEED	Yes	Complete	All previous and current MS4 Annual Reports are available online at http://facilities.gmu.edu/ProjMgmtConst/LandDevelopment/ms4.cfm
	2.d.2 Proof of Compliance	Documentation of compliance with the public participation requirements of this section.	Maintain the document in activities Mason CEED organizes and the number of participants per event.	Mason CEED	Yes	Complete	Mason CEED keeps records of volunteers' headcounts in each stream clean-up events. Compliance and safety forms are filled out for every volunteer before being allowed to participate.

Minimum Control Measure No. 3: Illicit Discharge Detection and Elimination							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
3.a - Storm Sewer System Map	3.a.1 Outfall Map	Maintain the storm sewer system map	Maintain the storm sewer system map showing the names and locations of the outfalls	Mason CEED	Yes	Complete	An outfall reconnaissance is conducted every year and necessary updates of the outfall map are made. Refer to Appendix E for outfall maps for Fairfax and Science and Technology campuses.
	3.a.2-3 Associated Information Table	Maintain information on every outfall located on the storm sewer system map	Complete the information table including a unique identifier, estimated MS4 acreage served, and the name of the receiving surface water	Mason CEED	Yes	Complete	Data has been collected for all MS4 outfalls including unique identifier, and receiving surface water. Please see Appendix F for information table.
	3.a.4 Completed Map	Complete and maintain the storm sewer system map and information table.	Maintain mapping and information table.	Mason CEED	Yes	Complete	The storm sewer system map and outfall information table are available upon request.
	3.a.5 Interconnection	Notify the downstream MS4	Send the interconnection notice to downstream MS4	Mason CEED	Yes	Complete	Mason sends the interconnection notice to downstream MS4 annually. Please see Appendix G for details.
3.b - Prohibited Discharge	3.b.1 - Prohibit nonstormwater Discharge	The operator shall effectively prohibit, through ordinance or other legal mechanism, nonstormwater discharges into the storm sewer system to the extent allowable under federal, state, or local	Implement the illicit discharge policy	Mason CEED/EHS	Yes	Complete	Mason Illicit Discharge Detection and Elimination (IDDE) Policy prohibits nonstormwater discharges into the University's MS4. The policy educates and instructs the public on what illicit discharges are and how to notify Mason CEED and/or EHS of a spill. The policy also establishes enforcement

Minimum Control Measure No. 3: Illicit Discharge Detection and Elimination							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
		law, regulation, or ordinance.					procedures for violators. Refer to Appendix E for Mason's IDDE Policy implemented 2013.
3.c - IDDE Procedures	3.c.1 Written dry weather field screening	Dry Weather Field Screenings are to detect and eliminate illicit discharges to the MS4.	Develop and implement a field observation and field screening monitoring program to detect and eliminate illicit discharges.	Mason CEED/EHS	Yes	Complete	Mason CEED developed Outfall Reconnaissance Procedures and Guideline to conduct field screenings of illicit discharge. Documentation is collected on the conditions of all outfalls during the inspection.
3.d - Inspections	3.d.1 Promote, publicize, and facilitate public reporting of illicit discharges into or from MS4	The operator shall conduct inspections in response to complaints and follow-up inspections as needed to ensure that corrective measures have been implemented by the responsible party.	Inspect all stormwater outfalls regularly. Inspection reports are based on odor, visual observation, and other indicators to identify illicit discharges.	Mason CEED/FM/EHS	Yes	Complete	Mason conducts annual outfall inspection following the procedures in the Outfall Reconnaissance Procedures and Guideline. If any violations are found between screenings, Mason CEED has an understanding with EHS as to reporting any illicit discharge found on campus. Refer to Appendix E for Mason's IDDE policy and how to repot potential violation.
3.e - Development Procedures	3.e.1 MS4 Program Updates	The MS4 Program plan shall include all procedures developed by the operator to detect, identify, and address nonstormwater discharges to the MS4 in accordance with the schedule given in Appendix D.	Follow procedures for reporting and tracing all illicit discharges. Appropriate staff will be instructed with these procedures.	Mason CEED/FM/EHS	Yes	Complete	Standard procedures shall be followed for reporting and tracking all illicit discharges.

Minimum Control Measure No. 3: Illicit Discharge Detection and Elimination							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
3.f - Annual Reporting	3.f.1-3 Requirements	Each annual report shall include a list of any written notifications of physical interconnection, the total number of outfalls screened during the reporting period, the screening results, details of any follow-up actions necessitated by the screening results, and a summary of each investigation.	Maintain written notifications with outside stormwater systems and complete an inventory form for all MS4 outfalls.	Mason CEED/EHS	Yes	Complete	Mason CEED completes an inventory form as part of the yearly outfalls reconnaissance. Refer to Appendix E. There was one no-reportable incident and one reportable incident in this permit year. DEQ was notified on the reportable incident.

Minimum Control Measure No. 4: Construction Site Stormwater Runoff Control							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
4.a - Oversight Requirements	4.a.1-4 Land Disturbing Activities	The operator shall utilize its legal authority to address discharges entering the MS4.	Implement the Land Disturbance Permit process to address discharges entering the MS4.	Mason CEED	Yes	Complete	Mason CEED is the VESCP authority under the Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management approved by DEQ. This document can be found on. http://facilities.gmu.edu/ProjMgmtConst/LandDevelopment/upload/2012-Edition-REV.pdf Mason CEED review, approve and permit land disturbing projects in accordance with under the Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management
4.b - Required Plan Approval	4.b.1-2 Land Disturbing Activities	The operator shall require that land disturbance not begin until an erosion and sediment control plan or an agreement in lieu of a plan is approved by a VESCP authority	Implement the land disturbance permit process to be compliance with department-approved annual standards and specifications.	Mason CEED	YES	Complete	Mason CEED review, approve and permit land disturbing projects in accordance with under the Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management
4.c - Compliance and Enforcement	4.c.1 – 8 Inspections	The operator shall inspect land-disturbing activities for compliance with an approved erosion and sediment control plan or agreement in lieu of a plan in accordance with the	Maintain an inspection schedule that includes inspections upon installation, every two weeks and within 48 hours of a 10-year storm, and at completion of the project.	Mason CEED	YES	Complete	Mason CEED inspects land disturbing activities upon installation in accordance with under the Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management

Minimum Control Measure No. 4: Construction Site Stormwater Runoff Control							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
		minimum standards.					
4.d - Regulatory Coordination		The operator shall implement enforceable procedures to require small and large construction activities secure necessary state permit authorization from the department to discharge stormwater.	Implement procedures to require all construction activities on campus to obtain proper permits.	Mason CEED/FM	YES	Complete	Mason CEED requires that all construction entities abide the Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management approved by DEQ. Land disturbing activities larger than one acre are required to obtain Construction General Permit.
4.e - MS4 Program Requirements	4.e.1 MS4 Program Plan Updates	The operator's MS4 Program must include a description of a legal authorities utilized to ensure compliance with the minimum control measures related to construction site stormwater runoff control.	Maintain compliance with the minimum control measures.	Mason CEED/EHS	YES	Complete	Mason CEED has an understanding with EHS as to reporting any illicit discharge found on campus. Refer to Appendix E for Mason's IDDE policy and how to report any violation.
	4.e.2 MS4 Program Plan Updates	The operator's MS4 Program must include written plan review procedures and all associated documents utilized in plan review	Maintain compliance with the minimum control measures.	Mason CEED/EHS	YES	Complete	Plan Reviewers use DEQ checklist provided in Mason's Land Development How-To Manual.
	4.e.3 MS4 Program Plan Updates	The operator's MS4 Program must include a copy of the annual standards and specifications	Maintain compliance with the minimum control measures.	Mason CEED	YES	Complete	The approved Annual Standards and Specifications for Erosion and Sediment Control and Stormwater can be found online

Minimum Control Measure No. 4: Construction Site Stormwater Runoff Control							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
							http://facilities.gmu.edu/ProjMgmtConst/LandDevelopment/upload/2012-Edition-REV.pdf.
	4.e.4 MS4 Program Plan Updates	The operator's MS4 Program must include written inspection procedure	Maintain compliance with the minimum control measures.	Mason CEED	YES	Complete	Written inspection procedure can be found in Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management approved by DEQ.
	4.e.5 MS4 Program Plan Updates	The operator's MS4 Program must include a written procedure for compliance and enforcement.	Maintain compliance with the minimum control measures.	Mason CEED	YES	Complete	Written procedure can be found in the Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management approved by DEQ.
	4.e.6 MS4 Program Plan Updates	The operator's MS4 Program must define the roles and responsibilities.	Maintain compliance with the minimum control measures	Mason CEED	YES	Complete	Mason CEED coordinates with other Mason entities including FM, EHS, OoS to implements all portions of the MS4 Program Plan.
4.f - Reporting Requirements	4.f.1 – 4.f.4 Track regulated land disturbing activities	Report the total number of regulated land disturbing activities, acreage disturbed, number of inspections, and a summary of the actions taken during the reporting period.	Maintain an up-to-date list of all current and future land disturbing activities.	Mason CEED	YES	Complete	Refer to Appendix H for a complete list of all current and future land disturbing activities. Refer to Appendix I for any notices of corrective action.

Minimum Control Measure No. 5: Post Construction Site Stormwater Runoff Control							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
5.a - Oversight Requirements	5.a.1-3 New and Old Development	The operator shall address post construction stormwater runoff that enters the MS4.	Implement procedures to require all construction activities on campus to obtain proper permits.	Mason CEED	YES	Complete	Mason CEED reviews and inspects land disturbing activities in accordance with Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management approved by DEQ.
5.b - Design Criteria	5.b.1-3 Legal Authority	The operator shall utilize legal authority to address stormwater runoff.	Require design and installation of stormwater runoff controls compliant with the water quality criteria, design criteria, and department approved annual standards and specifications for land disturbing activities.	Mason CEED	YES	Complete	Mason CEED reviews, approves and permits land disturbing projects in accordance with Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management approved by DEQ.
5.c - Inspection, Operation, and Maintenance	5.c.1-2 Stormwater Management Facilities	Provide for adequate long-term operation and management of its stormwater management facilities.	Long term operations and management procedures for all stormwater management facilities. An inspection must be completed annually.	Mason CEED	YES	Complete	Mason CEED inspects stormwater management facilities annually. Refer to Appendix J for a list of stormwater management facilities on campus.
5.d - Program Plan Requirements	5.d.1 MS4 Program Plan Updates	Maintain a list of the applicable legal authorities that ensure compliance with the minimum control measures related to post-construction stormwater management in new development and	MS4 Program Plan shall be updated in accordance with the table in Appendix D.	Mason CEED	YES	Complete	Mason is the legal authority that ensures compliance with the minimum control measures related to post-construction stormwater management in new development and development on prior developed lands.

Minimum Control Measure No. 5: Post Construction Site Stormwater Runoff Control							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
		development on prior developed lands.					
	5.d.2 MS4 Program Plan Updates	Written policies and procedures utilized to ensure that stormwater management facilities are designed and installed in accordance with legal authority	MS4 Program Plan shall be updated in accordance with the table in Appendix D.	Mason CEED	YES	Complete	Mason CEED's written policies and procedures are published in the George Mason University Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management approved by DEQ.
	5.d.3 MS4 Program Plan Updates	Written inspection policies and procedures utilized in conducting inspections.	MS4 Program Plan shall be updated in accordance with the table in Appendix D.	Mason CEED	YES	Complete	Mason CEED's written policies and procedures are published in the Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management, approved by DEQ. Mason CEED employees receive certification through VA DEQ. A list of our stormwater facilities can be found in Appendix J.
	5.d.4 MS4 Program Plan Updates	Written procedures for inspection, compliance and enforcement to ensure maintenance is conducted on private stormwater facilities to ensure long-term operation in accordance with approved design.	MS4 Program Plan shall be updated in accordance with the table in Appendix D.	Mason CEED	YES	Complete	All stormwater management facilities on both Fairfax and Science and Technology campuses are owned and maintained by Mason.

Minimum Control Measure No. 5: Post Construction Site Stormwater Runoff Control							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
	5.d.5 MS4 Program Plan Updates	Written procedures for inspection and maintenance of operator owned stormwater management facilities.	MS4 Program Plan shall be updated in accordance with the table in Appendix D.	Mason CEED	YES	Complete	All stormwater management facilities on both Fairfax and Science and Technology campuses are owned and operated by Mason. Information regarding long-term maintenance can be found in the Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management approved by DEQ
	5.d.6 MS4 Program Plan Updates	The roles and responsibilities of each of the operator's departments, divisions, or subdivisions in implementing the minimum control measures related to post construction stormwater management in new development and development on prior developed lands.	MS4 Program Plan shall be updated in accordance with the table in Appendix D.	Mason CEED	YES	Complete	Mason CEED is the sole division and holds all responsibility for implementing the minimum control measures related to post-construction stormwater management in new development and development on prior developed lands at the University.
5.e - Tracking and Reporting	5.e.1-9 Electronic Database or Spreadsheet	The operator shall maintain an updated electronic database of all known operator-owned and privately-owned stormwater management facilities that discharge into the MS4.	Maintain a database with the stormwater facility type, general description of location, the acres treated, date brought online, HUC number, whether the facility is operator-owned or privately-owned and if	Mason CEED	YES	Complete	Mason CEED developed a spreadsheet to include relevant information for Stormwater facilities. Refer to Appendix J for Stormwater Management Facilities.

Minimum Control Measure No. 5: Post Construction Site Stormwater Runoff Control							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
			maintenance agrees, and the date of the operator's most recent inspection.				

Minimum Control Measure No. 6: Pollution Prevention and Good Housekeeping							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
6.a - Operations and Maintenance Activities	6.a.1- Staff Education -	The operator shall develop and implement written procedures designed to minimize or prevent pollutant discharge.	At a minimum, the written procedures shall be designed to: prevent illicit discharge, ensure the proper disposal of waste, prevent the discharge of municipal vehicle wash water into MS4, prevent the discharge of wastewater into MS4, require implementation of BMPs, minimize the pollutants in stormwater runoff from bulk storage areas, prevent pollution discharge into the MS4, and ensure that the application of materials is conducted in accordance with the manufacturer's recommendations.	Mason CEED/ EHS/ FM	Yes	Complete	Mason has adopted Illicit Discharge Detection and Elimination (IDDE) Policy, Waste Management and Recycling policy, which are available at Mason website.
6.b - Municipal Facility	6.b.1 - Municipal high-priority facilities	Within 12 months of the state permit coverage, the operator shall identify all municipal high-priority facilities.	The high-priority facilities shall include composting facilities, equipment storage and maintenance facilities, materials storage yards, pesticide storage facilities, public works yards, recycling facilities,	Mason CEED/ EHS/ FM	YES	Complete	Mason has high priority facilities including equipment storage and maintenance facilities, materials storage yards, public works yards, recycling facilities, and vehicle storage and maintenance yards.

Minimum Control Measure No. 6: Pollution Prevention and Good Housekeeping							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
			salt storage facilities, solid waste handling and transfer facilities, and vehicle storage and maintenance yards.				
	6.b.2 - High potential of discharging pollutants	Within 12 months of the state permit coverage, the operator shall identify which of the municipal high-priority facilities have a high potential of discharging pollutants.	The high-priority facilities shall include composting facilities, equipment storage and maintenance facilities, materials storage yards, pesticide storage facilities, public works yards, recycling facilities, salt storage facilities, solid waste handling and transfer facilities, and vehicle storage and maintenance yards.	Mason CEED	YES	Complete	Mason has policies and procedures in place (refer to Appendix E) if there is a potential of pollutant discharge at any of the municipal high-priority facilities on campus.
	6.b.3-4 Stormwater Pollution Prevention Plans	The operator shall complete SWPPP development and implementation shall be completed within 48 months of coverage under this state permit	Develop and Implement Stormwater Pollution Prevention Plan.	Mason CEED	NO	2017	Mason CEED has a current Stormwater Pollution Prevention Plan in place. Mason is in the process of revising and updating the SWPPP by 2017.
6.c - Turf and Landscaping Management	6.c.1 (a)- Turf and Landscaping	The operator shall implement turf and landscape nutrient management plans that have been developed by a certified turf and	Implement turf and landscape nutrient management plans. Implementation shall be within 12 months of state permit coverage, the operator	Mason CEED/FM	Yes	Complete	Mason updated the Nutrient Management Plans for Fairfax and Science and Technology campuses and all plans were approved by DCR on August 2015. Refer to Appendix K, for the approved Nutrient

Minimum Control Measure No. 6: Pollution Prevention and Good Housekeeping							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
		landscape nutrient management planner	shall identify all applicable lands where nutrients are applied to a contiguous area of more than one acre.				Management Plans.
	6.c.1 (b)- Turf and Landscaping	The operator shall implement turf and landscape nutrient management plans that have been developed by a certified turf and landscape nutrient management planner	Implementation shall be within 60 months of state permit coverage, the operator shall implement turf and landscape nutrient management plans on all lands where nutrients are applied to a contiguous area of more than one acre.	Mason CEED	Yes	2018	Mason will implement the approved Nutrient Management Plans for all identified acres.
	6.c.2 - Annual Tracking	Operators shall annually track nutrient management Plans	Track the total acreage of lands where turf and landscape nutrient management plans are required and the total acreage of lands upon which turf and landscape nutrient management plans have been implemented.	Mason CEED/FM	Yes	Complete	Mason CEED tracks the total acreage of lands where turf and landscape nutrient management plans are required and the total acreage of lands upon which turf and landscape nutrient management plans have been implemented. Refer to Appendix K
	6.c.3 - Deicing	The operator shall not apply any deicing agent containing urea or other forms of nitrogen or phosphorus to parking lots, roadways, and sidewalks, or other paved areas.	The operator shall not apply any deicing agent containing urea or other forms of nitrogen or phosphorus.	Mason CEED/FM	Yes	Complete	When necessary, Mason applies Kissner Salts and Chemicals: Landscaper's Choice Ice Melter for sidewalks on campuses. For all parking lots and roadways, FM applies the identical deicing agent as Virginia Department of Transportation (VDOT).

Minimum Control Measure No. 6: Pollution Prevention and Good Housekeeping							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
6.d - Training	6.d.1 - Field Personnel	The operator shall conduct training for employees, determine and document the applicable employees or positions to receive each type of training, and develop an annual written training plan.	Provide biennial training to applicable field personnel in the recognition and reporting of illicit discharges.	Mason CEED/EHS	Yes	Complete	EHS has personnel and procedures in place for recognition and reporting of illicit discharges.
	6.d.2 - Road, Street, and Parking Lot Maintenance	The operator shall conduct training for employees, determine and document the applicable employees or positions to receive each type of training, and develop an annual written training plan.	Provide biennial training to applicable employees in good housekeeping and pollution and prevention practices that are to be employed during road, street, and parking lot maintenance.	Mason CEED	Yes	Complete	Employees working on maintenance of roads, streets, and parking lots receive training by an outside contractor.
	6.d.3 - Maintenance and Public Works Facilities	The operator shall conduct training for employees, determine and document the applicable employees or positions to receive each type of training, and develop an annual written training plan.	Provide biennial training to applicable employees in good housekeeping and pollution and prevention practices that are to be employed in and around maintenance and public works facilities.	Mason CEED/FM	Yes	Complete	Employees working in and around maintenance and public works facilities receive training by an outside contractor.
	6.d.4 - Pesticides and Herbicides	The operator shall conduct training for employees, determine and document the applicable employees or positions to	Require employees, and contractors, who apply pesticides and herbicides to be properly trained or certified in accordance	Mason CEED/FM	Yes	Complete	Employees applying pesticides and herbicides have completed their yearly certifications. One employee is currently certified.

Minimum Control Measure No. 6: Pollution Prevention and Good Housekeeping							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
		receive each type of training, and develop an annual written training plan.	with the Virginia Pesticide Control Act.				
	6.d.5 - Plan Reviewers, Inspectors, Program Administrators, and Construction Site Certifications	The operator shall conduct training for employees, determine and document the applicable employees or positions to receive each type of training, and develop an annual written training plan.	Require employees and contractors serving as plan reviewers, inspectors, program administrators, and construction site operators to obtain the appropriate certifications.	Mason CEED	Yes	Complete	Mason staff members receive the appropriate training and certifications from DEQ to serve as plan reviewers, inspectors and program administrators
	6.d.6 - ESC Certifications	The operator shall conduct training for employees, determine and document the applicable employees or positions to receive each type of training, and develop an annual written training plan.	Require applicable employees to obtain appropriate certifications as required under the Virginia Erosion and Sediment Control Law (VESCL) and its attendant regulations.	Mason CEED	Yes	Complete	Mason staff members receive the appropriate training and certifications from DEQ. One staff member is certified as combined administrator for ESC and combined administrator for SWM. One staff member is provisionally certified as SWM plan review and ECS plan reviewer. Five staff members are provisionally certified as the ESC inspector.
	6.d.7 - In and Around Recreational Facilities	The operator shall conduct training for employees, determine and document the applicable employees or positions to receive each type of training, and develop an annual written training plan.	Provide biennial training to applicable employees in good housekeeping and pollution and prevention practices that are to be employed in and around recreational facilities.	Mason CEED/EHS	Yes	Complete	Mason contracts all work in and around recreational facilities to Brickman and Game Day, Inc. Both companies provide their own trained employees.

Minimum Control Measure No. 6: Pollution Prevention and Good Housekeeping							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
	6.d.8 - Emergency Response	The operator shall conduct training for employees, determine and document the applicable employees or positions to receive each type of training, and develop an annual written training plan.	Provide spill response training to appropriate emergency response employees.	Mason CEED/EHS	Yes	Complete	EHS has 9 staff members who have received 40 hour HAZWOPER training to act as emergency spill responders. Training records for all these members are well maintained.
	6.d.9 - Training Documentation	The operator shall conduct training for employees, determine and document the applicable employees or positions to receive each type of training, and develop an annual written training plan.	Keep documentation on each training event including the training date, the number of employees attending the training, and the objective of the training event for a period of three years after each training.	Mason CEED/EHS	Yes	Complete	Mason keeps documentation on each training event including the training date, the number of employees attending the training, and the objective of the training event for a minimum period of three years after each training.
6.e - Control Measures and Procedures	6.e.1 - Stormwater Discharge Procedures	The operator shall require that municipal contractors use appropriate control measures and procedures for stormwater discharge to the MS4 system.	Describe oversight procedures in the MS4 Program Plan.	Mason CEED	Yes	Complete	Mason CEED has one staff member certified as combined administrator for ESC and combined administrator for SWM. One staff member is provisionally certified as SWM plan review and ECS plan reviewer. Five staff members are provisionally certified as ESC inspectors. These employees inspect construction sites to ensure the control measures and procedures are being implemented correctly.
6.f - MS4 Program Plan		At a minimum, the MS4 Program Plan	Maintain protocols being used to satisfy	Mason CEED	No	2016	Mason is currently establishing written protocols

Minimum Control Measure No. 6: Pollution Prevention and Good Housekeeping							
BMP CATEGORY	**PROPOSED BMP**	**PROGRAM**	**MEASURABLE GOAL**	**RESPONSIBLE PERSON/ DEPARTMENT**	**CURRENT PROGRAM IN PLACE**	**ESTIMATED DATE OF IMPLEMENTATION**	**ANNUAL OBJECTIVES ACHIEVED/INTENDED ACHIEVEMENT**
		shall contain: written protocols being used to satisfy the daily operations and maintenance requirements, a list of all municipal high-priority facilities, a list of lands where nutrients are applied to a contiguous area of more than one acre, and the annual written training plan for the next reporting cycle.	the daily operations and maintenance requirements, a list of all municipal high-priority facilities, a list of lands where nutrients are applied, and the annual written training plan for the next reporting cycle.				for daily operations and maintenance requirements. This document is expected to be completed by 2016. Refer to the above section 6.b.1 for all high priority facilities. Mason has Nutrient Management Plans for both Fairfax Campus and Science and Technology Campus. Refer to Appendix K for approved Nutrient Management Plans.
6.g - Annual Reporting Requirements		Summaries on the development and implementation of daily operational procedures, required SWPPPs, turf and landscape required, and the required training information.	Compile summaries of all procedures, SWPPPs, turf and landscaping, and training information.	Mason CEED	No	2018	Mason CEED currently has all training information completed. Once the SWPPPs and turf and landscaping information is compiled in 2017, the summaries are expected to be completed by 2018.

Appendix B:
Water Quality Monitoring

Water Quality Monitoring

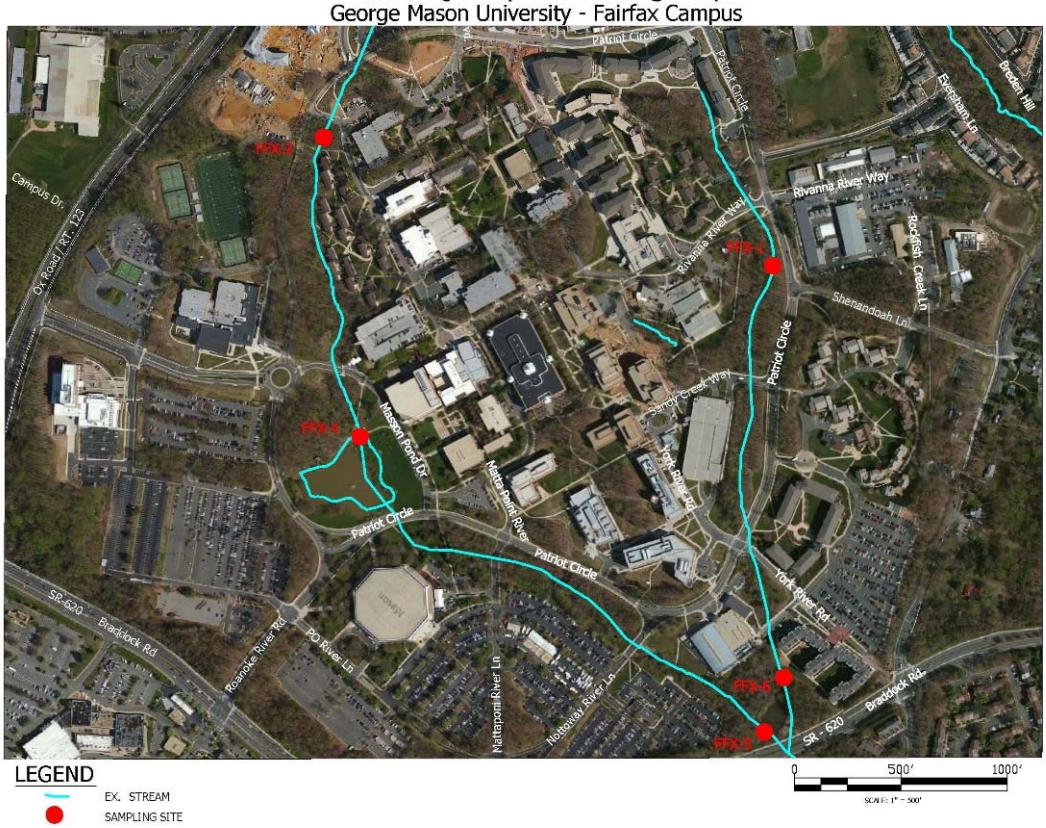
In accordance with the MS4 Permit 2013-2018, George Mason University (GMU) has created a Water Quality Monitoring Procedure that includes Water Quality Monitoring Manual that provides detailed instructions and information about proper testing and reporting procedures. In order to ensure the Mason is properly discharging and treating the waters across the campuses, Mason requires testing on a annual basis with a goal of quad-annual testing. George Mason University has identified the pollutants/characteristics (listed below) as top priority for monitoring.

During this permitting period, Mason collected water samples at six outfalls on Fairfax Campus and one outfall on Science and Technology Campus. The samples were analyzed by Analytics Corporation, a certified laboratory. The sample locations and the results are provided below.

Location	pH	Dissolved Oxygen	Total Nitrogen	Nitrate	Total Phosphorus	Turbidity	Total Suspended Solids
FFX-1	7.62	6.85 mg/L	1.72 mg/L	0.672 mg/L	0.198 mg/L	2.94 NTU	2.5 mg/L
FFX-2	7.18	3.15 mg/L	4.24 mg/L	0.388 mg/L	0.274 mg/L	22.7 NTU	15 mg/L
FFX-3	6.85	4.28 mg/L	0.98 mg/L	0.265 mg/L	0.081 mg/L	18.7 NTU	18.1 mg/L
FFX-4	6.58	3.06 mg/L	2.56 mg/L	0.155 mg/L	0.101 mg/L	16.7 NTU	50.2 mg/L
FFX-5	6.85	6.31 mg/L	2.37 mg/L	0.408 mg/L	0.111 mg/L	7.46 NTU	23.6 mg/L
FFX-6	6.77	5.56 mg/L	0.79 mg/L	0.358 mg/L	0.091 mg/L	14.4 NTU	22 mg/L
PW-1	7.01	8.27 mg/L	2.06 mg/L	0.195 mg/L	0.135 mg/L	9.08 NTU	11.1 mg/L

Water Quality Monitoring Map

George Mason University - Fairfax Campus



Water Quality Monitoring Map

George Mason University - Fairfax West Campus

Water Quality Monitoring Map
George Mason University - Science and Technology Campus

LEGEND
EX. STREAM
SAMPLING SITE

0 500' 1000'
SCALE: 1" = 500'

Appendix C:
Public Education and Outreach Campaigns and Activities

Education and Outreach Activities- July 1, 2014-June 30, 2015		
Date	**Activity**	**Notes**
October 24, 2014	Fall Stream Clean Up	Collected 10.05 pounds of garbage and 10 pounds of recyclables
March 16, 2015	Kiosk	Hand out Mason LD brochures with facts about stormwater to students, faculty, and staff on campus.
March 20, 2015	Classroom outreach to CEIE 355 – Introduction to Environmental Engineering	Explained George Mason University's MS4 phase II permit program to class of 30+
April 2, 2015	Classroom outreach to CEIE 340 – Water Resource Engineering	Explained George Mason University's MS4 phase II permit program to class of 30+
April 18, 2015	Spring Stream Clean-up	Collected 144.35 pounds of garbage and 125.4 pounds of recyclables
April 21, 2015	Campus Clean-up	Collected 99.8 pounds of garbage

The Land Development Team at George Mason University seeks to alert homeowners, students, and staff on the impacts of stormwater runoff on water quality through free training sessions, workshops and distributions of educational materials. The public outreach program at Mason also provides guidance on how the community can help in minimizing adverse impacts of urban runoff in waterways.

George Mason University marks all inlets around all three main campuses with this drainage marker.

George Mason University
4400 University Drive, MS 1E4
Fairfax, Virginia 22030

CONTACT
MasonLD@gmu.edu
http://facilities.gmu.edu

GEORGE MASON UNIVERSITY | Land Development


photo credit: George Hodan

STORMWATER MANAGEMENT

STORMWATER MANAGEMENT

Stormwater runoff is rainwater that doesn't soak into the ground. The rain that runs off is often washed pollutants from impervious surfaces like parking lots, streets, and gutters into the storm drain system, which then flows into our streams, ponds, and bays. Stormwater can flow into a storm sewer system or directly to a stream, wetland, river, or pond. Anything that enters a storm sewer system is discharged untreated into these bodies.

EROSION AND SEDIMENT CONTROL

Erosion and Sediment Control and Stormwater Management Programs are integral components of GMU's design, construction, maintenance, and management of the university's facilities and campuses.


Masonvale Rain Garden

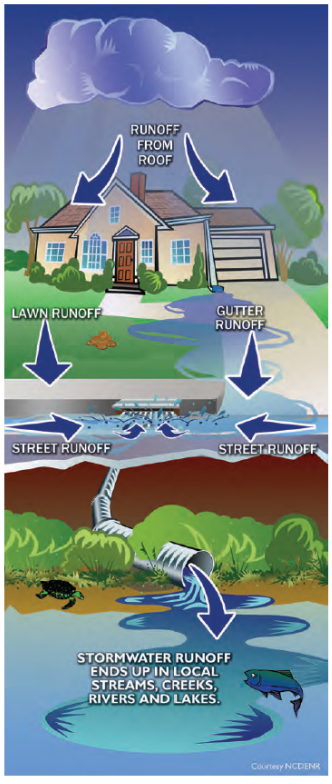
HOW DOES STORMWATER MANAGEMENT WORK?

Under natural conditions, rainwater is dissipated through the processes of transpiration, evaporations and percolation. Through transpiration, a large quantity of water is intercepted by plant foliage and evaporates back into the atmosphere. The remaining water that reaches the surface of ground infiltrates into the soils and through percolation, continues to travel underground until it slowly makes its way into the streams and aquifers.

As water seeps into the ground the process of percolation also allows for the removal of pollutants present in stormwater. The ability of water to seep into the ground, as well as, the amount of water that can be retained depends on soil properties such as porosity and permeability. A high porosity soil can hold large amounts of water and usually allows for rapid infiltration. When precipitation reaches the soil surface faster than it can be infiltrated into the ground, water collects at the surface and travels downhill.

WHY IS STORMWATER MANAGEMENT NECESSARY?

As more land cover is replaced with impervious surfaces, less rain can be naturally absorbed and treated by the environment. After development, stormwater discharges can increase by more that twice the amount under natural conditions. If not controlled, large quantities of water can cause flooding in our communities and stream channel erosion. Stormwater Management's policies are necessary in order to address impacts of urbanization on water resources, minimize flood damage, and significant erosion of channel bed and banks.



stormwater graphic courtesy John David Hardee

Proposed Education and Outreach Activities 2014-2018

Activity	Goal
Bi-annual Stream Clean Up	Clean every stream on campus.
Information Stations around Campus	Increase awareness and public education on high-priority water quality issues by using kiosks in commonly occupied buildings on campus.
Guest Lecture	Attend more classes to teach students the importance on high-priority water quality issues and reducing waste on campus.

Appendix D:
Schedule of MS4 Program Plan Updates Required

Schedule of MS4 Program Plan Updates Required			
Program Update Requirement	**Permit Reference**	**Update Completed By**	**Where added in Appendix A**
Public Education Outreach Plan (MCM 1)	Section II B 1	12 months after permit coverage (by June 30, 2014)	MCM 1.b-g Also in Appendix C
Illicit Discharge Procedures (MCM 3)	Section II B 3		MCM 3.e Also in Appendix E
Individual Residential Lot Special Criteria (MCM 5)	Section II B 5 c (1) (d)		MCM 5.c.1-2 Also in Appendix H
Operator-Owned Stormwater Management Inspection Procedures (MCM 5)	Section II B 5		MCM 5.d Also in Appendix H
Identification of Locations Requiring SWPPPs (MCM 6)	Section II B 6 b		MCM 6.b.1-2
Nutrient Management Plan (NMP) Locations (MCM 6)	Section II B 6 c (1) (a)		MCM 6.c.1 (a) Appendix K
Training Schedule and Program (MCM 6)	Section II B 6		MCM 6.d

Updated TMDL Action Plans	Section I B	24 months after permit coverage (by June 30, 2015)	Appendix L
Chesapeake Bay TMDL Action Plan	Section I C		Appendix L
Stormwater Management Progressive Compliance and Enforcement (MCM 4)	Section II B 5		MCM 5
Daily Good housekeeping Procedures (MCM 6)	Section II B 6 a		MCM 6.a
Other TMDL Action Plans for applicable TMDLs approved between June 2008 and June 2013	Section I B	36 months after permit coverage (by June 30, 2016)	Appendix L
Outfall Map Completed (MCM 3)	Section II B 3 a (3)	48 months after permit coverage (by June 30, 2017)	MCM 3.a.2-5
SWPPP Implementation (MCM 6)	Section II B 6 b (3)		MCM 6.b.3-4
NMP Implementation (MCM 6)	Section II B 6 c (1) (b)	60 months after permit coverage (by June 30, 2018)	MCM 6.c.2

Appendix E:
Illicit Discharge Detection and Elimination Program

universitypolicy.gmu.edu http://universitypolicy.gmu.edu/policies/illicit-discharge-detection-and-elimination/

Illicit Discharge Detection and Elimination

University Policy Number 1409

Categorized: General Policies

Responsible Office: Environmental Health and Safety

Policy Procedure:

- George Mason University MS4 Program Plan

Related Law & Policy:

- Virginia Stormwater Management Program (VSMP) Permit Regulations 4VAC50-60-10 et seq.
- Clean Water Act 33 U.S.C. §1251 et seq.
- Policy 1406: Environmental Health and Safety
- Policy 1408: Environmental Management and Sustainability System

I. PURPOSE AND SCOPE

The purpose of this policy is to provide for the health, safety, and general welfare of the students, staff and visitors of George Mason University through the regulation of non-storm water discharges to the storm drainage system to the maximum extent practicable as required by federal and state law. This policy establishes methods for controlling the introduction of pollutants into the municipal separate storm sewer system (MS4) in order to comply with requirements of Virginia Stormwater Management Program permit for George Mason University.

II. DEFINITIONS

"Best Management Practices" (BMPs) means schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to storm water, receiving waters, or storm water conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

"De Minimis" means small, minor, or insignificant spills of materials that occur during normal material handling operations (e.g., spills from unloading or transfer of materials, leaks from pipes or valves, minor leaks of process equipment, etc.).

"Hazardous Materials" means any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

"Illegal Discharge" means any direct or indirect non-storm water discharge to the storm drain system, except as exempted in Section III of this policy.

"Municipal Separate Storm Sewer System" (MS4) means the system of conveyances (including, roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) owned and operated by George Mason University and designed or used for collecting or conveying storm water, and that is not used for collecting or conveying sewage.

"Non-Storm Water Discharge" means any discharge to the storm drain system that is not composed entirely of storm water.

"Pollutant" means anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, polices, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wasteland residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

"Storm Drainage System" means publicly-owned facilities by which storm water is collected and/or conveyed, including but not limited to any roads with drainage systems, municipal streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs, and other drainage structures.

"Storm Water" means any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation, and resulting from such precipitation.

"Wastewater" means any water or other liquid, other than uncontaminated storm water, discharged from a facility.

III. PROHIBITION OF ILLICIT DISCHARGES

No university employee, student, visitor or contractor shall throw, drain, or otherwise discharge, cause, or allow others under its control to throw, drain, or otherwise discharge into the university's storm water drainage system any pollutants or waters containing any pollutants, other than storm water. It is the responsibility of the Offices of Environmental Health and Safety (EHS), Facilities Management and Facilities Project Management and Construction Management to train employees to recognize the hazards associated with illicit discharges and to identify illicit discharge sources. Additionally, Facilities Land Development ("Mason LD") is responsible for performing outfall inspections and surveys, including observation, documentation, and sampling (if deemed necessary).

The commencement, conduct, or continuance of any illegal discharge to the storm drain system is prohibited except as described as follows:

1. The following discharges are exempt as they are considered to be not significant contributors of pollutants to the MS4: water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated ground water infiltration, uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, flows from riparian habitats and wetlands, de-chlorinated swimming pool discharges, street wash water and flows that have been identified in writing by Virginia's Department of Environmental Quality as de minimis discharges that are not significant sources of pollutants to state waters and not requiring a VPDES permit.

2. Discharges or flow from firefighting, and other discharges specified in writing by Mason LD as being necessary to protect public health and safety.

3. Discharges associated with dye testing; however, this activity requires notification to Mason LD prior to the time of the test.

4. The prohibition shall not apply to any non-storm water discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the United States Environmental Protection Agency (EPA), provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for the permitted discharge to the storm drain system.

IV. NOTIFICATION OF SPILLS

Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials, which are resulting or may result in illegal discharges or pollutants discharging into storm water, the storm drain system, or waters of the United States, said person shall take all necessary steps to ensure the discovery, containment, mitigation, and proper reporting of such release.

In the event of a release of non-hazardous materials; said person shall notify EHS within 24 hours via email (safety@gmu.edu), phone (703-993-8448), or by calling University Police, who in turn will contact EHS. If hazardous material of any amount enters a storm sewer; said person shall immediately notify University Police, who will then notify EHS. Failure to provide notification of a release as provided above is a violation of this Policy.

V. COMPLIANCE

A. The university may suspend or cease activities and operations that are not in full compliance with this policy.

B. Whenever George Mason University finds that a violation of this Policy has occurred, EHS may order compliance by written notice to the responsible person. Such notice may require, without limitation:

1. The performance of monitoring, analyses, and reporting;
2. The elimination of prohibited discharges or connections;
3. Cessation of any violating discharges, practices, or operations;
4. The abatement or remediation of storm water pollution or contamination hazards and the restoration of any affected property;
5. Payment of any fee, penalty, or fine assessed against the university to cover remediation cost;
6. The implementation of new storm water management practices; and
7. Disciplinary action up to and including dismissal, where appropriate.

C. Such notification shall set forth the nature of the violation(s) and establish a time limit for correction of these violation(s). Said notice may further advise that, if applicable, should the violator fail to take the required action within the established deadline. EHS will then initiate work orders for the appropriate corrective actions and the violator or university department will be charged for the cost.

D. The remedies listed in this Policy are not exclusive of any other remedies available under any applicable federal, state, or local law.

VI. EFFECTIVE DATE, REVIEW, AND APPROVAL:

This policy will become effective upon the date of approval by the Senior Vice President and Provost. This Policy, and any related procedures, shall be reviewed annually.

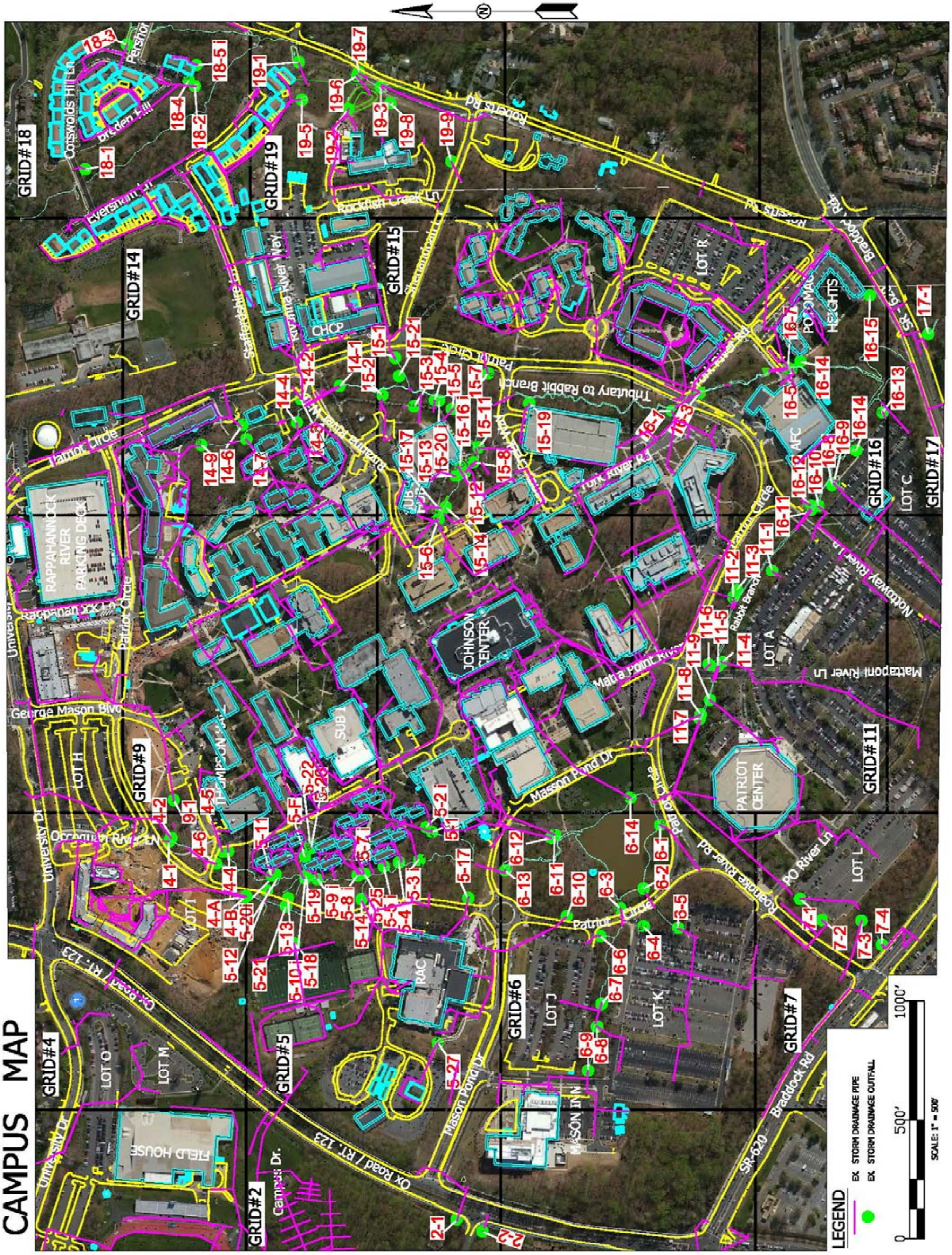
Approved:

__/S_____ ___1/22/2013_____
Senior Vice President Date

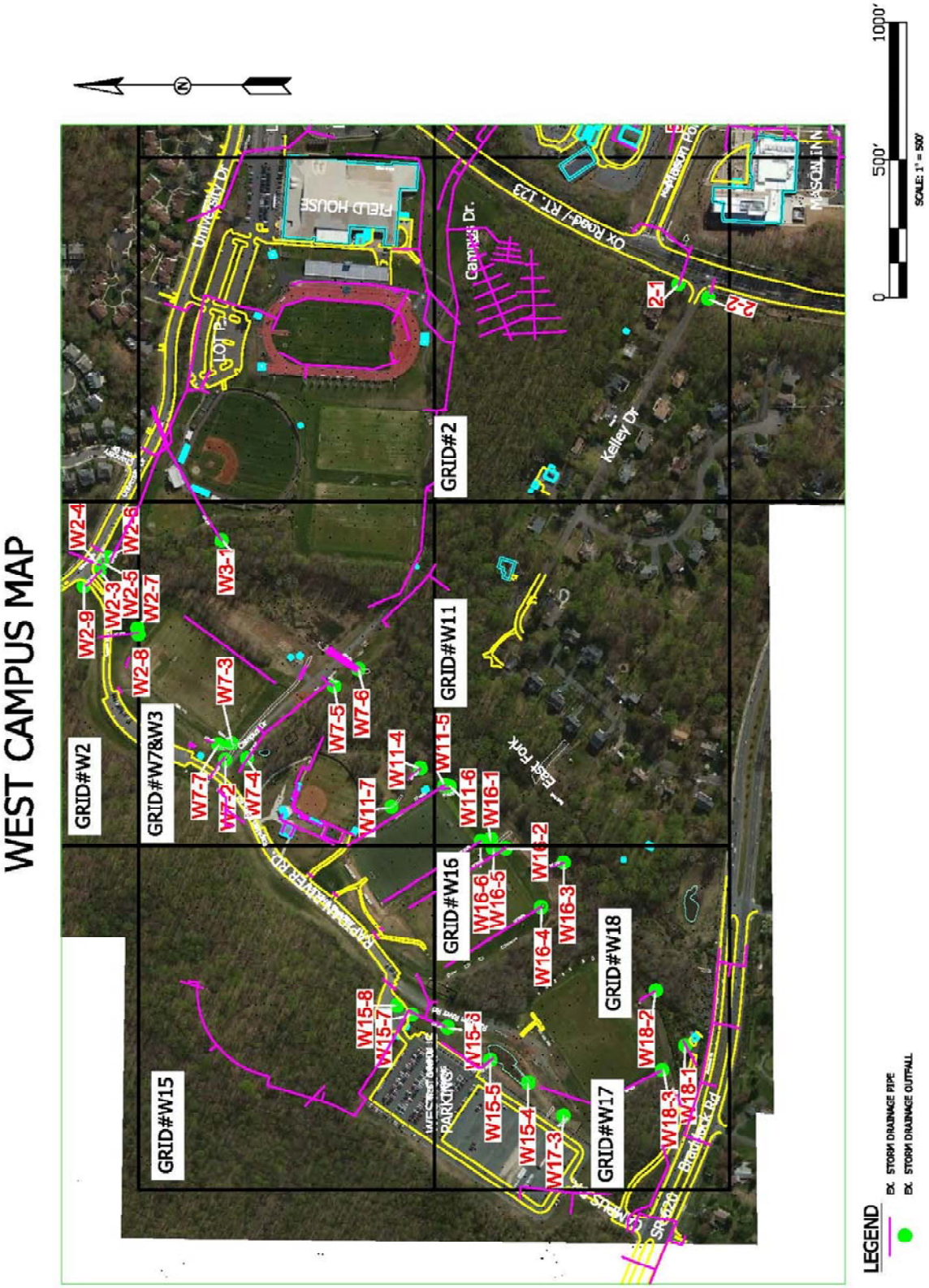
Approved:

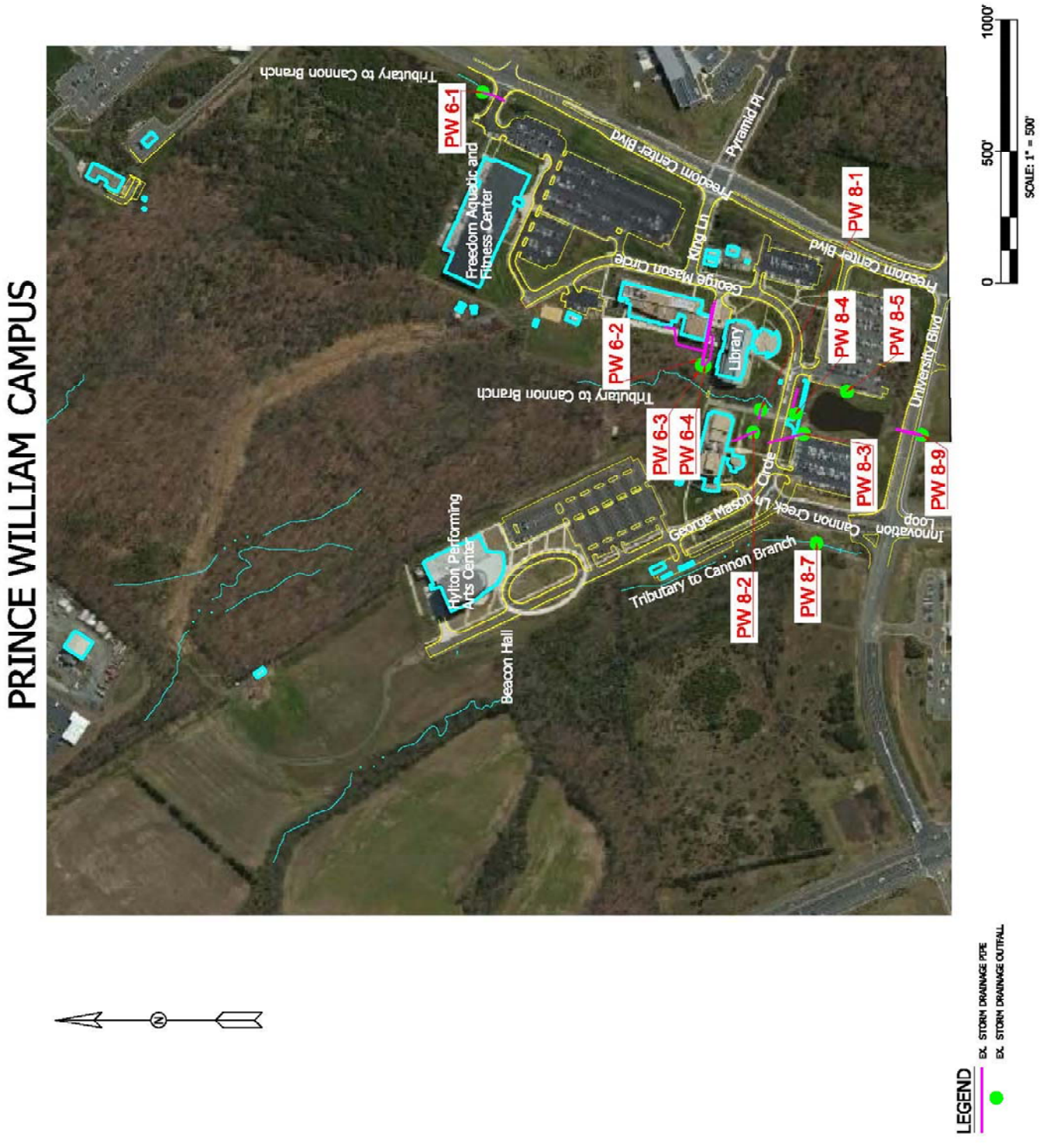
__/S_____ ___1/22/2013_____
Provost Date

Appendix F:
MS4 Internal Outfalls


CAMPUS MAP
LEGEND
EX. STORM DRAINAGE PIPE
EX. STORM DRAINAGE OUTFALL
SCALE: 1" = 500'
0
500'
1000'
GRID#2
GRID#4
GRID#5
GRID#6
GRID#7
GRID#9
GRID#11
GRID#14
GRID#15
GRID#16
GRID#17
GRID#18
GRID#19
JOHNSON CENTER
PATRIOT CENTER
RAPPAHANNOCK RIVER PARKING DECK
FIELD HOUSE
MASON INN
RAC
AFC
CHCP
SUB I
LOT A
LOT C
LOT H
LOT J
LOT K
LOT L
LOT M
LOT O
LOT R
Ox Road / RT. 123
Braddock Rd
SR-620
Roberts Rd
Patriot Circle
George Mason Blvd
University Dr
Mason Pond Dr
Tributary to Rabbit Branch
Mattaponi River Ln

WEST CAMPUS MAP




PRINCE WILLIAM CAMPUS
Tributary to Cannon Branch
PW 6-1
Freedom Aquatic and Fitness Center
Freedom Center Blvd
Pyramid Pl
King Ln
George Mason Circle
PW 8-1
PW 6-2
Library
PW 8-4
PW 8-5
University Blvd
Tributary to Cannon Branch
PW 6-3
PW 6-4
PW 8-3
PW 8-9
Innovation Loop
Cannon Creek Ln
George Mason Circle
Tributary to Cannon Branch
Hylton Performing Arts Center
PW 8-2
PW 8-7
Beacon Hall
0
500'
1000'
SCALE: 1" = 500'
LEGEND
EX. STORM DRAINAGE PIPE
EX. STORM DRAINAGE OUTFALL

Outfall ID	Drainage Area (acres)
4-1	9.47
4-6	2.49
4-5	0.55
4-2	0.51
5-27	0.79
5-17	0.89
5-3i	7.16
5-1	14.65
5-2i	0.44
5-14	3.54
5-18	3.02
5-12	11.77
5-11	0.21
6-9	7.12
6-8	1.65
6-7	2.18
6-6	2.55
6-3	2.65
6-2	3.22
6-1	6.42
6-13	2.08
6-11	2.53
7-3	0.45
9-1	7.17
11-7	11.38
11-8	4.39
11-5	3.69
11-4	10.87
11-6	0.48
11-2	19.41
11-1	1.12
14-9	15.27
14-6	3.95
14-7	1.88
14-4	1.22
14-1	1.26
15-17	0.77
15-19	1.14
15-7	1.21
15-20i	1.67

Outfall ID	Drainage Area (acres)
15-2	0.75
15-1	5.77
16-11	3.60
16-8	7.84
16-9	1.05
16-13	0.80
16-7	1.00
16-5	1.84
16-3	18.15
16-1	0.81
17-1	8.59
18-2	2.02
18-3	1.56
18-1	0.06
19-1	3.17
19-2	1.96
19-6	2.79
19-7	0.15
19-3	0.26
19-8	0.76
19-9	8.43
15-8	2.92
15-14	1.00
15-6	10.52
15-5	1.21
16-14	11.56
16-1	6.12
11-9	2.48
6-5	11
6-12	4.38
19-5	25.4
14-2	2.23
14-3	0.56

Appendix G:
Notice of Potential Interconnected MS4

Facilities Project Management & Construction
4400 University Drive - MSN 1E4
Fairfax, VA 22030-4444
703-993-2513
Fax: 703-993-2530
e-mail: fstrike@gmu.edu

August 21, 2015

Fairfax County
DPWES Director's Office
12055 Government Center Pkwy
Fairfax, VA 22035

Subject: MS4 Pomit; Notice of Potential Interconnected Stormwater System

Attention: James Patteson, Appointed Director of DPWES

George Mason University (Mason) is a Phase II small MS4 and is covered under the Virginia Stormwater Management Program (VSMP) General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (Permit Number VAR040106).

The purpose of this letter is to notify you of the potential for interconnections between the stormwater system operated by Mason and the stormwater systems that you operate. The MS4 permit requires Mason notify in writing, any downstream regulated MS4 to which Mason is physically interconnected. We have identified several points where Mason discharges stormwater into your regulated MS4 stormwater system. Please see attached Figure 1: Map of MS4 Interconnectivity. There is no action required on your part at this time, as this letter is for notification purposes only. Please keep this for your records.

If you have any questions or desire additional information related to this subject, please contact me or

Zhongyan Xu
Manager, Civil and Environmental Engineering
Phone: (703) 993-4051
Email: zxu8@gmu.edu

Sincerely,

Frank Strike
Director, Project Management & Construction

Attachment(s): Figure 1: Map of MS4 Interconnectivity

Copy to:

- Tom Calhoun, Mason, Vice President of Facilities
- Brenda Claudio, Mason, Civil and Environmental Engineering
- Zhongyan Xu, Mason, Civil and Environmental Engineering

Facilities Project Management & Construction
4400 University Drive - MSN 1E4
Fairfax, VA 22030-4444
(703) 993-2513
Fax: (703) 993-2539
e-mail: fstrike@gmu.edu

August 21, 2015

City of Fairfax
City Hall Room 316
10455 Armstrong Street
Fairfax, VA 22030

Subject: MS4 Permit; Notice of Potential Interconnected Stormwater System

Attention: Robert Sisson, City Manager

George Mason University (Mason) is a Phase II small MS4 and is covered under the Virginia Stormwater Management Program (VSMP) General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (Permit Number VAR040106).

The purpose of this letter is to notify you of the potential for interconnections between the stormwater system operated by Mason and the stormwater systems that you operate. The MS4 permit requires Mason notify in writing, any downstream regulated MS4 to which Mason is physically interconnected. We have identified several points where Mason discharges stormwater into your regulated MS4 stormwater system. Please see attached Figure 1: Map of MS4 Interconnectivity. There is no action required on your part at this time, as this letter is for notification purposes only. Please keep this for your records.

If you have any questions or desire additional information related to this subject, please contact me or

Zhongyan Xu
Manager, Civil and Environmental Engineering
(703) 993-4051
Email: zxu8@gmu.edu

Sincerely,

Frank Strike
Director, Project Management & Construction

Attachment(s): Figure 1: Map of MS4 Interconnectivity

Copy to:
- Tom Calhoun, Mason, Vice President of Facilities
- Brenda Claudio, Mason, Civil and Environmental Engineering
- Zhongyan Xu, Mason, Civil and Environmental Engineering

Facilities Project Management & Construction
4400 University Drive - MSN 1C4
Fairfax, VA 22030-4444
703-993-2513
Fax: 703-993-2539
e-mail: fstrike@gmu.edu

August 21, 2015

Department of Transportation
Location and Design Division
1401 East Broad Street
Richmond, VA 23219-2000

Subject: MS4 Permit; Notice of Potential Interconnected Stormwater System

Attention: Roy T. Mills, State Stormwater Program Administrator

George Mason University (Mason) is a Phase II small MS4 and is covered under the Virginia Stormwater Management Program (VSMP) General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (Permit Number VAR040106).

The purpose of this letter is to notify you of the potential for interconnections between the stormwater system operated by Mason and the stormwater systems that you operate. The MS4 permit requires Mason notify in writing, any downstream regulated MS4 to which Mason is physically interconnected. We have identified several points where Mason discharges stormwater into your regulated MS4 stormwater system. Please see attached Figure 1: Map of MS4 Interconnectivity- Fairfax Campus and Figure 2: Map of MS4 Interconnectivity- Prince William Campus. There is no action required on your part at this time, as this letter is for notification purposes only. Please keep this for your records.

If you have any questions or desire additional information related to this subject, please contact me or

Zhongyan Xu
Manager, Civil and Environmental Engineering
Phone: (703) 993-4051
Email: zxu8@gmu.edu

Sincerely,

Frank Strike
Director, Project Management & Construction

Attachment(s): Figure 1: Map of MS4 Interconnectivity – Fairfax Campus
Figure 2: Map of MS4 Interconnectivity – Science and Technology Campus

Copy to:
- Tracey Harmon, VDOT, Environmental Quality Division
- Christine Watlington, VDOT, Senior Policy Analyst
- Tom Calhoun, Mason, Vice President of Facilities
- Brenda Claudio, Mason, Civil and Environmental Engineering
- Zhongyan Xu, Mason, Civil and Environmental Engineering

Facilities Project Management & Construction
4400 University Drive - MSN 1F4
Fairfax, VA 22030-4444
703-993-2513
Fax: 703-993-2539
e-mail: fstrike@gmu.edu

August 21, 2015

Prince William County
Watershed Management Branch
5 County Complex Suite 170
Prince William, VA 22192

Subject: MS4 Permit; Notice of Potential Interconnected Stormwater System

Attention: Benjamin Eib, Assistant Branch Chief of Watershed Management

George Mason University (Mason) is a Phase II small MS4 and is covered under the Virginia Stormwater Management Program (VSMP) General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (Permit Number VAR040106).

The purpose of this letter is to notify you of the potential for interconnections between the stormwater system operated by Mason and the stormwater systems that you operate. The MS4 permit requires Mason notify in writing, any downstream regulated MS4 to which Mason is physically interconnected. We have identified several points where Mason discharges stormwater into your regulated MS4 stormwater system. Please see attached Figure 1: Map of MS4 Interconnectivity. There is no action required on your part at this time, as this letter is for notification purposes only. Please keep this for your records.

If you have any questions or desire additional information related to this subject, please contact me or

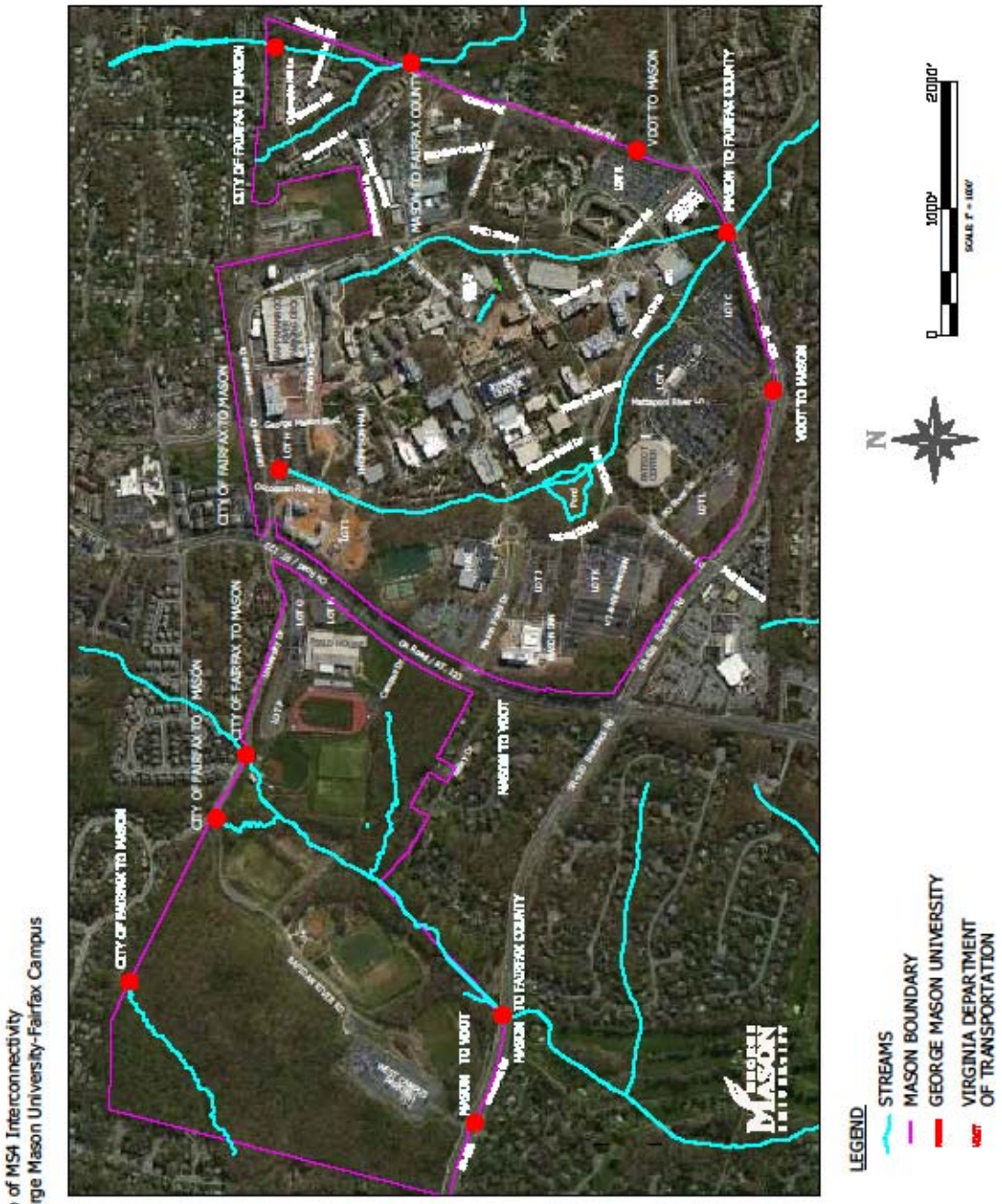
Zhongyan Xu
Manager, Civil and Environmental Engineering
Phone: (703) 993-4051
Email: zxu8@gmu.edu

Sincerely,

Frank Strike
Director, Project Management & Construction

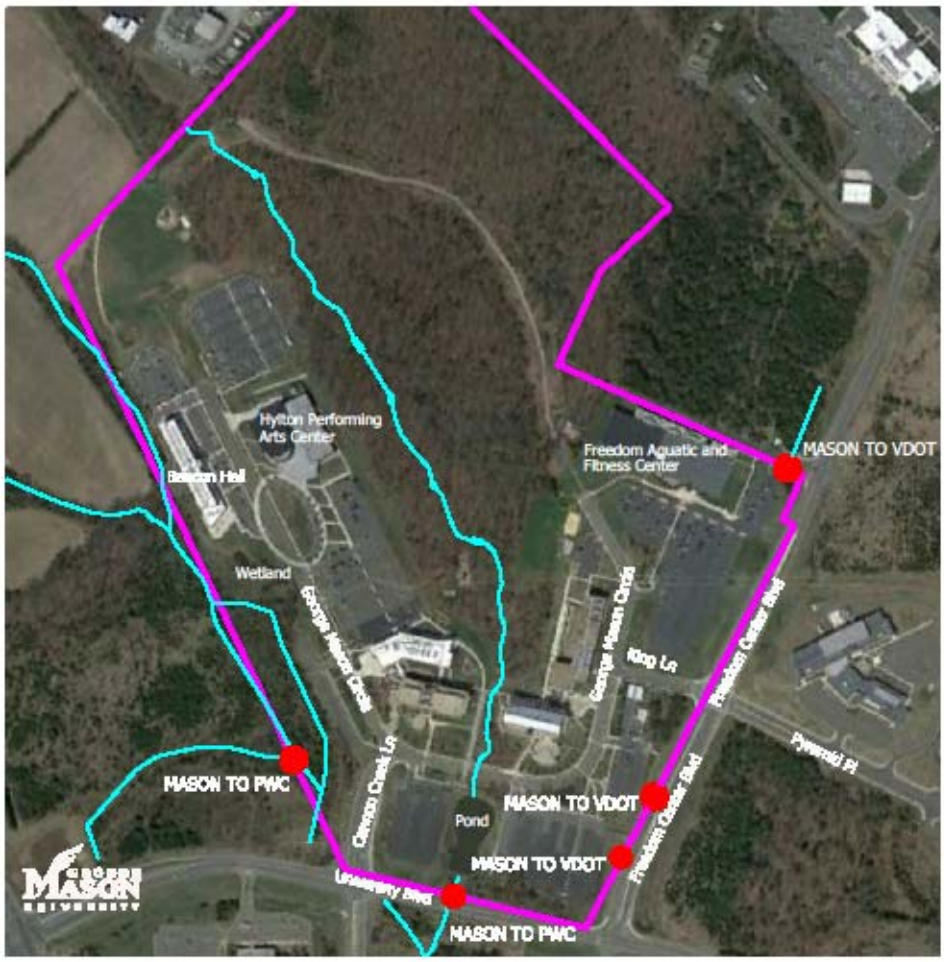
Attachment(s): Figure 1: Map of MS4 Interconnectivity

Copy to:
- Tom Calhoun, Mason, Vice President of Facilities
- Brenda Claudio, Mason, Civil and Environmental Engineering
- Zhongyan Xu, Mason, Civil and Environmental Engineering



Map of MS4 Interconnectivity
George Mason University-Fairfax Campus

Map of MS4 Interconnectivity
George Mason University - Science and Technology Campus



LEGEND

- STREAMS
- MASON BOUNDARY
- MASON GEORGE MASON UNIVERSITY
- PWC PRINCE WILLIAM COUNTY
- VDOT VIRGINIA DEPARTMENT OF TRANSPORTATION

N

0 500' 1000'
SCALE: 1" = 500'

Appendix H:

Current and Future Land Disturbance Projects

Current and Future Land Disturbing Projects							
Project Name	**Total Disturbed Area (ac)**	**Projected Timeline**		**Location**	**On-Site Project Manager**	**Project Description**	**Number of Inspections**
		Start	**Finish**				
Projects Currently Under Construction							
Roanoke River Road	1.9	Aug-12	Nov- 14	Fairfax	Christy Hogan (571) 226-6485	Campus Entrance	25
Life Science Lab Building	5.2	July-12	March-15	Science and Tech.	Micky Boeckl (703) 993-3726	Academic Laboratory Building	44
Fenwick Library	2.3	Dec-12	Sep-15	Fairfax	Alex Iszard (703) 993-9220	Academic Library	87
West Campus Connector Road	15	Dec-12	April-15	Fairfax	Christy Hogan (571) 226-6485	Road and Grade Separated Crossing	83
Shenandoah Dining	0.5	Aug-13	Sep-14	Fairfax	Nancy Pickens (571) 296-1137	Dining Building	29
Shenandoah Housing	1.5	May-13	May-15	Fairfax	Nancy Pickens (571) 296-1137	Student Housing	72
Field House	1.3	Nov-13	April-15	Fairfax	Johnny Trejos (571) 480-3124	Athletic Facility	31
Academic VII	5.54	July - 15	May-17	Fairfax	Alexis Iszard (703) 462-4597	Academic Building	0
Plant Expansion	0.25	May-15	Jun-16	Fairfax	Mike Herman (703) 993-2242	Facilities Building	2

2015/2016 Proposed/Potential Future Construction Projects							
Project Name	**Approx. Disturbed Area (ac)**	**Projected Timeline**		**Location**	**On-Site Project Manager**	**Project Description**	**Stormwater Management Component**
		Start	**Finish**				
Rappahannock Housing	1	May-16	Sep-18	Fairfax	Nancy Pickens (571) 296-1137	Student Housing	This project is still in the planning stage.
Bull Run Hall	Conceptual 3.5	Jan- 16	Nov-18	Science and Tech.	Jim Riddle (703) 993-3726	Academic and Research Building	This project is still in the planning stage.
Hilton Performing Arts Addition	2	Jan -16	June-17	Science and Tech.	Mike Herman (703) 993-2242	Concert Hall	This project is still in the planning stage

Appendix I:
Notice of Corrective Action

Left Blank Intentionally

Appendix J:
Permanent Stormwater Management Facilities

Inventory of Permanent Stormwater Management Facilities

Facility Name	Type	Location	HUC 12 Code	Virginia Code	Discharging Surface Waters	Drainage area (acres)	Facility size (acres)	BMP Efficiency (%)	TMDL	WQ Treatment Area (Acres)	Geographic Coordinates
Braddock Road Pond	Wet Pond	East Fairfax Campus	020700100401	PL29	Pohick Creek	315	~1.40 ac-ft	40	N/A	159.9	38.825243, -77.303450
Mason Pond	Wet Pond	East Fairfax Campus	020700100401	PL29	Pohick Creek	137	~9.79 ac-ft	50	N/A	163.02	38.828948, -77.310392
Rivanna Basin	Dry Pond	East Fairfax Campus	020700100401	PL29	Pohick Creek	28.12	28.12	N/A	N/A	Quantity Only	38.832147, -77.303623
Krasnow Pond	Dry Pond	East Fairfax Campus	020700100401	PL29	Pohick Creek	8.5	3.06	44	N/A	8.52	38.831.439, -77.299742
Masonvale Pond	Dry Pond	East Fairfax Campus	020700100401	PL29	Pohick Creek	17.4	8.83	35	N/A	6.99	38.832049, -77.299455
West Campus Pond	Dry Pond	West Campus	020700100705	PL46	Lower Bull Run	46.98		40	N/A		38.831387, -77.324588
PW Pond	Wet Pond	Science and Tech Campus	020700100504	PL34	Broad Run-Rocky Branch	70.53		50	N/A		38.755797, -77.522198
Roanoke SWM pond	Dry Pond	East Fairfax Campus	020700100401	PL29	Pohick Creek	4.98	0.37	40	N/A	0.92	38.826520, -77.311293
MHI Rain Garden #1	Rain Garden	East Fairfax Campus	020700100401	PL29	Pohick Creek	0.12	0.002	50	N/A	0.9	38.834585, -77.299988
MHI Rain Garden #2	Rain Garden	East Fairfax Campus	020700100401	PL29	Pohick Creek	0.08	0.002	50	N/A	0.6	38.833592, -77.299156
MHI Rain Garden #3	Rain Garden	East Fairfax Campus	020700100401	PL29	Pohick Creek	0.2	0.002	50	N/A	0.16	38.834441, -77.298927
Piedmont Rain Garden #1	Rain Garden	East Fairfax Campus	020700100401	PL29	Pohick Creek	0.04	0.01	50	N/A	0.02	38.832089, -77.306059
Piedmont Rain Garden #2	Rain Garden	East Fairfax Campus	020700100401	PL29	Pohick Creek	0.045	0.006	50	N/A	0.04	38.832404, -77.306244
Permeable Pavers	Permeable Surface	East Fairfax Campus	020700100401	PL29	Pohick Creek	4.6	.09	40	N/A	4.6	38.833084, -77.301103
Eastern Shore bike rack	Pervious Surface	East Fairfax Campus	020700100401	PL29	Pohick Creek	0.01011	0.01011	45	N/A	0	38.833318, -77.304331
Hampton Roads bike rack	Pervious Surface	East Fairfax Campus	020700100401	PL29	Pohick Creek	0.00984	0.00984	45	N/A	0	38.834022, -77.305071
Piedmont infiltration trench	Infiltration Trench	East Fairfax Campus	020700100401	PL29	Pohick Creek	0.05	0.006	50	N/A	0.03	38.832406, -77.306177
Bio-Swale #1	Bio-Swale	East Fairfax Campus	020700100401	PL29	Pohick Creek	0.6	0.04	35	N/A	0.15	38.827410, -77.306680

Bio-Swale #2	Bio-Swale	Science and Tech Campus	020700100504	PL34	Broad Run-Rocky Branch	1.52	0.13237	40	N/A	0	38.758298, -77.523085
Potomac Heights infiltration trench	Infiltration Trench	East Fairfax Campus	020700100401	PL29	Pohick Creek	0.100069	0.00846	50	N/A	0.02	38.826544, -77.302922
Research Hall Green Roof	Green Roof	East Fairfax Campus	020700100401	PL29	Pohick Creek	0.0149	0.019	50	N/A	0	38.828800, -77.305494

Appendix K:
Nutrient Management Plan

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

Joe Elton
Deputy Director of Operations

Rochelle Altholz
Deputy Director of Administration and Finance

David Dowling
Deputy Director of Soil and Water and Dam Safety

August 20, 2015

Subject: George Mason University- Fairfax Campus Nutrient Management Plan Approval

The following Nutrient Management Plan written by Ethan Virts and dated 8/14/2015 is approved by the Virginia Department of Conservation & Recreation as compliant with the provisions of the Code of Virginia–10.1-104.4. Derik Cataldi conducted the plan review.

Plan	Acres	Expiration
George Mason University: Fairfax Campus	200.6	August 14, 2018

A copy of this letter should be kept with your nutrient management plan. The Department recommends the process of revising nutrient management plans begin at least six months prior to the expiration date. If you have any questions concerning this letter and/or approval, please feel free to contact me at 804-371-7489 or by email at Derik.Cataldi@dcr.virginia.gov.

Sincerely,

J. Derik Cataldi
Urban Nutrient Management Specialist
Department of Conservation and Recreation
600 East Main St., 24 FL
Richmond, Virginia 23219
Derik.Cataldi@dcr.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

Joe Elton
Deputy Director of Operations

Rochelle Altholz
Deputy Director of Administration and Finance

David Dowling
Deputy Director of Soil and Water and Dam Safety

August 20, 2015

Subject: George Mason University- Athletic Fields Nutrient Management Plan Approval

The following Nutrient Management Plan written by Ethan Virts and dated 8/14/2015 is approved by the Virginia Department of Conservation & Recreation as compliant with the provisions of the Code of Virginia–10.1-104.4. Derik Cataldi conducted the plan review.

Plan	Acres	Expiration
George Mason University: Athletic Fields	18.6	August 14, 2018

A copy of this letter should be kept with your nutrient management plan. The Department recommends the process of revising nutrient management plans begin at least six months prior to the expiration date. If you have any questions concerning this letter and/or approval, please feel free to contact me at 804-371-7489 or by email at Derik.Cataldi@dcr.virginia.gov.

Sincerely,

J. Derik Cataldi
Urban Nutrient Management Specialist
Department of Conservation and Recreation
600 East Main St., 24 FL
Richmond, Virginia 23219
Derik.Cataldi@dcr.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

Joe Elton
Deputy Director of Operations

Rochelle Altholz
Deputy Director of Administration and Finance

David Dowling
Deputy Director of Soil and Water and Dam Safety

August 20, 2015

Subject: GMU- Science and Technology Campus Nutrient Management Plan Approval

The following Nutrient Management Plan written by Ethan Virts and dated 8/14/2015 is approved by the Virginia Department of Conservation & Recreation as compliant with the provisions of the Code of Virginia–10.1-104.4. Derik Cataldi conducted the plan review.

Plan	Acres	Expiration
George Mason University: Science and Technology Campus	29.17	August 14, 2018

A copy of this letter should be kept with your nutrient management plan. The Department recommends the process of revising nutrient management plans begin at least six months prior to the expiration date. If you have any questions concerning this letter and/or approval, please feel free to contact me at 804-371-7489 or by email at Derik.Cataldi@dcr.virginia.gov.

Sincerely,

J. Derik Cataldi
Urban Nutrient Management Specialist
Department of Conservation and Recreation
600 East Main St., 24 FL
Richmond, Virginia 23219
Derik.Cataldi@dcr.virginia.gov

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

1001 Boulders Parkway
Suite 300
Richmond, VA 23225

P 804.200.6500
F 804.560.1016
www.timmons.com

August 14, 2015

Mr. Derik Cataldi
Urban Nutrient Management Specialist
Virginia Department of Conservation and Recreation
600 East Main Street, 24th Floor
Richmond, Virginia 23219

Re: Nutrient Management Plan
George Mason University –
Fairfax Campus
Fairfax, Virginia

Dear Mr. Cataldi:

On behalf of George Mason University, Timmons Group has prepared this Nutrient Management Plan in accordance with the *Virginia Nutrient Management Standards and Criteria, revised July 2014*. This Nutrient Management Plan encompasses the approximately 200 acre area that contains turfgrass and could receive fertilizer applications at the George Mason University Fairfax Campus and Point of View site. Will you review the enclosed nutrient management plan and provide DCR approval?

Please feel free to contact me at (804) 200-6414, ethan.virts@timmons.com, or Bill Vest at (703) 554-6705, bill.vest@timmons.com, if you require additional information, or have any questions or additional recommendations.

Sincerely,

Timmons Group

Ethan Virts, PWS
Certified Nutrient Management Planner (No. 816)

Enclosures:
George Mason University – Fairfax Campus Nutrient Management Plan

GEORGE MASON UNIVERSITY – FAIRFAX CAMPUS
NUTRIENT MANAGEMENT PLAN

DIRECTOR OF FACILITIES

GEORGE MASON UNIVERSITY – FAIRFAX CAMPUS
ZHONGYAN XU, PHD, PE, CFM
PROJECT MANAGEMENT AND CONSTRUCTION, FACILITIES
703-993-4051 (P)
ZXU8@GMU.EDU

NUTRIENT MANAGEMENT PLANNER INFORMATION

ETHAN VIRTS
1001 BOULDERS PARKWAY, SUITE 300
RICHMOND, VA 23225
804-200-6414 (P)
ETHAN.VIRTS@TIMMONS.COM
VIRGINIA NUTRIENT MANAGEMENT PLANNER CERTIFICATION # 816

LOCATION INFORMATION –FAIRFAX CAMPUS

4400 UNIVERSITY BOULEVARD
FAIRFAX, VA 22030
38° 49' 51.6" N
77° 19' 39.7" W
LOWER BULL RUN WATERSHED
6TH ORDER NATIONAL WETLAND BOUNDARY DATASET CODE PL46
AND
POHICK CREEK WATERSHED
6TH ORDER NATIONAL WETLAND BOUNDARY DATASET CODE PL29

LOCATION INFORMATION – POINT OF VIEW SITE

7301 OLD SPRING DRIVE
LORTON, VA 22079
38° 39' 14.2" N
77° 11' 41.6" W
OCCOQUAN RIVER-BELMONT BAY WATERSHED
6TH ORDER NATIONAL WETLAND BOUNDARY DATASET CODE PL48

FAIRFAX CAMPUS AND POV TURFGRASS ACREAGE

TOTAL: 200.6 ACRES

PLAN START DATE: 8/14/2015
PLAN END DATE: 8/14/2018

ETHAN VIRTS

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

TIMMONS GROUP PROJECT NO. 36158.004

GEORGE MASON UNIVERSITY – FAIRFAX CAMPUS
NUTRIENT MANAGEMENT PLAN

TABLE OF CONTENTS

1.0 STATEMENT OF COMPLIANCE

George Mason University (Mason) agrees to comply with all requirements set forth in the *Nutrient Management Training and Certification Regulations 4VAC50-85*, and to follow recommendations for turf fertilization and management as described in the *Virginia Nutrient Management Standards and Criteria, revised July 2014*. This includes implementing this Nutrient Management Plan and maintaining fertilization records. All nutrient applications performed by Mason staff or associated contractors shall comply with the provisions of this Nutrient Management Plan as of August 14, 2015. This plan is effective for three years (until August 14, 2018) or until major changes to maintenance practices or grounds conditions occur. Mason is committed to environmental sustainability and adhering to this Nutrient Management Plan in order to protect the water quality of downstream aquatic resources while optimizing the health and performance of turf species.

2.0 SITE LOCATION AND DESCRIPTION

The Mason Fairfax Campus (Campus) is located northeast of Braddock Road (Route 620) within the City of Fairfax and County of Fairfax, Virginia (see Figure 1A: Vicinity Map). The Campus encompasses approximately 437.6 acres and the portion located east of Ox Road drains south to Rabbits Branch, and is located in the Pohick Creek Watershed (PL29). The portion of the Campus located west of Ox Road drains to Popes Head Creek, and is located within the Lower Bull Run watershed (PL46). Also included in this nutrient management plan is a small property owned by Mason named the Point of View (POV) site. The POV site is located in southeastern Fairfax County on Belmont Bay and encompasses approximately 38.2 acres (see Figure 1B: Vicinity Map). The POV site is located within the Occoquan River-Belmont Bay Watershed (PL48).

The Campus consists of approximately 100 academic and residential buildings, paved parking lots, maintained lawns that surround the Campus buildings and parking lots, common areas surrounding the athletic fields, and turf areas along West Campus Drive. All turfgrass areas on the Campus are dominated by tall fescue. Several areas of ornamental plantings and flowerbeds are intermittently dispersed throughout the Campus. Most of the POV Site was recently graded during construction activities, and these graded areas are not included in this nutrient management plan. The undisturbed areas at the POV site that are included in this nutrient management plan consist of mature hardwood forests with an understory dominated by fine fescue turfgrasses.

2.1 Environmentally Sensitive Areas

All areas within the project limits were evaluated based on susceptibility of nutrient loss to ground and surface water. No areas within the Campus or POV project limits are categorized as environmentally sensitive areas as depicted in Figure 3: Environmentally Sensitive Areas Map.

Subsurface Drains: There are no subsurface tile drains located at the Campus or POV sites. There are underground stormwater conveyance systems present throughout the Campus that convey water to stormwater treatment BMPs. Given that this stormwater is being treated by the existing stormwater management BMPs, this underground stormwater conveyance system

does not qualify as a subsurface tile drain. The POV site does not currently have an underground stormwater conveyance system.

Soils: The NRCS soil survey map depicts 12 distinct soil series/complexes within the Campus and POV site, the majority of which are well drained loamy soils. None of the soil series/complexes are listed as H (high) for Environmentally Sensitive Rating in Table 1-4 of the *Virginia Nutrient Management Standards and Criteria, revised July 2014*.

Streams and Wetlands: There are several perennial and intermittent streams, and wetlands located adjacent to turfgrass areas at the Campus. These streams and wetlands are depicted on Figure 3A: Environmentally Sensitive Areas Map. The POV site is located directly adjacent to Belmont Bay. The streams and wetlands within and adjacent to the POV site are depicted on Figure 3B: Environmentally Sensitive Areas Map. There are no restrictions applicable when applying fertilizers to turfgrass adjacent to streams and wetlands. However, special care should be taken to avoid applying fertilizers within streams and wetlands.

Other Environmentally Sensitive Areas: There were no wells, springs, sinkholes, rock outcrops, or land with slopes steeper than 15% identified during the June 25, 2015 site visit.

2.2 Fertilization Season

The recommended season of application for nitrogen fertilizers for all turf species at both the Fairfax Campus and POV Sites are shown in
Table 2.1 – Fertilization Season at Mason – Fairfax Campus and POV Site.

Table 2.1 – Fertilization Season at Mason-Fairfax Campus and POV Site

	Killing Frost Dates	Cool Season Applications (All Turf Areas Onsite)
Spring	April 10	February 27
Fall	October 25	December 6

3.0 SOIL SAMPLING METHODS, MANAGEMENT AREAS, AND NUTRIENT RECOMMENDATIONS

3.1 Soil Sampling Methods and Management Areas

A total of 21 soil samples were taken from turfgrass areas throughout the Campus and POV site. At least 10 sub-samples for each sample area were randomly taken from within the upper four inches of soil and mixed at each designated sampling area to create a representative sample. The soil samples were collected in June 2015 and analyzed at the Virginia Tech soils laboratory.

These 21 sample areas were categorized into six different nutrient management areas based on the soil test results and turfgrass species present. These nutrient management areas are shown in Figure 4: Nutrient Management Areas Map. Figure 4 should be used as a

reference when interpreting nutrient recommendations in Table 3.1 on pages 4 of this document.

For all the nutrient management areas, applications of inorganic fertilizers should not occur on frozen or snow-covered ground. Any fertilizers that make their way onto impervious surfaces such as parking lots or sidewalks should be swept or blown back into pervious, or turfgrass covered areas. Furthermore, fertilizers will not be used as ice melt.

3.2 Fairfax Campus and POV Turfgrass Areas – 200.6 Acres

The lime and nutrient recommendations for the Fairfax Campus and POV Site are listed in Table 3.1: Fairfax Campus and POV Site Lime and Nutrient Recommendations on page 4. The lime and nutrient recommendations in this table are based on the *Virginia Nutrient Management Standards and Criteria, revised July 2014*. Figure 5: Mason – Fairfax Campus Map should be used as a reference when interpreting Table 3.1. Several of the turf areas locations are referenced by the Campus building numbers as identified in Figure 5. The specified lime applications should be completed in small applications of up to 50 pounds each at intervals of 1 to 6 months until the full amount is applied in the form of ground, pulverized, or pelletized agricultural limestone.

The annual maximum nitrogen application for all turfgrass areas onsite is 3.5 lbs. per 1,000 square feet (SF). Per application rates of nitrogen vary depending on whether water soluble nitrogen (WSN) or water insoluble nitrogen (WIN) fertilizers are used. WSN should be applied at a rate no greater than 0.7 lbs. per 1,000 SF at intervals no less than 30 days apart, between the dates of February 27 and December 6. WIN can be applied at a rate no greater than 0.9 lbs. per 1,000 SF at intervals no less than 30 days apart, between the dates of February 27 and December 6.

The entire phosphorus (P_2O_5) and Potassium (K_2O) annual applications can be performed with the first application of nitrogen, or can also be applied before green-up of grass in late winter if the ground is not frozen. The recommended potassium application rates in some areas are greater than the amount specified in the soil lab analyses results. At this time, potassium is not considered to be an environmental concern that negatively impacts water quality, so slight over application of Potassium only contributes to health and vigor of turfgrasses.

Table 3.1: Fairfax Campus and POV Site Lime and Nutrient Recommendations

MANAGEMENT AREA #	SOIL SAMPLE AREA	SOIL pH	LIME REC. (LBS/1000 SF)	PHOSPHORUS (P_2O_5) REC. (LBS/1,000 SF)	POTASSIUM (K_2O) REC. (LBS/1,000 SF)
1	Lot C	7.7	0	0	1
	45, Lots A, & Lot L	7.9	0	0	1
2	8, 35, & 41	6.8	0	0.5*	2
	3, 4, 7, 14, 17, 29, 30, 46, 50	6.4	0	0.5*	2
	Tallwood Center	5.8	90	0.5*	2
	POV; east of old house	6.2	60	0.5*	2
3	48 & Lot J	6.8	0	1*	1
	1 & 24	8.0	0	1*	1
	3, 16, 22, 24, 27, 33, 34, 41, 52, 53, 54, 57, 59, 98	6.6	0	1*	1
	2, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, Lot R	7.2	0	1	1
	10	7.1	0	1	1
4	96, Lot K	5.9	70	2	2
	97, 99, Lot H	6.4	0	2	2
	51, 56 , 61 through 79	7.9	0	2	2
	19, 20, 21	6.6	0	2	2
	Area south of POV Building	5.8	100	2	2
5	Common Areas Adjacent to Fields 2, 4, 5, and Softball Field	5.7	80	1	1
	Turf Areas Along West Campus Dr.	5.5	160	1*	1
	Turf Areas Surrounding Field House	5.8	100	1	1
6	Common Areas Surrounding Soccer Field A & B, and Spuhler field	6.4	0	2	2
	Turf Area Adjacent to Braddock Road	5.9	60	2	2

Notes:

- *****Due to high phosphorus levels, fertilizers in the form of 10-10-10 or 5-10-10 should not be used.

- See attached Figure 5: Mason Fairfax Campus Map for references to building numbers at sample areas in Table 3.1.
- Agricultural limestone (ground, pulverized, or pelletized) should be broadcast in small applications of up to 50 lbs. per 1000 SF, at intervals of 1 to 6 months, until the full amount is applied.
- Nitrogen applications may not exceed 3.5 lbs per 1,000 square feet (SF) annually.
- No more than 0.7 lbs. of WSN or 0.9 lbs. of water insoluble nitrogen per 1,000 SF of WSN, may be applied within a 30 day period.

4.0 MAINTENANCE OF PLAN

This nutrient management plan will be maintained by Mason and will expire on August 14, 2018. As part of this plan, fertilizer application records shall be recorded and maintained (see Appendix C: Fertilizer Application Records). If significant changes to the Campus or POV sites occur, this plan is required to be updated accordingly by a Virginia Certified Nutrient Management Planner. Significant changes would include: changing turf species in the campus grounds, adding significant soil amendments, expansion of the area to be included under this nutrient management plan, or other changes that could alter nutrient recommendations and timing.

5.0 NUTRIENT APPLICATION, INCORP., AND SPECIAL CONDITIONS

There are multiple drop inlets associated with the underground stormwater system at the Campus. This drainage system ultimately outfalls to several stormwater BMPs that are designed to remove sediment and nutrients from stormwater. Special care should be taken to avoid applying fertilizers directly on top of drop inlet structures. No fertilizer should be applied to stormwater BMPs as these facilities already receive excess nutrients during stormwater events. Nutrient applications should not be completed when significant runoff producing events are anticipated. Applying only WIN, or slowly available forms of nitrogen, will help minimize the nutrient loss potential.

Special care should be taken when applying fertilizers near impervious surfaces, streams, and wetlands. Allowing vegetation to grow taller near stream and wetland areas would help prevent offsite nutrient loss that could result from fertilizer application errors, or significant runoff producing storm events.

6.0 REFERENCES

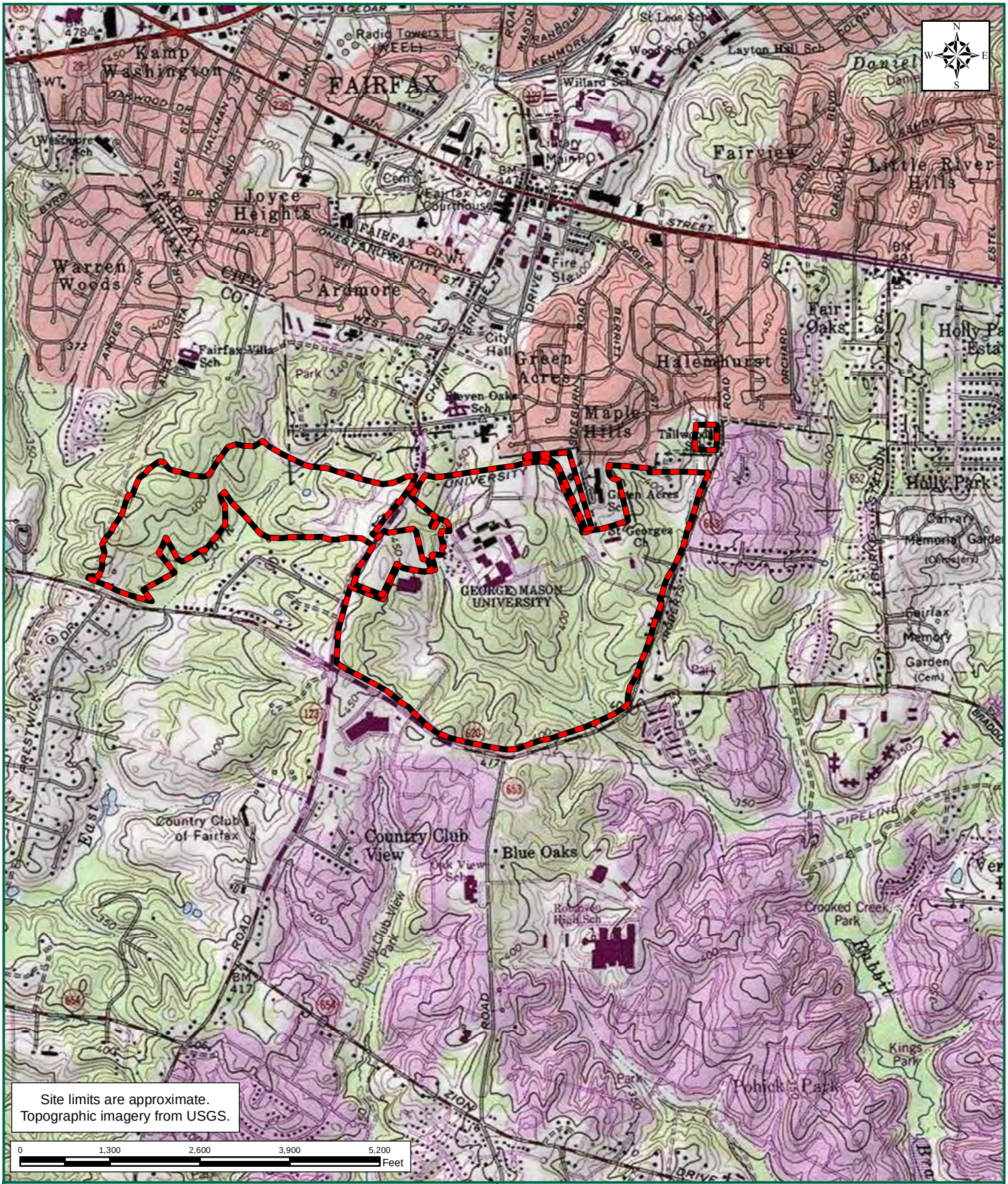
VADCR. November 2014. Nutrient Management Training and Certification Regulations 4VAC50-85. Virginia Soil and Water Conservation Board.

VADCR. July 2014. Virginia Nutrient Management Standards and Criteria. Division of Soil and Water Conservation: Richmond, VA.

Virginia Cooperative Extension. May 2011. Urban Nutrient Management Handbook. Funding by: VADCR; Produced by: Virginia Polytechnic Institute and State University.

FIGURES

Path: Y:\804\36158.004-GMU_Nutrient_Mgmt_Pl\GIS\Common Shared Exhibits\36158 - VIC - FFX.mxd



MASON - FAIRFAX CAMPUS
NUTRIENT MANAGEMENT PLAN
FAIRFAX COUNTY, VIRGINIA
FIGURE 1A: VICINITY MAP

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

TIMMONS GROUP JOB NUMBER: *36158.004*
PROJECT STUDY LIMITS: *437.6 ACRES*
LATITUDE: *38° 49' 59.61" N*
LONGITUDE: *77° 18' 33.39" W*

U.S.G.S. QUADRANGLE(S): *FAIRFAX*
DATE(S): *2013*
WATERSHED(S): *MIDDLE POTOMAC-ANCOSTIA-OCCOQUAN*
HYDROLOGIC UNIT CODE(S): *02070010*

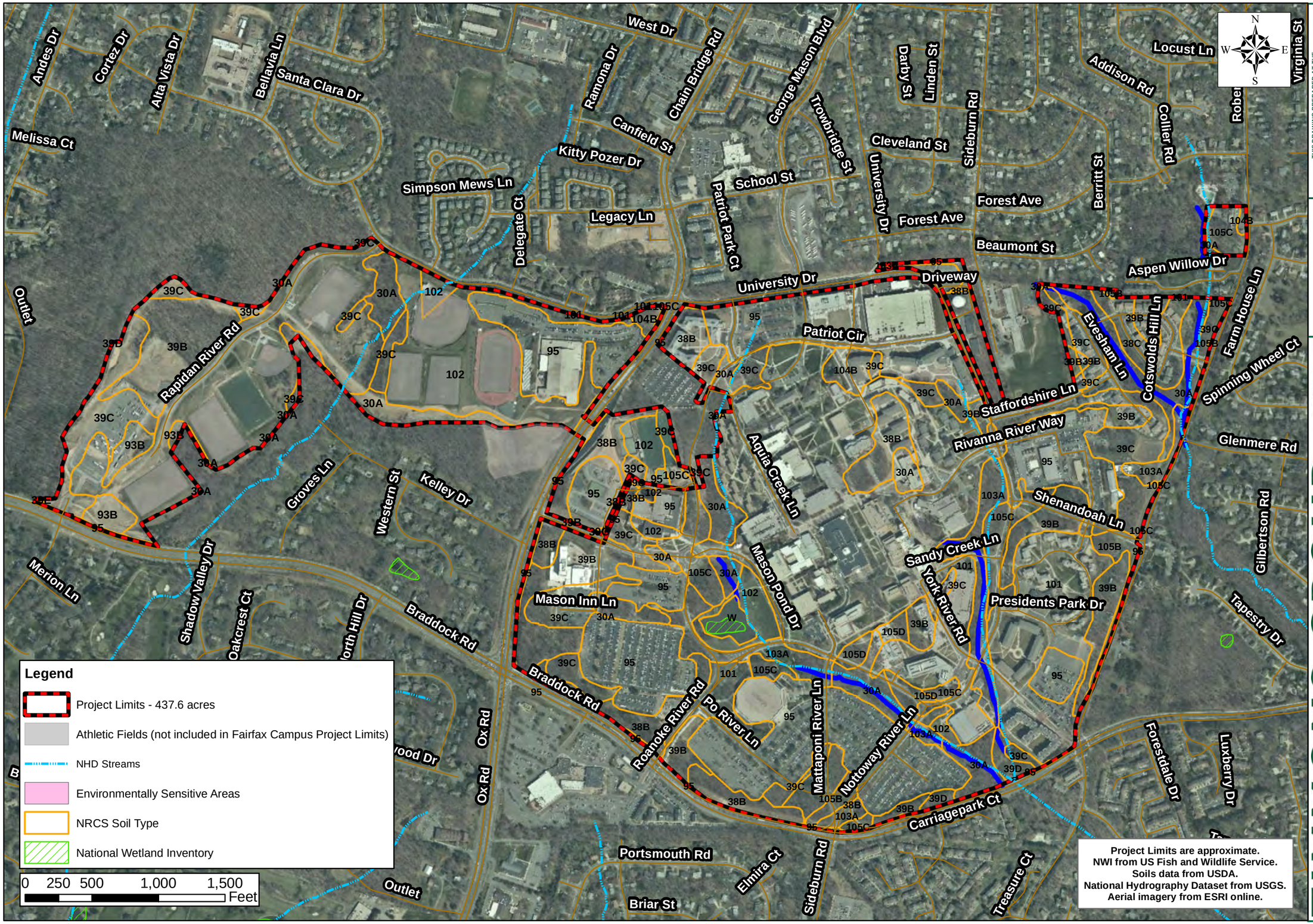
Path: Y:\804\36158.004-GMU_Nutrient_Mgmt_Pl\GIS\Common Shared Exhibits\36158 - VIC - FFX.mxd

MASON - POINT OF VIEW SITE
NUTRIENT MANAGEMENT PLAN
FAIRFAX COUNTY, VIRGINIA
FIGURE 1B: VICINITY MAP

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

TIMMONS GROUP JOB NUMBER: *36158.004*
PROJECT STUDY LIMITS: *38.2 ACRES*
LATITUDE: *38° 49' 39.3" N*
LONGITUDE: *77° 11' 39.6" W*

U.S.G.S. QUADRANGLE(S): *FAIRFAX*
DATE(S): *2013*
WATERSHED(S): *MIDDLE POTOMAC-ANCOSTIA-OCCOQUAN*
HYDROLOGIC UNIT CODE(S): *02070010*



Path: \\tgfs2\900\900Proj\804\36158.004-GMU_Nutrient_Mgmt_Pl\GIS\Common Shared Exhibits\36158 - FFX - EIM.mxd

THIS DRAWING PREPARED AT THE CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1648 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS

Site Development | Residential | Infrastructure | Technology | Environmental

DATE	REVISION DESCRIPTION

DATE 08/14/2015
DRAWN BY B. NORRIS
DESIGNED BY B. NORRIS
CHECKED BY E. VIRTS
SCALE 1" = 500'

TIMMONS GROUP

MASON FAIRFAX CAMPUS- NUTRIENT MANAGEMENT PLAN

FAIRFAX COUNTY, VIRGINIA

FIGURE 2A: ENVIRONMENTAL INVENTORY MAP

JOB NUMBER 36158.004
SHEET NO. 1 OF 1

Bay View Dr

Belmont Landing Rd

Old Spring Dr

91E

77A

77A

91E

60A

N

W

E

S

Legend

- Point of View Site Project Limits - 38.2 acres
- NHD Streams
- NRCS Soil Type
- National Wetland Inventory

0 250 500 Feet

Project Limits are approximate.
NWI from US Fish and Wildlife Service.
Soils data from USDA.
National Hydrography Dataset from USGS.
Aerial imagery from ESRI online.

Path: \\tgfs2\900\900Proj\804\36158.004-GMU_Nutrient_Mgmt_Plt\GIS\Common Shared Exhibits\36158 - FFXPOV-EIM.mxd

THIS DRAWING PREPARED AT THE
CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1648 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS

Site Development | Residential | Infrastructure | Technology | Environmental

DATE	REVISION DESCRIPTION

DATE 08/14/2015

DRAWN BY B. NORRIS

DESIGNED BY B. NORRIS

CHECKED BY E. VIRTS

SCALE 1" = 250'

TIMMONS GROUP

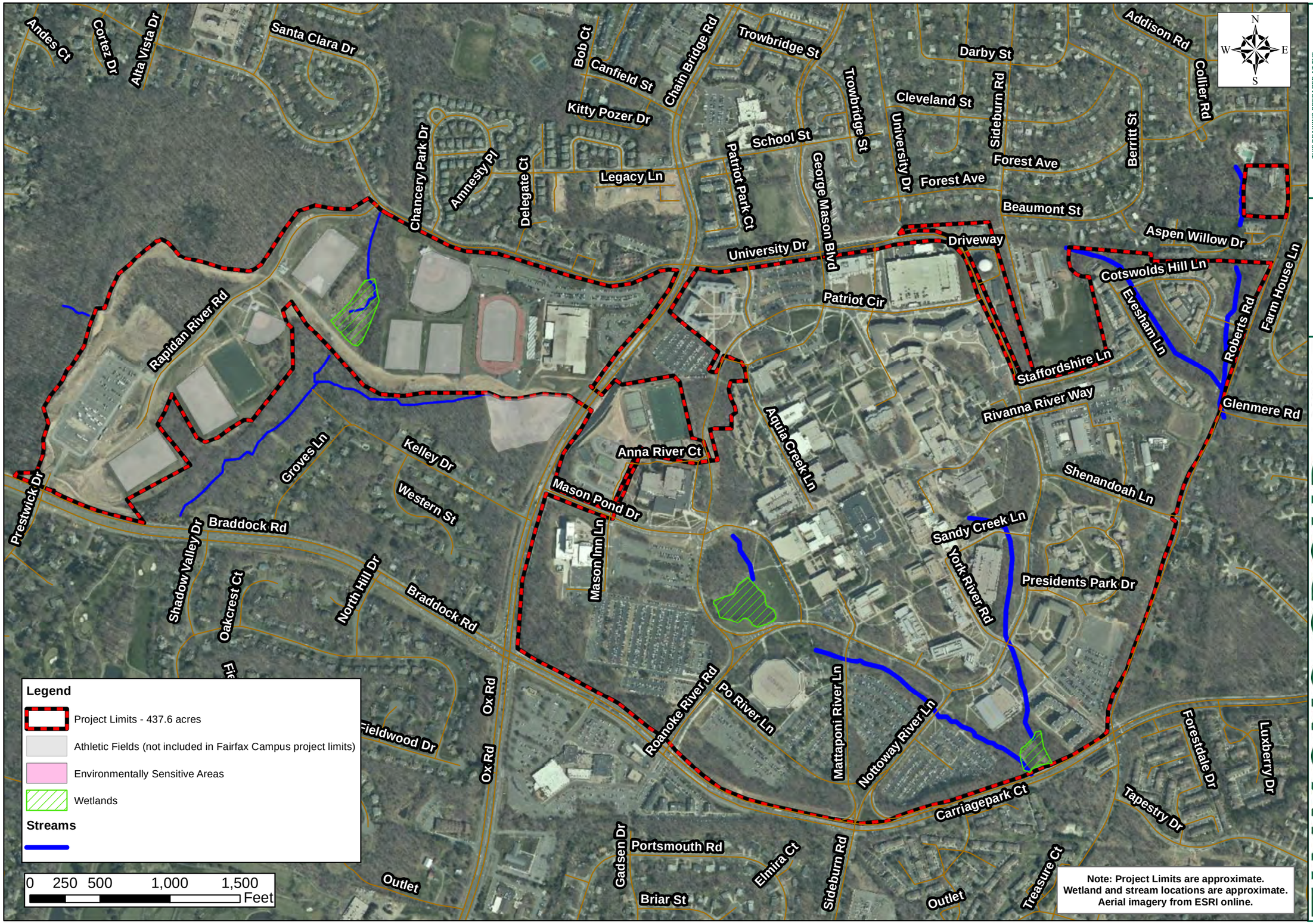
MASON POINT OF VIEW SITE- NUTRIENT MANAGEMENT PLAN

FAIRFAX COUNTY, VIRGINIA

FIGURE 2B: ENVIRONMENTAL INVENTORY MAP

JOB NUMBER 36158.004

SHEET NO. 1 OF 1



Path: \\tgfs2\900\900Proj\80436158.004-GMU_Nutrient_Mgmt_PlGIS\Common Shared Exhibits\36158 - FFX - ESA.mxd

THIS DRAWING PREPARED AT THE CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1648 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS

Site Development | Residential | Infrastructure | Technology | Environmental

DATE	REVISION DESCRIPTION

DATE 08/13/2015
DRAWN BY B. NORRIS
DESIGNED BY B. NORRIS
CHECKED BY E. VIRTS
SCALE 1" = 500'

TIMMONS GROUP

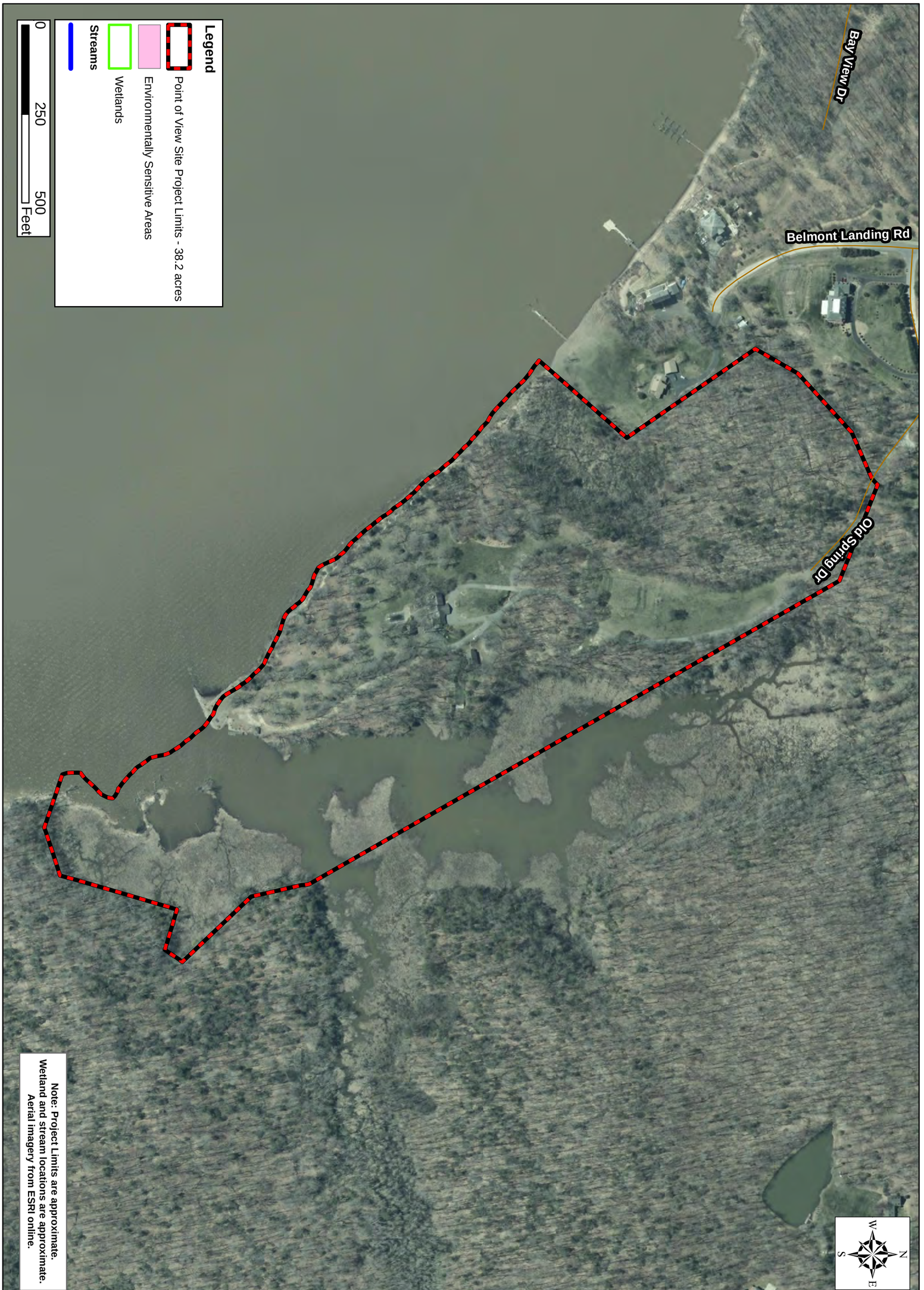
MASON FAIRFAX CAMPUS - NUTRIENT MANAGEMENT PLAN

FAIRFAX COUNTY, VIRGINIA

FIGURE 3A: ENVIRONMENTALLY SENSITIVE AREAS MAP

JOB NUMBER 36158.004
SHEET NO. 1 OF 1

Path: \\tgfs2\900\900Proj\804\36158.004-GMU_Nutrient_Mgmt_Pl\GIS\Common Shared Exhibits\36158 - FFXPOV-EIM.mxd



Note: Project Limits are approximate.
Wetland and stream locations are approximate.
Aerial imagery from ESRI online.

TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OUR8

THIS DRAWING PREPARED AT THE CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1648 www.timmons.com

Site Development | Residential | Infrastructure | Technology | Environmental

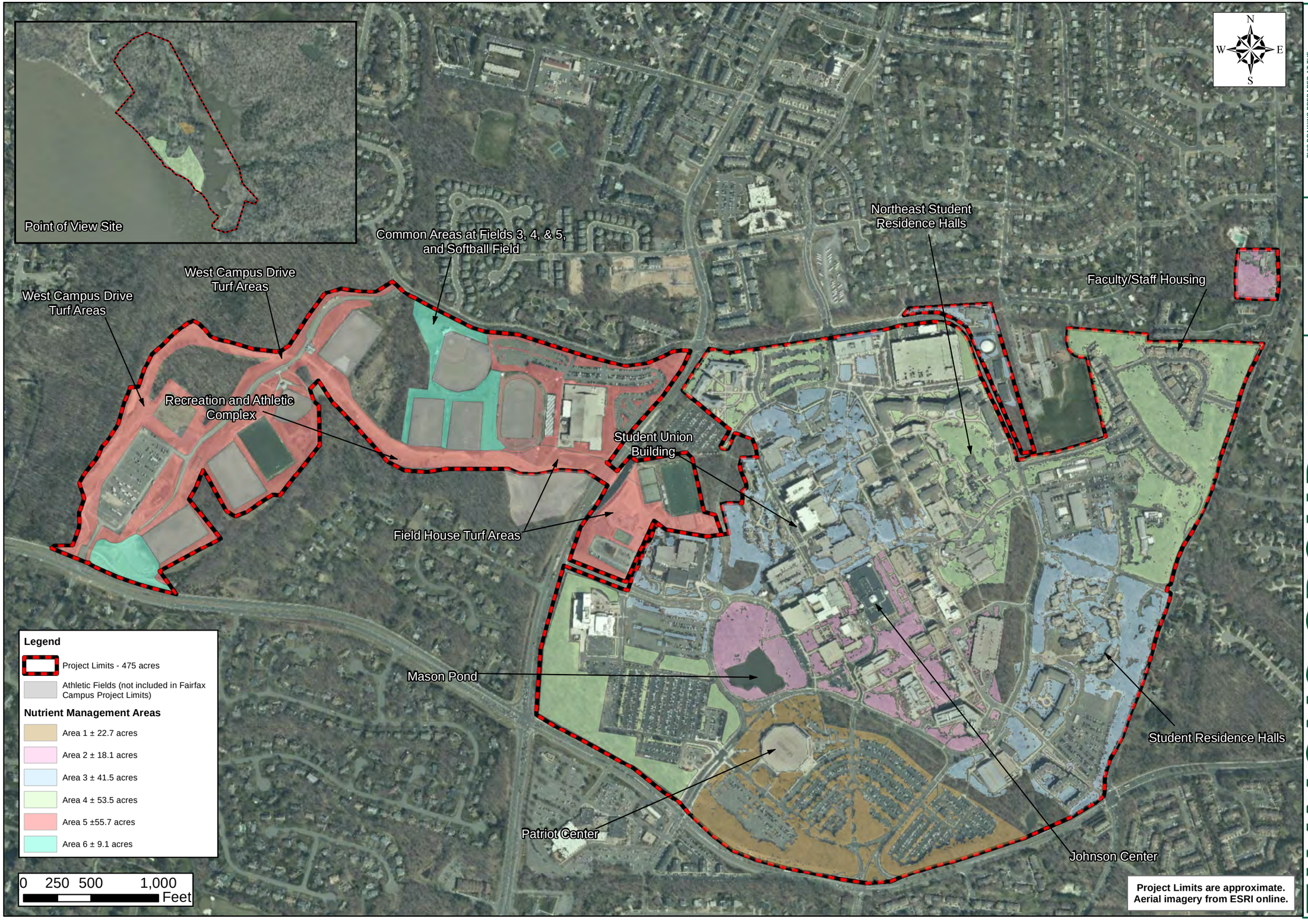
MASON POINT OF VIEW SITE- NUTRIENT MANAGEMENT PLAN

FAIRFAX COUNTY, VIRGINIA

FIGURE 3B: ENVIRONMENTALLY SENSITIVE AREAS MAP

SHEET NO. 1 OF 1
JOB NUMBER 36158.004
SCALE 1" = 250'
CHECKED BY E. VIRTS
DESIGNED BY B. NORRIS
DRAWN BY B. NORRIS
DATE 08/14/2015

DATE	REVISION DESCRIPTION



Path: \\tgfs2\1900\900Proj\804\36158.004-GMU_Nutrient_Mgmt_Plt\GIS\Common Shared Exhibits\36158 - FFX - NMA.mxd

THIS DRAWING PREPARED AT THE
CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1648 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS

Site Development | Residential | Infrastructure | Technology | Environmental

DATE	REVISION DESCRIPTION

DATE 07/23/2015
DRAWN BY B. NORRIS
DESIGNED BY B. NORRIS
CHECKED BY E. VIRTS
SCALE 1" = 500'

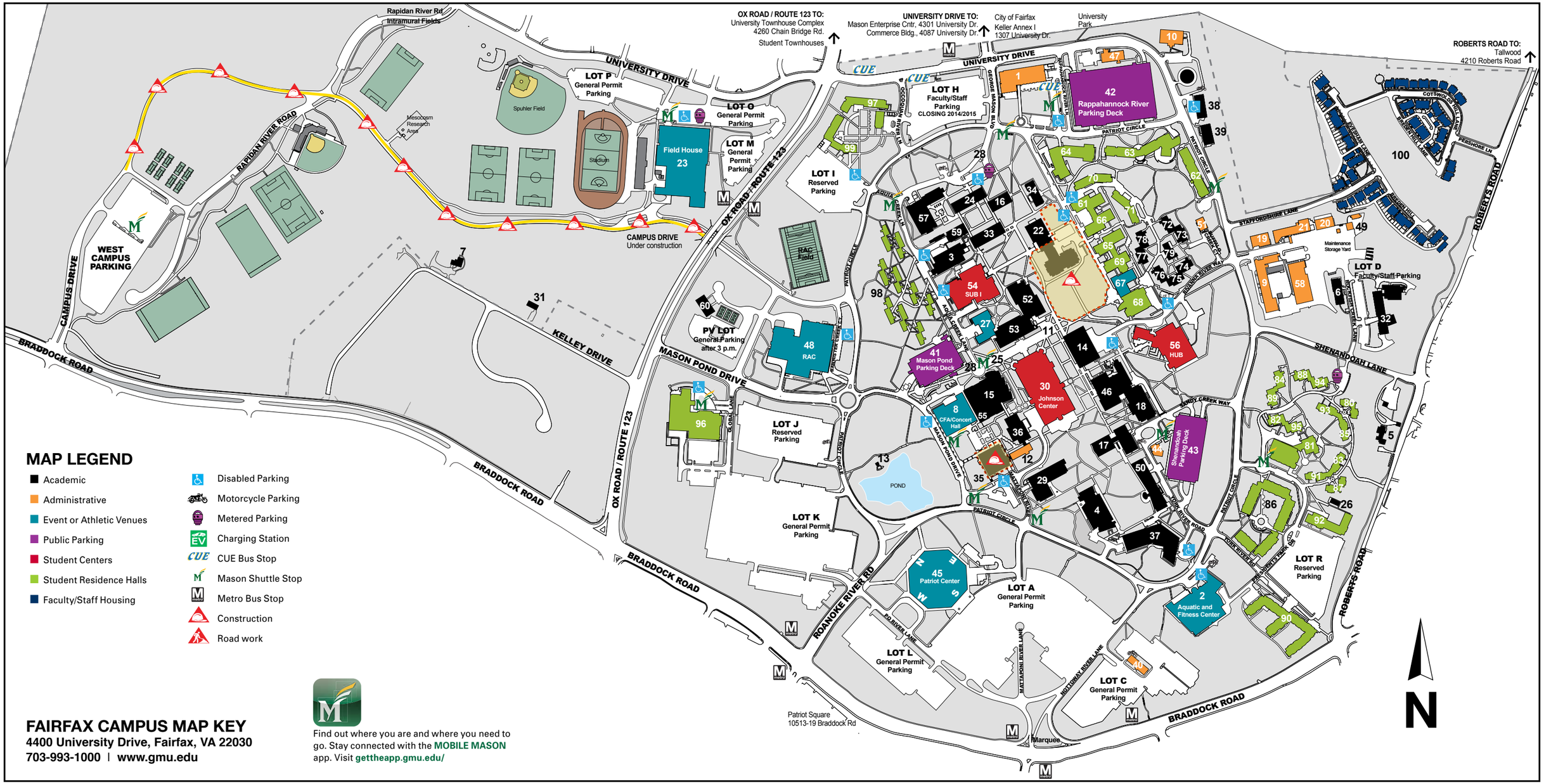
TIMMONS GROUP

MASON FAIRFAX CAMPUS - NUTRIENT MANAGEMENT PLAN

FAIRFAX COUNTY, VIRGINIA

FIGURE 4: NUTRIENT MANAGEMENT AREAS MAP

JOB NUMBER 36158.004
SHEET NO. 1 OF 1



MAP LEGEND

- Academic
- Administrative
- Event or Athletic Venues
- Public Parking
- Student Centers
- Student Residence Halls
- Faculty/Staff Housing

- Disabled Parking
- Motorcycle Parking
- Metered Parking
- Charging Station
- CUE Bus Stop
- Mason Shuttle Stop
- Metro Bus Stop
- Construction
- Road work

FAIRFAX CAMPUS MAP KEY

4400 University Drive, Fairfax, VA 22030
703-993-1000 | www.gmu.edu

Find out where you are and where you need to go. Stay connected with the **MOBILE MASON** app. Visit **gettheapp.gmu.edu/**

1 Alan and Sally Merten Hall (formerly University Hall)
2 Aquatic and Fitness Center
3 Aquia Building
4 Art and Design Building
5 Buchanan House
6 Carow Hall
7 Carty House
8 Center for the Arts/Concert Hall
9 Central Heating and Cooling Plant
10 Child Development Center
11 Clock
12 College Hall
13 Cross Cottage
14 David King Hall
15 de Laski Performing Arts Building
16 East Building
17 Enterprise Hall
18 Exploratory Hall
19 Facilities Administration
20 Facilities Management, Archives
21 Facilities Management, Customer Service Center
22 Fenwick Library
23 Field House and Module
24 Finley Building
25 George Mason Statue
26 Greenhouse
27 Harris Theatre
28 Information
29 Innovation Hall
30 Johnson Center
31 Kelley II
32 Krasnow Institute
33 Krug Hall
34 Lecture Hall
35 Mason Hall
36 Music/Theater
37 Nguyen Engineering Building
38 Northeast Module
39 Northeast Module II
40 Nottoway Annex
41 Parking Deck, Mason Pond
42 Parking Deck, Rappahannock Rvr
43 Parking Deck, Shenandoah
44 Parking Services
45 Patriot Center
46 Planetary Hall
47 Police and Safety Hdqrt.
48 Recreation and Athletic Complex (RAC)
49 Recycling Center
50 Research Hall
51 Rivanna Module
52 Robinson Hall A
53 Robinson Hall B
54 Student Union Building I
55 TheaterSpace/Black Box
56 The Hub
57 Thompson Hall
58 Warehouse
59 West Building
60 West PE Module

Residential
STUDENT HOUSING
Rappahannock Neighborhood
61 Blue Ridge
62 Eastern Shore
63 Hampton Roads and Pilot House
64 Northern Neck
65 Piedmont*
66 Sandbridge
67 Skyline Fitness Center
68 Southside Dining
69 Tidewater
70 Commonwealth
71 Dominion

The Commons
72 Amherst
73 Brunswick
74 Carroll
75 Dickenson
76 Essex
77 Franklin
78 Grayson
79 Hanover

Shenandoah Neighborhood
80 Adams
81 Eisenhower* and Ike's Diner
82 Harrison
83 Jackson
84 Jefferson
85 Kennedy
86 Liberty Square
87 Lincoln
88 Madison
89 Monroe
90 Potomac Heights/Housing Office
91 Roosevelt
92 Taylor
93 Truman
94 Washington
95 Wilson

Aquia Neighborhood
96 Mason Global Center (formerly Mason Inn)
97 Rogers
98 Student Apartments
99 Whitetop*
**24-hour Residential Desk*

FACULTY/STAFF HOUSING
100 Masonvale

Revised 06/2014

GEORGE MASON UNIVERSITY

APPENDIX A
SOIL TEST SUMMARIES

Soil Test Summary - Fairfax Campus

Customer Name:	Mason - Fairfax Campus
Testing Lab:	Virginia Tech Soil Testing Laboratory
Sample Date:	6/26/2015
Planner Name	Ethan Virts
Certification Number	Certification #: 816

Managed Area ID	Soil pH	Lab Test P (lbs/A)	VT (H/M/L)	Lab Test K (lbs/A)	VT (H/M/L)	Lime lbs/1,000 SF	Species
CP-1	5.9	11	L+	78	M-	70	Fescue
CP-2	6.8	72	H	80	M-	0	Fescue
CP-3	6.8	42	H-	130	M	0	Fescue
CP-4	6.4	18	M-	121	M	0	Fescue
CP-5	8.0	49	H-	252	H	0	Fescue
CP-6	7.9	18	M-	176	H-	0	Fescue
CP-7	6.6	32	M+	166	M+	0	Fescue
CP-8	7.7	153	VH	104	M	0	Fescue
CP-9	6.4	75	H	120	M	0	Fescue
CP-10	7.2	21	M	134	M	0	Fescue
CP-11	6.6	15	M-	84	M-	0	Fescue
CP-12	7.1	21	M	246	H	0	Fescue
CP-13	7.9	265	VH	120	M	0	Fescue
CP-14	5.8	66	H	91	M-	90	Fescue
POV-1	6.2	68	H	145	M	60	Fescue
POV-2	5.8	20	M-	80	M-	100	Fescue
Common Areas at Field 3, 4, 5, and Softball Field	5.7	28	M	106	M	80	Fescue
Common Areas at Soccer Fields A and B, and Spuhler Field	6.4	19	M-	167	M+	0	Fescue
Turf Area Adjacent to Braddock Road	5.9	16	M-	97	M-	60	Fescue
Turf Area Adjacent to West Campus Drive	5.5	38	H-	113	M	160	Fescue
Turf Areas Surrounding Field House	5.8	30	M	107	M	100	Fescue

APPENDIX B
NUTRIENT APPLICATION WORKSHEETS

NAME:	Mason - Fairfax Campus										
Prepared:	8/14/15				Species:		Fescue				
Expires:	8/14/18										
Management Area	Application Month/Day	# of Apps	Application Interval	Fertilizer Type	Total NPK lbs/1000ft^2						
					N	-	P_2O_5	-	K_2O		
Management Area #1	2/27 to 3/27	1		Water Soluble	0.70	-	0.0	-	1.0		
	3/27 to 12/6	4	> 30 days	Water Soluble	0.70	-	0.0	-	0.0		
	*Recommended Total Annual Application				3.50	-	0.0	-	1.0		
Management Area #2	2/27 to 3/27	1		Water Soluble	0.70	-	0.5	-	1.0		
	3/27 to 12/6	4	> 30 days	Water Soluble	0.70	-	0.0	-	0.0		
	*Recommended Total Annual Application				3.50	-	0.5	-	1.0		
Management Area #3	2/27 to 3/27	1		Water Soluble	0.70	-	1.0	-	0.5		
	3/27 to 12/6	4	> 30 days	Water Soluble	0.70	-	0.0	-	0.0		
	*Recommended Total Annual Application				3.50	-	1.0	-	0.5		
Management Area #4	2/27 to 3/27	1		Water Soluble	0.70	-	2.0	-	1.0		
	3/27 to 12/6	4	> 30 days	Water Soluble	0.70	-	0.0	-	0.0		
	*Recommended Total Annual Application				3.50	-	2.0	-	1.0		
Management Area #5	2/27 to 3/27	1		Water Soluble	0.70	-	1.0	-	1.0		
	3/27 to 12/6	4	> 30 days	Water Soluble	0.70	-	0.0	-	0.0		
	*Recommended Total Annual Application				3.50	-	1.0	-	1.0		
Management Area #6	2/27 to 3/27	1		Water Soluble	0.70	-	2.0	-	1.0		
	3/27 to 12/6	10	> 30 days	Water Soluble	0.70	-	0.0	-	0.0		
	*Recommended Total Annual Application				3.50	-	2.0	-	1.0		

Notes:	*The fertilizer recommendations listed above can be in the form of several different fertilizer products. If water insoluble nitrogen fertilizer is used, nitrogen can be applied at a rate of 0.9 lbs/1,000 sq. ft. at intervals at least 30 days apart between 2/27 and 12/6. However, the nutrient thresholds listed above are the maximums that should not be exceeded when applying water soluble nitrogen fertilizers. Applications of water soluble nitrogen fertilizer will not occur within 30 days of one another and must not exceed 0.7 lbs/1,000 sq. ft. The first nitrogen application should not be made until complete green-up of turf. *The full annual application of Phosphorus (P_2O_5) and Potassium (K_2O) should take place at the same time as the first nitrogen application. Phosphorus application should not take place in the form of 10-10-10 or 5-10-10 fertilizers in this management area due to high content of phosphorus in the soil already.
Management Area #1 Lime Recommendations:	No lime is recommended in this management area given that the soil pH is sufficient. Soil tests can be conducted annually to determin if lime applications are warranted in years 2 and 3 of this nutrient management plan.
Management Area #2 Lime Recommendations:	POV site, area behind old house: This sampling area requires 60 lbs. of agricultural lime (ground pulverized, or pelletized per 1,000 sq. ft. This lime application should take place in at least two applications of 50 lbs per 1,000 sq. ft. or less, at intervals of 1 to 6 months, until the full 60 lb. amount is applied.
	Tallwood Center: This soil sampling area requires 90 lbs. of agricultural lime (ground, pulverized, or pelletized) per 1,000 sq. ft.. This lime application should take place in at least two applications of 50 lbs per 1,000 sq. ft. or less, at intervals of 1 to 6 months, until the full 90 lb. amount is applied.
Management Area #3 Lime Recommendations:	*No lime is recommended for areas within Management Area #3 given that the soil pH is sufficient. Soil tests can be conducted annually to determine if additional lime is needed to raise the soil pH during years 2 and 3 of this nutrient management plan implementation.
Management Area #4 Lime Recommendations:	Mason Globe Center and Lot K Lawns: This soil sampling area requires 70 lbs of agricultural lime (ground, pulverized, or pelletized) per 1,000 sq. ft.. This lime application should take place in at least two applications of 50 lbs per 1,000 sq. ft. or less, at intervals of 1 to 6 months, until the full 70 lb. amount is applied.
	POV Site, Lawn area south of POV Building: This soil sampling area requires 100 lbs of agricultural lime (ground, pulverized, or pelletized) per 1,000 sq. ft.. This lime application should take place in at least two applications of 50 lbs per 1,000 sq. ft. or less, at intervals of 1 to 6 months, until the full 100 lb. amount is applied.ft. or less, at intervals of 1 to 6 months, until the full
Management Area #5 Lime Recommendations:	*Common areas surrounding Field 3, 4, 5, and Softball Field: 80 lbs. of agricultural limestone (ground, pulverized or pelletized) per 1,000 square feet should be applied in multiple small applications of up to 50 lbs. per 1,000 square feet each, at intervals of 1 to 6 months, until the full amount is applied.
	*Turf areas adjacent to West Campus Drive: 160 lbs. of agricultural limestone (ground, pulverized or pelletized) per 1,000 square feet should be applied in multiple small applications of up to 50 lbs. per 1,000 square feet each, at intervals of 1 to 6 months, until the full amount is applied.
	Turf areas surrounding Field House: 100 lbs. of agricultural limestone (ground, pulverized or pelletized) per 1,000 square feet should be applied in multiple small applications of up to 50 lbs. per 1,000 square feet each, at intervals of 1 to 6 months, until the full amount is applied.
Management Area #6 Lime Recommendations:	Common areas surrounding Soccer Field A, Soccer Field B, and Spuhler Field: Already has a sufficient soil pH. No lime application is needed.
	Turf area adjacent to Braddock Road: 60 lbs. of agricultural limestone (ground, pulverized or pelletized) per 1,000 square feet should be applied in multiple small applications of up to 50 lbs. per 1,000 square feet each, at intervals of 1 to 6 months, until the full amount is applied.

APPENDIX C
FERTILIZER APPLICATION RECORDS

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Mason - Fairfax Campus	Management Area ID:	
Address:	4400 University Drive	Management Area Size:	
	Fairfax, Virginia 22030	Plant Species:	
		Notes:	
Phone #:			

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
For information on calibration see Chapter 10 of the "Urban Nutrient Management Handbook".
Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

APPENDIX D
REFERENCE MATERIALS

Table 7.4. Recommended fertilization rates for newly planted ornamental plants during the first growing season (use only one of the fertilizers listed at the rate recommended).

Plant type/size	12-4-8	16-4-8	10-10-10	Application frequency
	Application rate/plant*			
1-gallon shrubs	1 tsp	1 tsp	1 tbsp	March, May, July
3-gallon shrubs	2 tsp	2 tsp	2 tbsp	March, May, July
5-gallon shrubs	3 tsp	3 tsp	3 tbsp	March, May, July
Trees under 4 feet	1 tbsp	1 tbsp	2 tbsp	March, July
Trees 4-6 feet	3 tbsp	3 tbsp	5 tbsp	March, July
Trees 6-8 feet	4 tbsp	4 tbsp	6 tbsp	March, July
	Application rate 100/sq ft			
Ground covers, annuals, and herbaceous perennials	0.5 lb	0.5 lb	1.0 lb	Each 4-6 weeks

Source: Georgia Cooperative Extension bulletin 1065 (2009).* When using slow-release or soluble fertilizers, follow label recommendations for application rate.

Table 7.5. Recommended application rates of various general-purpose granular fertilizers on established ornamental plants in the landscape.

Source	Application rate[a] 1,000 sq ft Pounds	1,000 sq ft Cups	100 sq ft Pounds	100 sq ft Cups	10 sq ft Tablespoons
10-10-10	10.0	20.0	1.0	2.0	4.0
8-8-8	12.5	25.0	0.5	2.5	5.0
13-13-13	6.0	12.0	0.75	1.5	3.0
12-3-6	6.0	12.0	0.75	1.5	3.0
12-4-8	6.0	12.0	0.75	1.5	3.0
12-6-6	6.0	12.0	0.75	1.5	3.0
16-4-8	6.0	12.0	0.5	1.0	2.0
4-12-12	25.0	50.0	2.5	5.0	10.0
5-10-10	20.0	40.0	2.0	4.0	8.0

Source: Georgia Cooperative Extension bulletin 1065 (2009).

[a]This rate will supply 1 pound of actual nitrogen per 1,000 square feet. For optimum growth of young shrubs, ground covers, and trees, three to five applications are recommended at six- to 10-week intervals from March to August. Application frequency varies with the amount of slow-release nitrogen in the product, so consult the label for specific recommendations. Established trees and shrubs will benefit from one to two applications during the growing season. Annual flowers and roses should receive applications at four- to six-week intervals from March to August. When using slow-release or specialty fertilizers, follow the manufacturer's recommendation on the container.

Section VI. Turfgrass Nutrient Recommendations for Home Lawns, Office Parks, Public Lands and Other Similar Residential/Commercial Grounds

Definitions

For the purposes of this section, the following definitions, as presented by the Association of American Plant Food Control Officials (AAPFCO), apply:

"Enhanced efficiency fertilizer" describes fertilizer products with characteristics that allow increased plant nutrient availability and reduce the potential of nutrient losses to the environment when compared to an appropriate reference product.

"Slow or controlled release fertilizer" means a fertilizer containing a plant nutrient in a form which delays its availability for plant uptake and use after application, or which extends its availability to the plant significantly longer than a reference "rapidly available nutrient fertilizer" such as ammonium nitrate, urea, ammonium phosphate or potassium chloride. A slow or controlled release fertilizer must contain a minimum of 15 percent slowly available forms of nitrogen.

"Water soluble nitrogen", "WSN" and "readily available nitrogen" means: Water soluble nitrogen in either ammonical, urea, or nitrate form that does not have a controlled release, or slow response.

Recommended Season of Application For Nitrogen Fertilizers - Applies to all Turf

A nitrogen fertilization schedule weighted toward fall application is recommended and preferred for agronomic quality and persistence of cool season turfgrass; however, the acceptable window of applications is much wider than this for nutrient management. The nutrient management recommended application season for nitrogen fertilizers to cool season turfgrasses begins six weeks prior to the last spring average killing frost date and ends six weeks past the first fall average killing frost date (see Figures 6-1 & 6-2). Applications of nitrogen during the intervening late fall and winter period should be avoided due to higher potential leaching or runoff risk, but where necessary, apply no more than 0.5 pounds per 1,000 ft^2 of water soluble nitrogen within a 30 day period. Higher application rates may be used during this late fall and winter period by using materials containing slowly available sources of nitrogen, if the water soluble nitrogen contained in the fertilizer does not exceed the recommended maximum of 0.5 pounds per 1,000 ft^2 rate. Do not apply nitrogen or phosphorus fertilizers when the ground is frozen.

The acceptable nitrogen fertilizer application season for non-overseeded warm season turfgrass begins no earlier than the last spring average killing frost date and ends no later than one month prior to the first fall average killing frost date (see Figures 6-1 & 6-2).

Figure 6-1

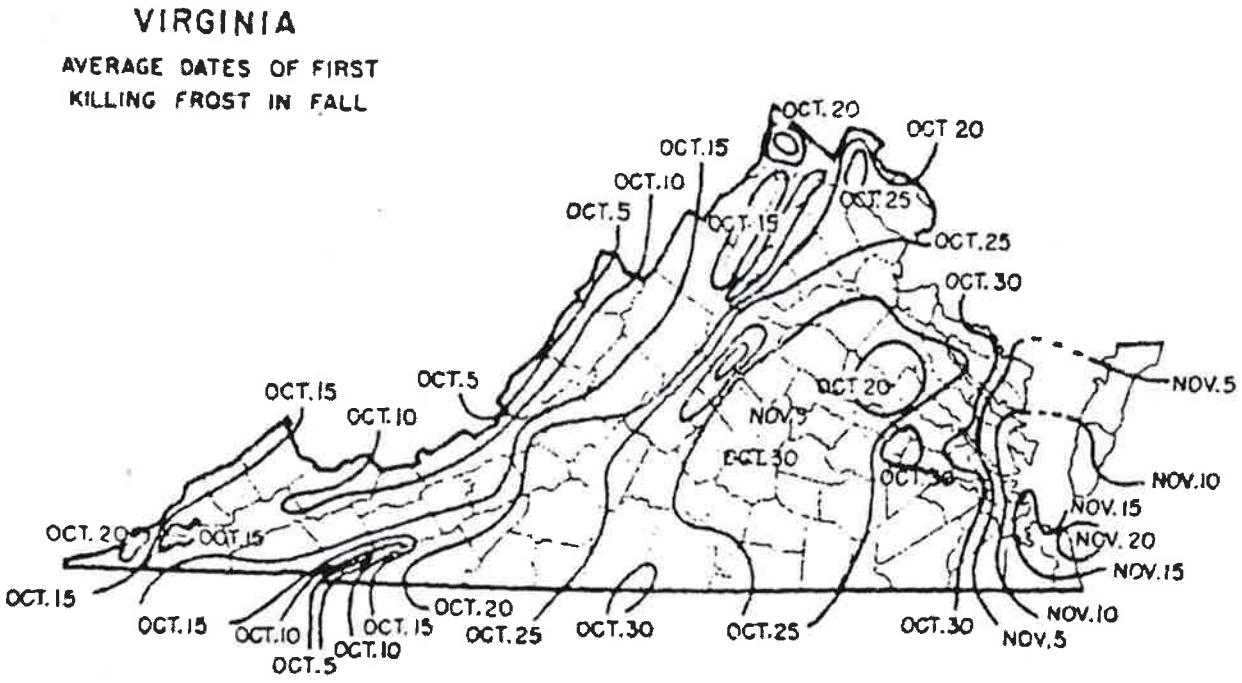
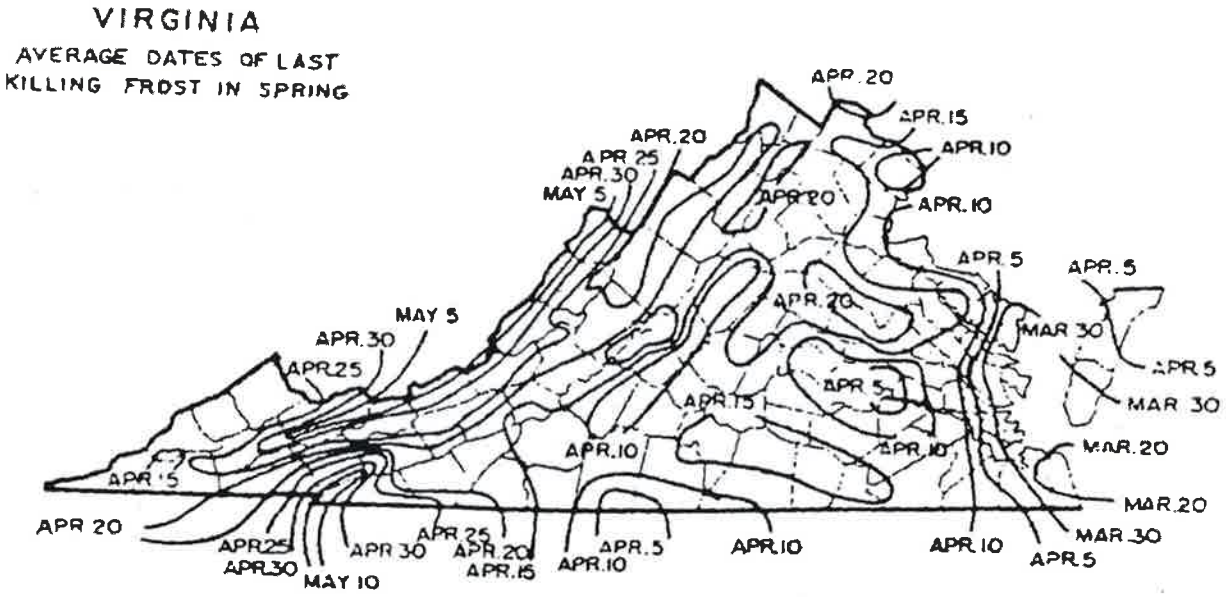


Figure 6-2



Per Application Rates

Do not apply more than 0.7 pounds of water soluble nitrogen per 1,000 ft^2 within a 30 day period. For cool season grasses, do not apply more than 0.9 pounds of total nitrogen per 1,000 ft^2 within a 30 day period. For warm season grasses, do not apply more than 1.0 pounds of total nitrogen per 1,000 ft^2 within a 30 day period. Lower per application rates of water soluble nitrogen sources or use of slowly available nitrogen sources should be utilized on very permeable sandy soils, shallow soils over fractured bedrock, or areas near water wells.

Annual Application Rates for Home Lawns and Commercial Turf

Up to 3.5 pounds per 1,000 ft^2 of nitrogen may be applied annually to cool season grass species or up to 4 pounds per 1,000 ft^2 may be applied annually to warm season grass species using 100 percent water soluble nitrogen sources. Lower rates of nitrogen application may be desirable on those mature stands of grasses that require less nitrogen for long-term quality. As a result, lower application rates will probably be more suited to the fine leaf fescues (hard fescue, chewings fescue, creeping red fescue, and sheep fescue) and non-overseeded zoysiagrass. Lower rates should also be used on less intensively managed areas.

Use of Slowly Available Forms of Nitrogen

For slow or controlled release fertilizer sources, or enhanced efficiency fertilizer sources, no more than 0.9 pounds of nitrogen per 1,000 ft^2 may be applied to cool season grasses within a 30 day period and no more than 1.0 pounds of nitrogen per 1,000 ft^2 may be applied to warm season grasses within a 30 day period.

Provided the fertilizer label guarantees that the product can be used in such a way that it will not release more than 0.7 pounds of nitrogen per 1,000 ft^2 in a 30 day period, no more than 2.5 pounds of nitrogen per 1,000 ft^2 may be applied in a single application. Additionally, total annual applications shall not exceed 80 percent of the annual nitrogen rates for cool or warm season grasses.

Phosphorus and Potassium Nutrient Needs (Established Turf)

Apply phosphorus (P_2O_5) and potassium (K_2O) fertilizers as indicated necessary by a soil test using the following guidelines:

Soil Test Level	Nutrient Needs (pounds per 1000 ft^2) *	
	P_2O_5	K_2O
L	2-3	2-3
M	1-2	1-2
H	0.5-1	0.5-1
VH	0	0

* For the lower soil test level within a rating, use the higher side of the range and for higher soil test level within a rating use the lower side of the recommendation range. (For example the recommendation for a P_2O_5 soil test level of L- would be 3 pounds per 1,000 ft^2.)

Do not use high phosphorus ratio fertilizers such as 10-10-10 or 5-10-10, unless soil tests indicate phosphorus availability below the M+ level.

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

1001 Boulders Parkway
Suite 300
Richmond, VA 23225

P 804.200.6500
F 804.560.1016
www.timmons.com

August 14, 2015

Mr. Derik Cataldi
Urban Nutrient Management Specialist
Virginia Department of Conservation and Recreation
600 East Main Street, 24th Floor
Richmond, Virginia 23219

Re: Nutrient Management Plan
George Mason University – Athletic Fields
Fairfax County, Virginia

Dear Mr. Cataldi:

On behalf of George Mason University, Timmons Group has prepared this Nutrient Management Plan in accordance with the *Virginia Nutrient Management Standards and Criteria, revised July 2014*. This Nutrient Management Plan encompasses the approximately 18.6 acre area that contains turfgrass and could receive fertilizer applications at the George Mason University athletic fields, including both athletic fields and the surrounding common area lawns. Will you review the enclosed nutrient management plan and provide DCR approval?

Please feel free to contact me at (804) 200-6414, ethan.virts@timmons.com, or Bill Vest at (703) 554-6705, bill.vest@timmons.com, if you require additional information, or have any questions or additional recommendations.

Sincerely,

Timmons Group

Ethan Virts, PWS
Certified Nutrient Management Planner (No. 816)

Enclosures:

George Mason University – Athletic Fields Nutrient Management Plan

GEORGE MASON UNIVERSITY – ATHLETIC FIELDS
NUTRIENT MANAGEMENT PLAN

DIRECTOR OF FACILITIES

GEORGE MASON UNIVERSITY – ATHLETIC FIELDS
ZHONGYAN XU, PHD, PE, CFM
PROJECT MANAGEMENT AND CONSTRUCTION, FACILITIES
703-993-4051 (P)
ZXU8@GMU.EDU

NUTRIENT MANAGEMENT PLANNER INFORMATION

ETHAN VIRTS
1001 BOULDERS PARKWAY, SUITE 300
RICHMOND, VA 23225
804-200-6414 (P)
ETHAN.VIRTS@TIMMONS.COM
VIRGINIA NUTRIENT MANAGEMENT PLANNER CERTIFICATION # 816

LOCATION INFORMATION

4400 UNIVERSITY DRIVE
FAIRFAX, VA 22030
38° 49' 52.1" N
77° 19' 33.1" W
LOWER BULL RUN WATERSHED
6TH ORDER NATIONAL WETLAND BOUNDARY DATASET PL48

ACREAGE

TOTAL ATHLETIC FIELDS: 18.6 ACRES

PLAN START DATE: 8/14/2015
PLAN END DATE: 8/14/2018

ETHAN VIRTS

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

TIMMONS GROUP PROJECT NO. 36158.004

GEORGE MASON UNIVERSITY – ATHLETIC FIELDS
NUTRIENT MANAGEMENT PLAN

TABLE OF CONTENTS

FIGURES

APPENDICES

1.0 STATEMENT OF COMPLIANCE

The George Mason University (Mason) agrees to comply with all requirements set forth in the *Nutrient Management Training and Certification Regulations 4VAC50-85*, and to follow recommendations for turf fertilization and management as described in the *Virginia Nutrient Management Standards and Criteria, revised July 2014*. This includes implementing this Nutrient Management Plan and maintaining fertilization records. All nutrient applications performed by Mason staff or associated contractors shall comply with the provisions of this Nutrient Management Plan as of August 14, 2015. This plan is effective for three years (until August 14, 2018) or until major changes to maintenance practices or grounds conditions occur. Mason is committed to environmental sustainability and adhering to this Nutrient Management Plan in order to protect the water quality of downstream aquatic resources while optimizing the health and performance of turf species.

2.0 SITE LOCATION AND DESCRIPTION

The Mason Athletic Fields (Site) are located between Ox Road (Route 123) and Braddock Road (Route 623), southwest of the City of Fairfax, Virginia, and encompass a total area of approximately 18.6 acres that contains maintained turfgrass (see Figure 1: Vicinity Map). The Site drains to Popes Head Creek and East Fork of Popes Head Creek, which both ultimately flow into Bull Run. The Site is located within the Lower Bull Run watershed (PL46) and the Piedmont physiographic province.

The Site consists of eight athletic fields that are all dominated by Bermudagrass, and the Throwing Field which is currently under construction. All eight athletic field turf areas that aren't under construction are heavily manicured, with turf heights of approximately 1 to 2 inches.

2.1 Environmentally Sensitive Areas

All areas within the project limits were evaluated based on susceptibility of nutrient loss to ground and surface water. None of the turf areas onsite are categorized as environmentally sensitive areas (see Figure 3: Environmentally Sensitive Areas Map). However, special care should be taken when applying nutrients near drop inlet structures, stormwater management BMPs, streams, and wetlands. All nutrient applications should adhere to the recommended fertilizer application rates, and timing to avoid and minimize nutrient loss to the greatest extent practicable.

Subsurface Drains: There is an underground stormwater conveyance system present in areas surrounding the athletic fields that carries runoff to stormwater treatment ponds. Given that this stormwater is being treated by the existing stormwater management BMPs, this underground stormwater conveyance system does not qualify as a subsurface tile drain. However, special care should be taken when applying fertilizer near drop inlet structures, impervious surfaces, and stormwater management BMPs. Fertilizer should not be applied on drop inlets or impervious surfaces. Nor should fertilizer be applied to stormwater management BMPs.

Soils: The NRCS soil survey map depicts that all athletic fields are mapped as Wheaton loam. This soil series does not have a high rating for leaching, lateral drainage flow, or shallow

depth to bedrock in the Nutrient Loss Risk and Environmental Sensitivity Ratings for Virginia Soils Table (Table 1.4 in the Virginia Nutrient Management Standards and Criteria).

Streams and Wetlands: Perennial and/or intermittent streams are present near several of the turf management areas. Fertilizer should not be applied within streams and/or wetlands. Allowing vegetation to grow taller along stream and wetland boundaries is an additional measure that can be taken to reduce nutrient loss to streams and wetlands. The approximate locations of streams and wetlands are depicted in Figure 3: Environmentally Sensitive Areas Map.

Land with Slopes Greater than 15%: There were no areas with greater than 15% slopes identified in any turf management areas.

2.2 Fertilization Season

The recommended season of application for nitrogen fertilizers for Bermudagrass, which is categorized as a warm season grass, is shown in Table 2.1 – Fertilization Season at Mason – Athletic Fields.

Table 2.1 – Fertilization Season at Mason – Athletic Fields

	Killing Frost Dates	**Warm Season Applications* (Athletic Fields)**
Spring	April 10	April 10
Fall	October 25	September 25

3.0 SOIL SAMPLING METHODS, MANAGEMENT AREAS, AND NUTRIENT RECOMMENDATIONS

3.1 Soil Sampling Methods and Management Areas

A total of 8 soil samples were taken from athletic fields throughout the Site. A sample was not taken from the Throwing Field because this athletic field is currently under construction. At least 10 sub-samples from each of these eight athletic fields were randomly taken from within the upper four inches of soil and mixed to create a representative sample of each area. The soil samples were collected in June 2015 and analyzed at the Virginia Tech soils laboratory.

These 8 sample areas were categorized into four different management areas based on the soil test results and turfgrass species present. These nutrient management areas are shown in Figure 4: Nutrient Management Areas Map. Figure 4 should be used as a reference when interpreting nutrient recommendations in Table 3.1 on page 4 of this document.

For all the nutrient management areas, applications of inorganic fertilizers will not occur on frozen or snow-covered ground. Any fertilizers that make their way onto impervious surfaces such as parking lots or sidewalks should be swept or blown back into pervious, or turfgrass covered areas. Furthermore, fertilizers must not be used as ice melt.

3.2 Athletic Fields – 22.7 acres

All athletic fields are dominated by Bermudagrass, which is a warm season turfgrass species, with the except for the Throwing Field which is currently under construction. Therefore, nutrient and lime recommendations are not provided for the Throwing Field. The lime and nutrient recommendations for the other eight athletic fields within the Site are shown in Table 3.1: Athletic Fields Lime and Nutrient Recommendations on page 4 of this document. The lime and nutrient recommendations in this table are based on the *Virginia Nutrient Management Standards and Criteria, revised July 2014*. The prescribed lime applications should be completed in small applications of less than 50 lbs. per 1,000 square feet (SF), at intervals of 1 to 6 months, until the full amount is applied.

The entire phosphorus (P_2O_5) and Potassium (K_2O) annual applications should be performed with the first application of nitrogen, or can also be applied before green-up of grass in February or March if the ground is not frozen. The recommended potassium application rates in some areas are greater than the amount specified in the soil lab analyses results. At this time, potassium is not considered to be an environmental concern that negatively impacts water quality, so slight over application of this nutrient only contributes to health and vigor of turfgrass.

Table 3.1: Athletic Fields Lime and Nutrient Recommendations

MANAGEMENT AREA #	SOIL SAMPLE AREA	SOIL pH	LIME REC. (LBS/1000 SF)	PHOSPHORUS (P_2O_5) REC. (LBS/1,000 SF)	POTASSIUM (K_2O) REC. (LBS/1,000 SF)
1	Field 5	5.4	100	2	1
2	Field 4	5.7	40	0.5*	2
	Spuhler Field	6.2	20	0.5*	2
3	GMU Softball Field	6.2	20	0	0
4	Field 1	5.6	40	1*	2
	Soccer Field A	5.4	100	1	2
	Soccer Field B	6.4	0	1*	2
	George Mason Stadium	5.5	50	1*	2

Notes:

- *****Due to high phosphorus levels, fertilizers in the form of 10-10-10 or 5-10-10 should not be used.
- Agricultural limestone (ground, pulverized, or pelletized) should be broadcast in small applications of up to 50 lbs. per 1000 SF, at intervals of 1 to 6 months, until the full amount is applied.
- Nitrogen applications may not exceed 5.0 lbs. per 1,000 SF annually.
- No more than 0.35 lbs. of WSN or 0.5 lbs. of WIN per 1,000 SF may be applied within a within a 15 day period.

3.3 Sand Based Athletic Field Nitrogen Applications – 16.1 acres

The sand based athletic fields onsite require a lower nitrogen per application rate than fields with loam based soils. The sand based athletic fields onsite include Field 1, Field 4, Mason Stadium Field, Softball Field, Spuhler Field, Soccer Field A, and Soccer Field B. These areas are noted as Management Areas 2, 3, and 4 on Figure 4.

The annual maximum nitrogen application for all of the sand based athletic fields is 5.0 lbs. per 1,000 SF. Per application rates of nitrogen vary depending on whether water soluble nitrogen (WSN) or water insoluble nitrogen (WIN) fertilizers are used. WSN should be applied at a rate no greater than 0.35 lbs. per 1,000 SF at intervals no less than 15 days apart, between the dates of April 10th and September 25th. WIN can be applied at a rate no greater than 0.5 lbs. per 1,000 SF at intervals no less than 15 days apart, between the dates of April 10th and September 25th. The first nitrogen applications, which must occur after April 10th, should not be made until after complete green-up of turf.

If athletic fields are overseeded with additional warm season grasses, an additional 0.7 lbs. per 1,000 SF of WSN may be applied in the fall after the perennial ryegrass overseeding is well established. The WSN must be applied as two applications not to exceed 0.35 lbs. per 1,000 SF of nitrogen, with a minimum of 15 days between applications. Additional WSN application of 0.5 lbs. per 1,000 SF may be made in February-March to overseeded perennial ryegrass if growth and color indicate need. Alternatively, split applications of 0.5 lbs. of nitrogen per 1,000 SF each with a minimum of 15 days between applications may be applied using a material containing slowly available water insoluble nitrogen sources.

3.4 Loam Based Athletic Field Nitrogen Applications – 2.5 acres

The loam based athletic field onsite require a higher nitrogen per application rate than fields with sand based soils. The loam based athletic fields onsite includes only Field 5 and is noted as Management Area 1 on Figure 4.

The annual maximum nitrogen application for Field 5 is 5.0 lbs. per 1,000 SF. Per application rates of nitrogen vary depending on whether water soluble nitrogen (WSN) or water insoluble nitrogen (WIN) fertilizers are used and the timing of fertilizer application. WSN should be applied at a rate no greater than 0.35 lbs. per 1,000SF at intervals no less than 15 days apart, between the dates of April 10th and May 10th, and September 25th and October 25th. During those same dates WIN can be applied at a rate no greater than 0.5 lbs. per 1,000 SF at intervals no less than 15 days apart. The first nitrogen applications, which must occur after April 10th, should not be made until after complete green-up of turf. WSN should be applied at a rate no greater than 0.7 lbs. per 1,000SF at intervals no less than 30 days apart, between the dates of May 10th and October 25th. During those same dates WIN can be applied at a rate no greater than 1.0 lbs. per 1,000 SF at intervals no less than 30 days apart.

If Field 5 is overseeded with additional warm season grasses, an additional 0.7 lbs. per 1,000 SF of WSN may be applied in the fall after the perennial ryegrass overseeding is well established. The WSN must be applied as two applications not to exceed 0.35 lbs. per 1,000 SF of nitrogen, with a minimum of 15 days between applications. Additional WSN application of 0.5 lbs. per 1,000 SF may be made in February-March to overseeded perennial ryegrass if growth and color indicate need. Alternatively, split applications of 0.5 lbs. of nitrogen per 1,000 SF each with a minimum of 15 days between applications may be applied using a material containing slowly available water insoluble nitrogen sources.

4.0 MAINTENANCE OF PLAN

This Nutrient Management Plan will be maintained by Mason and will expire on August 14, 2018. As part of this plan, fertilizer application records shall be recorded and

maintained (see Appendix C: Fertilizer Application Records). If significant changes to the Site occur, this plan is required to be updated accordingly by a Certified Nutrient Management Planner. Significant changes would include: changing turf species in the athletic fields, renovating an athletic field and the existing underlying soil, creation of additional athletic fields, expansion of the area to be included under this Nutrient Management Plan, or other changes that could alter nutrient recommendations and timing.

5.0 NUTRIENT APPLICATION, INCORP., AND SPECIAL CONDITIONS

There are multiple drop inlets associated with the underground stormwater system onsite. This drainage system ultimately outfalls to several stormwater BMPs that are designed to remove sediment and nutrients from stormwater. Special care should be taken to avoid applying fertilizers directly on top of drop inlet structures. No fertilizer should be applied to stormwater BMPs as these facilities already receive excess nutrients during stormwater events. Nutrient applications should not be completed when a significant runoff producing events are anticipated. Applying only WIN, or slowly available forms of nitrogen, will help minimize the nutrient loss potential.

Special care should be taken when applying fertilizers near impervious surfaces and near any streams or wetlands. The locations of streams and wetlands are depicted on Figure 3: Environmentally Sensitive Areas Map. Allowing vegetation to grow taller near stream and wetland areas would help prevent offsite nutrient loss that could result from fertilizer application errors, or significant runoff producing storm events.

6.0 REFERENCES

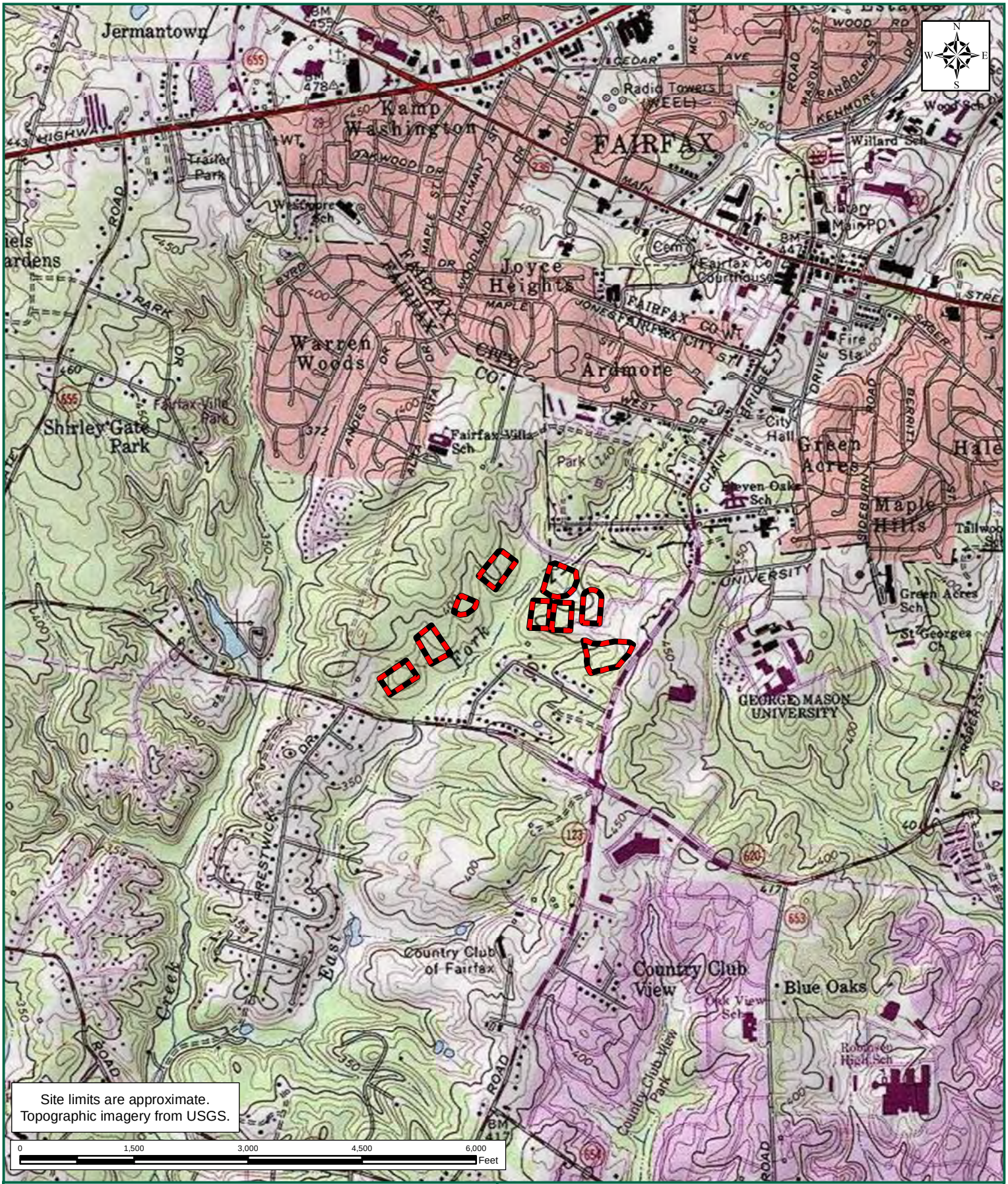
VADCR. November 2014. Nutrient Management Training and Certification Regulations 4VAC50-85. Virginia Soil and Water Conservation Board.

VADCR. July 2014. Virginia Nutrient Management Standards and Criteria. Division of Soil and Water Conservation: Richmond, VA.

Virginia Cooperative Extension. May 2011. Urban Nutrient Management Handbook. Funding by: VADCR; Produced by: Virginia Polytechnic Institute and State University.

FIGURES

Path: Y:\804\36158.004-GMU_Nutrient_Mgmt_Pl\GIS\Common Shared Exhibits\36158- VIC- AF.mxd



MASON ATHLETIC FIELDS
NUTRIENT MANAGEMENT PLAN
FAIRFAX COUNTY, VIRGINIA
FIGURE 1: VICINITY MAP

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

TIMMONS GROUP JOB NUMBER: *36158.004*
PROJECT STUDY LIMITS: *22.7 acres*
LATITUDE: *38° 49' 52.1" N*
LONGITUDE: *77° 19' 33.1" W*

U.S.G.S. QUADRANGLE(S): *FAIRFAX*
DATE(S): *1998*
WATERSHED(S): *MIDDLE POTOMAC-ANACOSTIA-OCCOQUAN*
HYDROLOGIC UNIT CODE(S): *02070010*

Path: Y:\804\36158.004-GMU_Nutrient_Mgmt_Pl\GIS\Common Shared Exhibits\36158 - EIM - Athletic Field.mxd

TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS

THIS DRAWING PREPARED AT THE CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1648 www.timmons.com

Site Development | Residential | Infrastructure | Technology | Environmental

MASON ATHLETIC FIELDS - NUTRIENT MANAGMENT PLAN

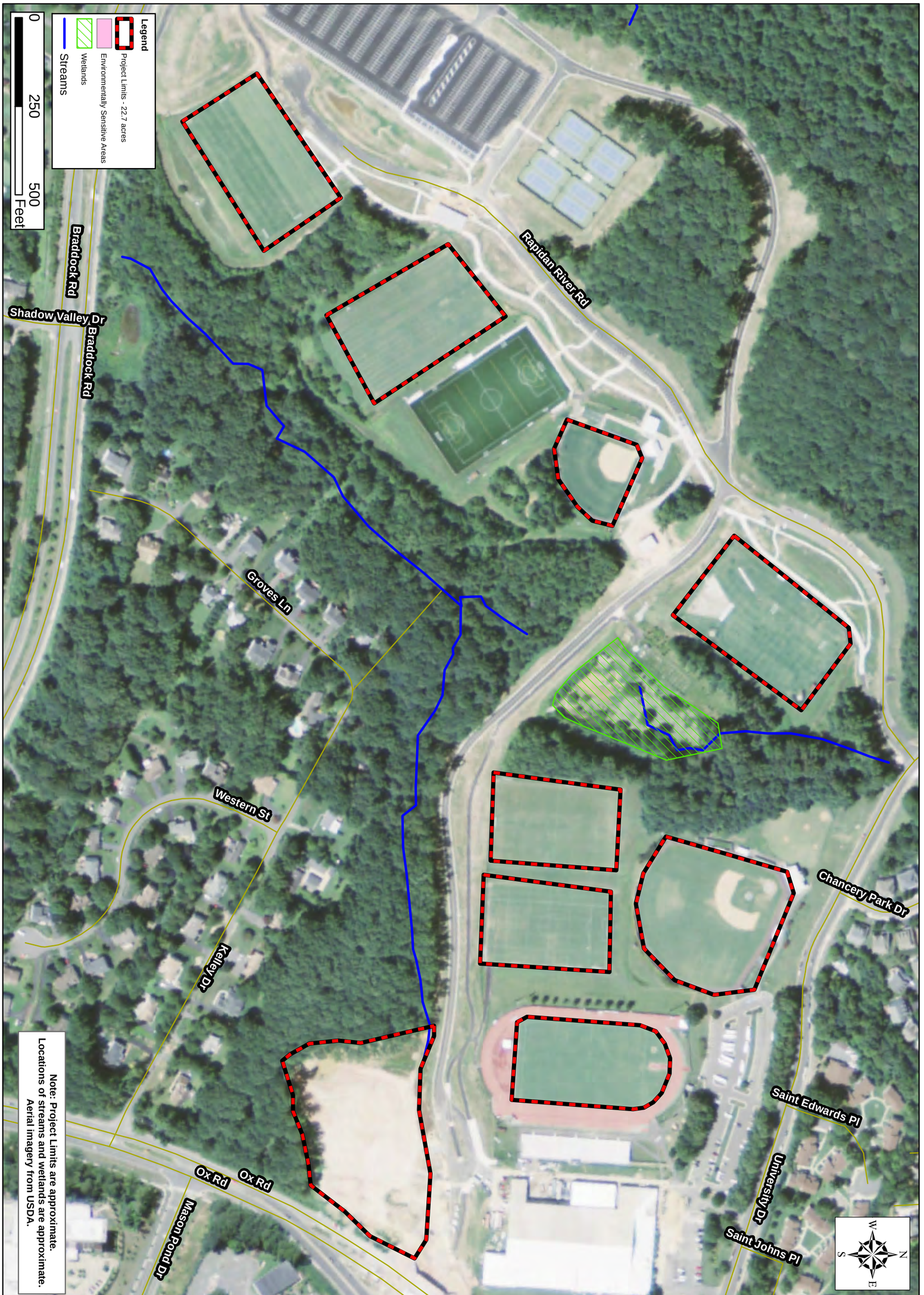
FAIRFAX COUNTY, VIRGINIA

FIGURE 2: ENVIRONMENTAL INVENTORY MAP

SHEET NO.	1 OF 1
JOB NUMBER	36158.004
SCALE	1" = 250'
CHECKED BY	E. VIRTS
DESIGNED BY	B. NORRIS
DRAWN BY	B. NORRIS
DATE	08/13/2015

DATE	REVISION DESCRIPTION

Path: Y:\804\36158.004-GMU_Nutrient_Mgmt_Pl\GIS\Common Shared Exhibits\36158 - EIM - Athletic Field.mxd



TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS

THIS DRAWING PREPARED AT THE CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1648 www.timmons.com

Site Development | Residential | Infrastructure | Technology | Environmental

MASON ATHLETIC FIELDS - NUTRIENT MANAGMENT PLAN

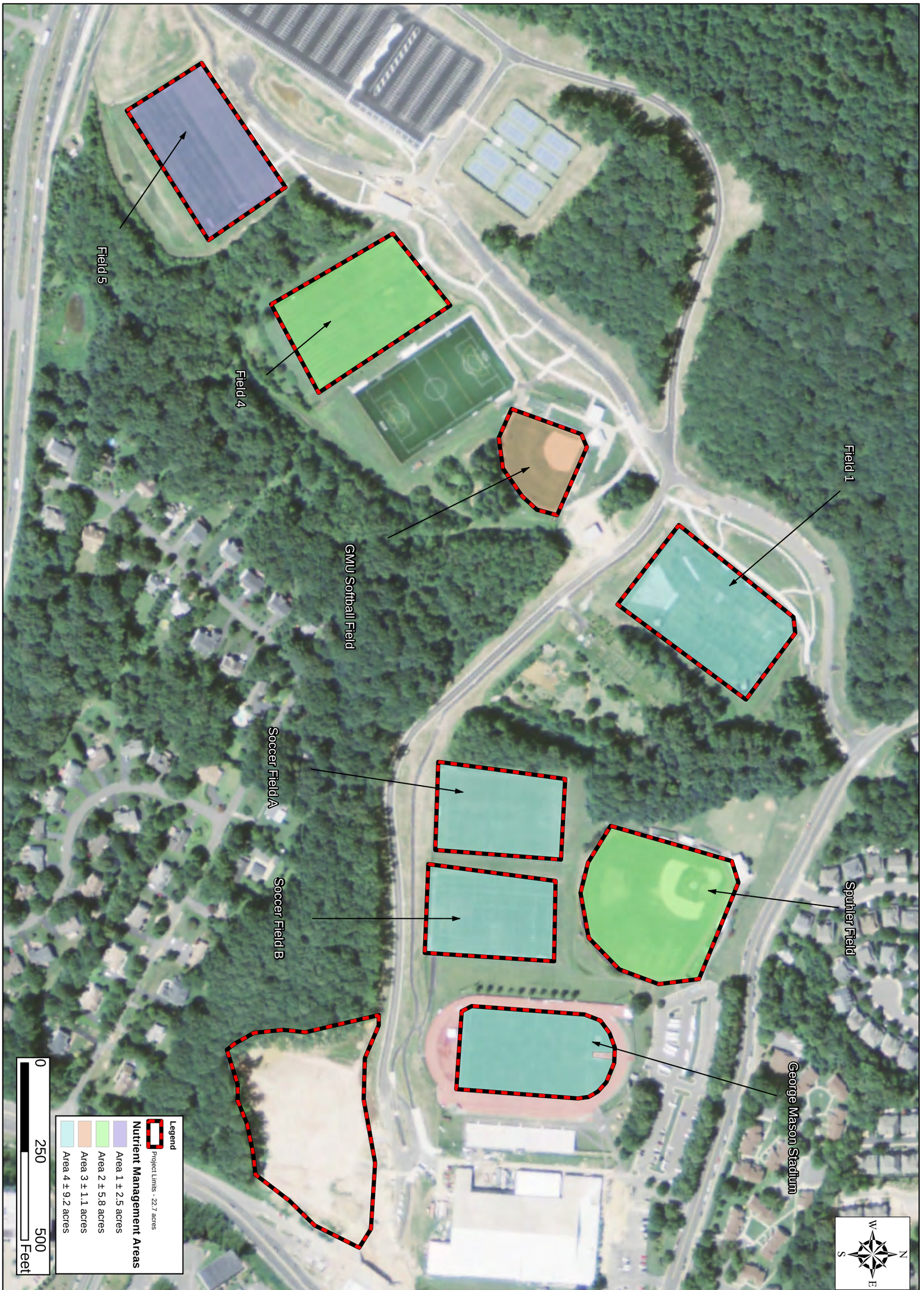
FAIRFAX COUNTY, VIRGINIA

FIGURE 3: ENVIRONMENTALLY SENSITIVE AREAS MAP

SHEET NO.	JOB NUMBER	SCALE	CHECKED BY	DESIGNED BY	DRAWN BY	DATE
1 OF 1	36158.004	1" = 250'	E. VIRTS	B. NORRIS	B. NORRIS	08/13/2015

DATE	REVISION DESCRIPTION

Path: Y:\804\36158.004-GMU_Nutrient_Mgmt_Pl\GIS\Common Shared Exhibits\36158 - AF - NMA.mxd



TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS

THIS DRAWING PREPARED AT THE CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1648 www.timmons.com

Site Development | Residential | Infrastructure | Technology | Environmental

MASON ATHLETIC FIELDS - NUTRIENT MANAGMENT PLAN

FAIRFAX COUNTY, VIRGINIA

FIGURE 4: NUTRIENT MANAGEMENT AREAS

SHEET NO.	JOB NUMBER	SCALE	CHECKED BY	DESIGNED BY	DRAWN BY	DATE
1 OF 1	36158.004	1" = 250'	E. VIRTS	B. NORRIS	B. NORRIS	08/13/2015

DATE	REVISION DESCRIPTION

APPENDIX A
SOIL TEST SUMMARIES

Soil Test Summary - Athletic Fields

Customer Name:	Mason - Athletic Fields
Testing Lab:	Virginia Tech Soil Testing Laboratory
Sample Date:	6/24/2015
Planner Name	Ethan Virts
Certification Number	Certification #: 816

Managed Area ID	Soil pH	Buffer pH	Lab Test P (ppm)	Lab Test P (lbs/A)	VT (H/M/L)	Lab Test K (ppm)	Lab Test K (lbs/A)	VT (H/M/L)	Species
Field 1	5.6	6.28	27	54	H-	70.5	141	M	Bermudagrass
Field 4	5.7	6.28	43	86	H+	34	68	L+	Bermudagrass
Field 5	5.4	6.12	10	20	M-	62	124	M	Bermudagrass
George Mason Stadium	5.5	6.25	18.5	37	H-	30	60	L+	Bermudagrass
GMU Softball Field	6.2	6.37	63	126	VH	180	360	VH	Bermudagrass
Soccer Field A	5.4	6.09	14	28	M	79.5	159	M+	Bermudagrass
Soccer Field B	6.4	6.34	20	40	H-	83.5	167	M+	Bermudagrass
Spuhler Field	6.2	6.35	31.5	63	H	86	172	M+	Bermudagrass

Notes:

APPENDIX B
NUTRIENT APPLICATION WORKSHEETS

NAME:	Mason - Athletic Fields									
Prepared:	8/14/15				Species:		Bermudagrass			
Expires:	8/14/18									
Management Area	Application Month/Day	# of Apps	Application Interval	Fertilizer Type	Total NPK lbs/1000ft^2					
					N	-	P_2O_5	-	K_2O	
Management Area #1	4/10 to 5/10	2	>15 days	Water Soluble	0.35	-	2.0	-	1.0	
	5/10 to 9/25	4	>30 days	Water Soluble	0.70	-	0.0	-	0.0	
	9/25 to 10/25	2	> 15 days	Water Soluble	0.35	-	0.0	-	0.0	
	*Recommended Total Annual Application				4.20	-	2.0	-	1.0	
Management Area #2	4/10 to 4/25	1		Water Soluble	0.35	-	0.5	-	2.0	
	4/26 to 9/25	10	> 15 days	Water Soluble	0.35	-	0.0	-	0.0	
	*Recommended Total Annual Application				3.85	-	0.5	-	2.0	
Management Area #3	4/10 to 4/25	1		Water Soluble	0.35	-	0.0	-	0.0	
	4/26 to 9/25	10	> 15 days	Water Soluble	0.35	-	0.0	-	0.0	
	*Recommended Total Annual Application				3.85	-	0.0	-	0.0	
Management Area #4	4/10 to 4/25	1		Water Soluble	0.35	-	1.0	-	2.0	
	4/26 to 9/25	10	> 15 days	Water Soluble	0.35	-	0.0	-	0.0	
	*Recommended Total Annual Application				3.85	-	1.0	-	2.0	

Notes:	*The fertilizer recommendations listed above can be in the form of several different fertilizer products. However, the nutrient thresholds listed above are the maximums that should not be exceeded when applying water soluble nitrogen fertilizers. For additional details when using Water insoluble nitrogen sources please reference sections 3.3 and 3.4 of the George Mason University - Athletic Fields Nutrient Managmeent Plan. The first nitrogen application should not be made until complete green-up of turf. *The full annual application of Phosphorus (P_2O_5) and Potassium (K_2O) should take place at the same time as the first nitrogen application. Phosphorus application should not take place in the form of 10-10-10 or 5-10-10 fertilizers in this management area due to high content of phosphorus in the soil already.
Management Area #1 Lime Recommendations:	Field 5: This soil sampling area requires 100 lbs of agricultural lime (ground, pulverized, or pelletized) per 1,000 sq. ft.. This lime application should take place in at least two applications of 50 lbs per 1,000 sq. ft. or less, at intervals of 1 to 6 months, until the full 100 lb. amount is applied.
Management Area #2 Lime Recommendations:	Field 4: This soil sampling area requires 40 lbs of agricultural lime (ground, pulverized, or pelletized) per 1,000 sq. ft.. The total 40 lbs. of lime can be applied in one application. Spuhler Field: This soil sampling area requires 20 lbs of agricultural lime (ground, pulverized, or pelletized) per 1,000 sq. ft.. The total 20 lbs. of lime can be applied in one application.
Management Area #3 Lime Recommendations:	GMU Softball Field: This soil sampling area requires 20 lbs of agricultural lime (ground, pulverized, or pelletized) per 1,000 sq. ft.. The total 20 lbs. of lime can be applied in one application.
Management Area #4 Lime Recommendations:	Field 1: This soil sampling area requires 40 lbs of agricultural lime (ground, pulverized, or pelletized) per 1,000 sq. ft. The total 40 lbs. of lime can be applied in one application. Soccer Field A: This soil sampling area requires 100 lbs of agricultural lime (ground, pulverized, or pelletized) per 1,000 sq. ft.. This lime application should take place in at least two applications of 50 lbs per 1,000 sq. ft. or less, at intervals of 1 to 6 months, until the full 100 lb. amount is applied. Soccer Field B: Already has a sufficient Soil pH. No lime application is needed George Mason Stadium: This soil sampling area requires 50 lbs of agricultural lime (ground, pulverized, or pelletized) per 1,000 sq. ft. The total 50 lbs. of lime can be applied in one application. Soil pH tests can be conducted annually to determine if additional lime is needed to raise the soil pH during years 2 and 3 of this nutrient management plan implementation.

APPENDIX C
FERTILIZER APPLICATION RECORDS

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Mason - Athletic Fields	Management Area ID:	
Address:	4400 University Drive	Management Area Size:	
	Fairfax, Virginia 22030	Plant Species:	
		Notes:	
Phone #:			

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
For information on calibration see Chapter 10 of the "Urban Nutrient Management Handbook".
Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

APPENDIX D
REFERENCE MATERIALS

Figure 6-1

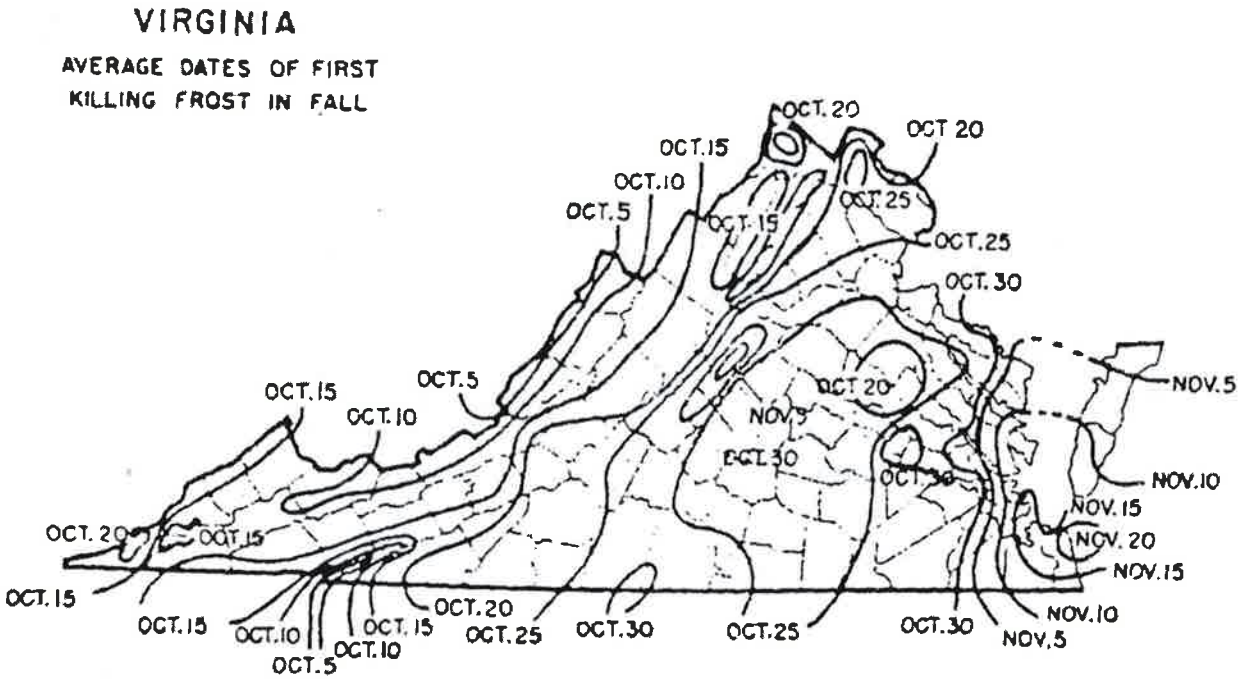
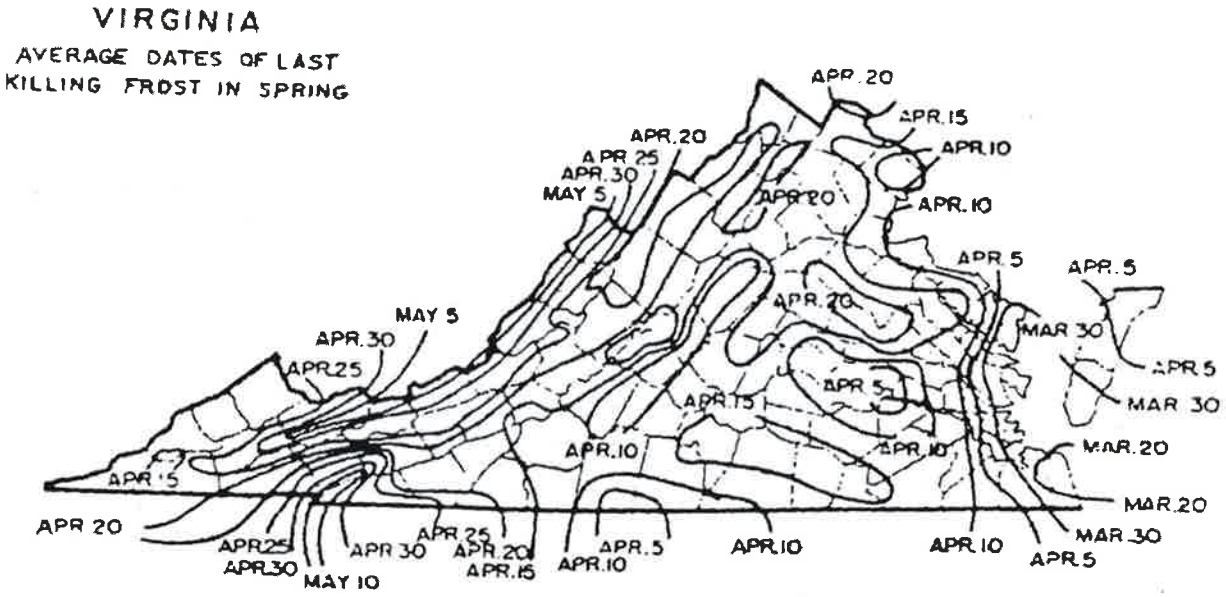


Figure 6-2



Nitrogen Management on Athletic Fields - Warm Season Grasses

The following comments apply to both Naturally Occurring or Modified Sand based Fields and Predominantly Silt/Clay Soil Fields:

- Annual nitrogen rates for warm season grasses shall not exceed **4 pounds** in areas which have the average first killing frost on or before October 20, and shall not exceed **5 pounds** in areas which have the average first killing frost after October 20 as shown in Figure 6-1. Nitrogen rates and timings for overseeding warm season grasses are not included in these rates.
- April 15 - May 15 applications should not be made until after complete green-up of turf.
- Nitrogen applications June through August should be coordinated with anticipated rainfall if irrigation is not available.
- Use the lower end of the ranges for non-irrigated fields and the higher end of the ranges should be used on fields with irrigation.
- Nitrogen rates towards the higher end of the ranges may be applied on heavily used fields to accelerate recovery, however per application and annual rates cannot be exceeded.

Bermudagrass - Predominantly Silt/Clay Soil Fields [a]		
When to Apply[b]	**Pounds per 1,000 ft² Nitrogen**	**First Fall Killing Frost Date[b]**
April 15 - May 15	0.5 - 0.7 [(c)]	Before Oct. 20
June	0.7	
July	0.5 - 0.7 [(d)]	
August	0.5 - 0.7 [(d)]	
Sept 1 - Sept 15	0.5 - 0.7 [(c)]	After Oct. 20
If overseeded with perennial ryegrass		
Oct - Nov	0.5 [(e)]	
Feb-Mar	0.5 [(e)]	

Bermudagrass - Naturally Occurring or Modified Sand based Fields [a]		
When to Apply[b]	**Lbs/1,000 ft² Nitrogen[c]**	**First Fall Killing Frost Date[b]**
April 15 - May 15	0.5 - 0.7 [(c)]	Before Oct. 20
June	0.7 [(c)]	
July	0.7 [(c)]	
August	0.7 [(c)]	
Sept 1 - Sept 15	**0.7 [(c)]**	**After Oct. 20**
If overseeded with perennial ryegrass		
Oct - Nov	0.5 [(e)]	
Feb - Mar	0.5 [(e)]	

The following notes apply to both of the Bermudagrass tables above:

(a) In the Piedmont and the Ridge and Valley areas of Virginia, the existing native soil will normally be comprised predominantly of clay and/or silt and these soils have inherently

lower water infiltration and percolation rates and greater nutrient holding capacity. However, most areas of the Coastal Plain have existing native soils that are predominantly sandy textured soils and other facilities throughout the state may choose to install modified soil root zones that are predominantly sand (>50%) in order to maximize drainage and reduce compaction tendency. If subsurface drain tile surrounded by sand and/or gravel has been installed under the playing surface of any of these fields, their nitrogen programs should be managed as predominantly sand-based systems to minimize nutrient leaching.

(b) The beginning and ending dates for application of nitrogen shall be determined using guidance and frost date maps contained in the Season of Application for Nitrogen section, Figures 6-1 and 6-2.

(c) WSN must be applied as two applications not to exceed 0.35 pounds per 1,000 ft^2 each with a minimum of 15 days between applications. Alternatively, using a material that contains slowly available nitrogen sources, split applications of 0.5 pounds per 1,000 ft^2 may be applied with a minimum of 15 days between applications.

(d) If a material containing slowly available forms of nitrogen is used, rates up to 1.0 pounds of nitrogen per 1,000 ft^2 may be applied in a single application with a minimum of 30 days between applications.

(e) For overseeded warm season grasses, an additional 0.7 pounds per 1,000ft^2 of WSN may be applied in the Fall after the perennial ryegrass overseeding is well established. The WSN must be applied as two applications not to exceed 0.35 pounds per 1,000 ft^2 of nitrogen each, with a minimum of 15 days between applications. Additional WSN application of 0.5 pounds per 1,000 ft^2 may be made in February-March to overseeded perennial ryegrass if growth and color indicate need. Alternatively, split applications of 0.5 pounds of nitrogen per 1,000 ft^2 each with a minimum of 15 days between applications may be applied using a material containing slowly available nitrogen sources.

Phosphorus and Potassium Recommendations Athletic Fields
Apply phosphorus (P_2O_5) and potassium (K_2O) fertilizers as indicated by a soil test using the following guidelines:

Soil Test Level	Nutrient Needs (pounds per 1000 ft^2)*	
	P_2O_5	K_2O
L	2-3	2-3
M	1-2	1-2
H	0.5-1	0.5-1
VH	0	0

* For the lower soil test level within a rating, use the higher side of the range and for higher soil test level within a rating use the lower side of the recommendation range.

- For irrigated turf grown on Naturally Occurring and Modified Sand Based soils only, up to 0.5 pounds of P_2O_5 per 1,000 ft^2 may be applied, if needed, to aid in recovery of damaged turf during times of extreme use. No phosphorus applications shall be made when the soil phosphorus test level is above 65% saturation, based on the soil test phosphorus values and region as listed in Table 4-1 of Section IV.

- Avoid the general use of high phosphorus ratio fertilizers such as 10-10-10 or 5-10-10, unless soil tests indicate phosphorus availability below the M+ level.

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

1001 Boulders Parkway
Suite 300
Richmond, VA 23225

P 804.200.6500
F 804.560.1016
www.timmons.com

August 14, 2015

Mr. Derik Cataldi
Urban Nutrient Management Specialist
Virginia Department of Conservation and Recreation
600 East Main Street, 24th Floor
Richmond, Virginia 23219

Re: Nutrient Management Plan
George Mason University
Science and Technology Campus
Manassas, Virginia

Dear Mr. Cataldi:

On behalf of George Mason University, Timmons Group has prepared this Nutrient Management Plan in accordance with the *Virginia Nutrient Management Standards and Criteria, revised July 2014*. This Nutrient Management Plan encompasses the approximately 29.17 acre area that contains turfgrass and could receive fertilizer applications at the George Mason University – Science and Technology Campus. Will you review the enclosed nutrient management plan and provide DCR approval?

Please feel free to contact me at (804) 200-6414, ethan.virts@timmons.com, or Bill Vest at (703) 554-6705, bill.vest@timmons.com, if you require additional information, or have any questions or additional recommendations.

Sincerely,

Timmons Group

Ethan Virts, PWS
Certified Nutrient Management Planner (No. 816)

Enclosures:

George Mason University – Science and Technology Campus Nutrient Management Plan

GEORGE MASON UNIVERSITY
SCIENCE AND TECHNOLOGY CAMPUS
NUTRIENT MANAGEMENT PLAN

DIRECTOR OF FACILITIES

GEORGE MASON UNIVERSITY
ZHONGYAN XU, PHD, PE, CFM
PROJECT MANAGEMENT AND CONSTRUCTION, FACILITIES
703-993-4051 (P)
ZXU8@GMU.EDU

NUTRIENT MANAGEMENT PLANNER INFORMATION

ETHAN VIRTS
1001 BOULDERS PARKWAY, SUITE 300
RICHMOND, VA 23225
804-200-6414 (P)
ETHAN.VIRTS@TIMMONS.COM
VIRGINIA NUTRIENT MANAGEMENT PLANNER CERTIFICATION # 816

LOCATION INFORMATION

10900 UNIVERSITY BOULEVARD
MANASSAS, VA 20110
38° 45' 18.2" N
77° 31' 25.5" W
BROAD RUN-ROCKY BRANCH WATERSHED
6TH ORDER NATIONAL WETLAND BOUNDARY DATASET CODE: PL34

ACREAGE

TOTAL TURF ACREAGE: 29.17 ACRES

PLAN START DATE: 8/14/2015
PLAN END DATE: 8/14/2018

ETHAN VIRTS

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

TIMMONS GROUP PROJECT NO. 36158.004

GEORGE MASON UNIVERSITY – SCIENCE AND TECHNOLOGY CAMPUS
NUTRIENT MANAGEMENT PLAN

TABLE OF CONTENTS

FIGURES

APPENDICES

1.0 STATEMENT OF COMPLIANCE

The George Mason University (Mason) agrees to comply with all requirements set forth in the *Nutrient Management Training and Certification Regulations 4VAC50-85*, and to follow recommendations for turf fertilization and management as described in the *Virginia Nutrient Management Standards and Criteria, revised July 2014*. This includes implementing this Nutrient Management Plan and maintaining fertilization records. All nutrient applications performed by Mason staff or associated contractors shall comply with the provisions of this Nutrient Management Plan as of August 14, 2015. This plan is effective for three years (until August 14, 2018) or until major changes to maintenance practices or grounds conditions occur. Mason is committed to environmental sustainability and adhering to a Nutrient Management Plan in order to protect the water quality of downstream aquatic resources while optimizing the health and performance of turf species.

2.0 SITE LOCATION AND DESCRIPTION

The Mason – Science and Technology Campus (Site) is located in the central portion of Prince William County, along Prince William Parkway (State Route 234), and encompasses approximately +/- 75 acres. The Site is located approximately one mile east of the Broad Run River and contains predominately flat topography (see Figure 1: Vicinity Map). The Site generally drains south to three separate stormwater treatment BMPs located along the southern property boundary and continues draining offsite to the southeast into an unnamed tributary. This unnamed tributary drains to Cannon Branch, which ultimately flows into the Potomac River. The Site is located within the Broad Run-Rocky Branch Watershed (VAHU6 PL34) and the Piedmont physiographic province.

The Site consists of the campus buildings, twelve paved parking areas, and maintained lawns that surround the campus. All turfgrass areas onsite are dominated by tall fescue. Several areas of ornamental plantings and flowerbeds are intermittently dispersed throughout the campus.

2.1 Environmentally Sensitive Areas

All areas within the project limits were evaluated based on susceptibility of nutrient loss to ground and surface water. Two soil complexes mapped onsite include the Catlett soil series in their description. This soil series is listed as H (high) for Environmental Sensitivity Rating due to shallow soils less than 41 inches deep likely to be located over fractured or limestone bedrock. However, during the site evaluation performed by Timmons Group on June 24, 2015, no bedrock was encountered at 41 inches and therefore the soils are not considered to be consistent with the NRCS description. As a result, no areas within the site limits are categorized as environmentally sensitive as depicted in Figure 3: Environmentally Sensitive Areas Map.

Subsurface Drains: There are no subsurface tile drains located on the Site. There is a large underground stormwater conveyance system present. Surface water runoff generally drains off of the campus turf areas and impervious surfaces to this underground stormwater system via drop inlets, and outfalls directly to stormwater BMPs.

Soils: The NRCS soil survey map depicts twelve distinct soil series present onsite, the majority of which are moderately well to well drained silt loam soils. Both the Catlett-Sycoline complex, 2 to 7 percent slopes (13B) and the Catlett-Sycoline complex, 7 to 15 percent slopes (13C) are listed as H (high) for Environmental Sensitivity Rating due to shallow soils less than 41 inches deep likely to be located over fractured or limestone bedrock. However, during the site evaluation no bedrock was encountered at 41 inches and therefore the soils are not considered to be consistent with the NRCS description.

Streams and Wetlands: An intermittent stream flows southwest through the central portion of the Site to the stormwater BMP pond located adjacent to University Boulevard. This stormwater BMP drains into an unnamed tributary of Cannon Branch. No wetlands were found to be present within the site limits during the June 24, 2015 site visit. Several wetland systems and intermittent streams surround the Site as seen on Figure 3: Environmentally Sensitive Areas Map.

Other Environmentally Sensitive Areas: There were no wells, springs, sinkholes, rock outcrops, or land with slopes steeper than 15% identified during the June 24, 2015 site visit.

2.2 Fertilization Season

The recommended season of application for nitrogen fertilizers for all turf species at the Site are shown in Table 2.1 – Fertilization Season at Mason – Science and Technology Campus.

Table 2.1 – Fertilization Season at Mason – Science and Technology Campus

	Killing Frost Dates	Cool Season Applications (All Turf Areas Onsite)
Spring	April 10	February 27
Fall	October 25	December 6

3.0 SOIL SAMPLING METHODS, MANAGEMENT AREAS, AND NUTRIENT RECOMMENDATIONS

3.1 Soil Sampling Methods and Management Areas

A total of 10 soil samples were taken from campus lawns throughout the Site. Soil samples were collected from turfgrass areas at the meadow north of Beacon Hall, Beacon Hall, Hylton Performing Arts Building, Life Science/Discovery Buildings, Freedom Aquatic Center, Vivarium Trailer, Bio-Medical Research Building, Parking Areas A, B, and C, and Occoquan/Bull Run Hall lawns. At least 10 sub-samples from each area were randomly taken from within the upper four inches of soil and mixed to create a representative sample of each area. The soil samples were collected on June 24, 2015 and analyzed at the Virginia Tech soils laboratory.

These ten sample areas were categorized into two different management areas based on the soil test results and turfgrass species present. These nutrient management areas are

shown in Figure 4: Nutrient Management Areas Map. Figure 4 should be used as a reference when interpreting nutrient recommendations in Table 3.1 on pages 4 of this document.

For all the nutrient management areas, applications of inorganic fertilizers will not occur on frozen or snow-covered ground. Any fertilizers that make their way onto impervious surfaces such as parking lots or sidewalks should be swept or blown back into pervious, or turfgrass covered areas. Furthermore, fertilizers will not be used as ice melt.

3.2 Lime and Nutrient Recommendations

The lime and nutrient recommendations for the campus lawns within the Site are shown in Table 3.1: Mason – Science and Technology Campus Lime and Nutrient Recommendations on the next page. The lime and nutrient recommendations in this table are based on the *Virginia Nutrient Management Standards and Criteria, revised July 2014*. All campus lawns within Management Area 2 onsite have an appropriate pH and require no lime application. The three lawns within Management Area 1 require lime applications in order to obtain a desirable soil pH. These lime applications should be completed in small applications of up to 50 pounds, each at intervals of 1 to 6 months, until the full amount is applied in the form of ground, pulverized, or pelletized agricultural limestone.

The annual maximum nitrogen application for all turfgrass areas onsite is 3.5 lbs. per 1,000 square feet (SF). Per application rates of nitrogen vary depending on whether water soluble nitrogen (WSN) or water insoluble nitrogen (WIN) fertilizers are used. WSN should be applied at a rate no greater than 0.7 lbs. per 1,000 SF at intervals no less than 30 days apart, between the dates of February 27 and December 6. WIN can be applied at a rate no greater than 0.9 lbs. per 1,000 SF at intervals no less than 30 days apart, between the dates of February 27 and December 6. The first nitrogen application, which must occur after February 27, should not be made until after complete green-up of turf.

The entire phosphorus (P_2O_5) and Potassium (K_2O) annual applications can be performed with the first application of nitrogen, or can also be applied before green-up of grass in late winter or early spring if the ground is not frozen. The recommended potassium application rates in some areas are greater than the amount specified in the soil lab analyses results. At this time, potassium is not considered to be an environmental concern that negatively impacts water quality, so slight over application of this nutrient only contributes to health and vigor of turfgrass.

Table 3.1: Mason – Science and Technology Campus Lime and Nutrient Recommendations

MANAGEMENT AREA #	SOIL SAMPLE AREA	SOIL pH	LIME REC. (LBS/1000 SF)	PHOSPHORUS (P_2O_5) REC. (LBS/1,000 SF)	POTASSIUM (K_2O) REC. (LBS/1,000 SF)
1	Bio Medical Research Center	5.8	120	2	1
	Meadow Area	6.1	70	2	1
	Vivarium Trailer	6.1	100	2	1
2	Freedom Aquatic Center	7.5	0	1	2
	Hylton Performing Arts and Beacon Hall	6.8	0	1	2
	Life Sciences and Discovery Buildings	6.9	0	1*	2
	Occoquan Building and Bull Run Hall	6.6	0	1*	2
	Parking Area A	7.2	0	1	2
	Parking Area B	7.1	0	1*	2
	Parking Area C	7.1	0	1	2

*****Due to high phosphorus levels, fertilizers in the form of 10-10-10 or 5-10-10 should not be used.

- Agricultural limestone (ground, pulverized, or pelletized) should be broadcast in small applications of up to 50 lbs. per 1000 SF, at intervals of 1 to 6 months, until the full amount is applied.
- Nitrogen applications may not exceed 3.5 lbs per 1,000 SF annually.
- No more than 0.7 lbs of WSN or 0.9 lbs of WIN per 1,000 SF, may be applied within a 30 day period.

3.4 Ornamental Landscape

During soil sampling it was observed that the *in situ* soil profile beneath the flower beds and ornamental landscape areas were generally the same as adjacent turf areas. Additionally, the ornamental flower beds, trees, and shrubs are fertilized upon installation and on an as-needed basis. It is recommended that the soil test results of nearby turf areas be considered when applying fertilizer to ornamental planting areas. Nutrient needs in the ornamental landscapes are variable and dependent on a variety of factors including maintenance objectives, the age of the plant, plant stress levels, and a visual inspection of the plant. Tables of recommended fertilization rates for newly planted and established ornamentals are included in Appendix D: References.

4.0 MAINTENANCE OF PLAN

This Nutrient Management Plan will be maintained by Mason and will expire on August 14, 2018. As part of this plan, fertilizer application records shall be recorded and maintained (see Appendix C: Fertilizer Application Records). If significant changes to the Site occur, this plan is required to be updated accordingly by a Virginia Certified Nutrient Management Planner. Significant changes would include: changing turf species in the campus grounds, renovating a lawn or the existing underlying soil, creation of athletic fields, expansion of the area to be included under this Nutrient Management Plan or other changes that could alter nutrient recommendations and timing.

5.0 NUTRIENT APPLICATION, INCORP., AND SPECIAL CONDITIONS

There are multiple drop inlets associated with the underground stormwater system onsite. This drainage system ultimately outfalls to several stormwater BMPs that are designed to remove sediment and nutrients from stormwater. Special care should be taken to avoid applying fertilizers directly on top of drop inlet structures. No fertilizer should be applied to stormwater BMPs as these facilities already receive excess nutrients during stormwater events. Nutrient applications should not be completed when a significant runoff producing events are anticipated. Applying only water insoluble nitrogen, or slowly available forms of nitrogen, will help minimize the nutrient loss potential.

Special care should be taken when applying fertilizers near impervious surfaces, streams, and wetlands. Allowing vegetation to grow taller near stream and wetland areas would help prevent offsite nutrient loss that could result from fertilizer application errors, or significant runoff producing storm events.

6.0 REFERENCES

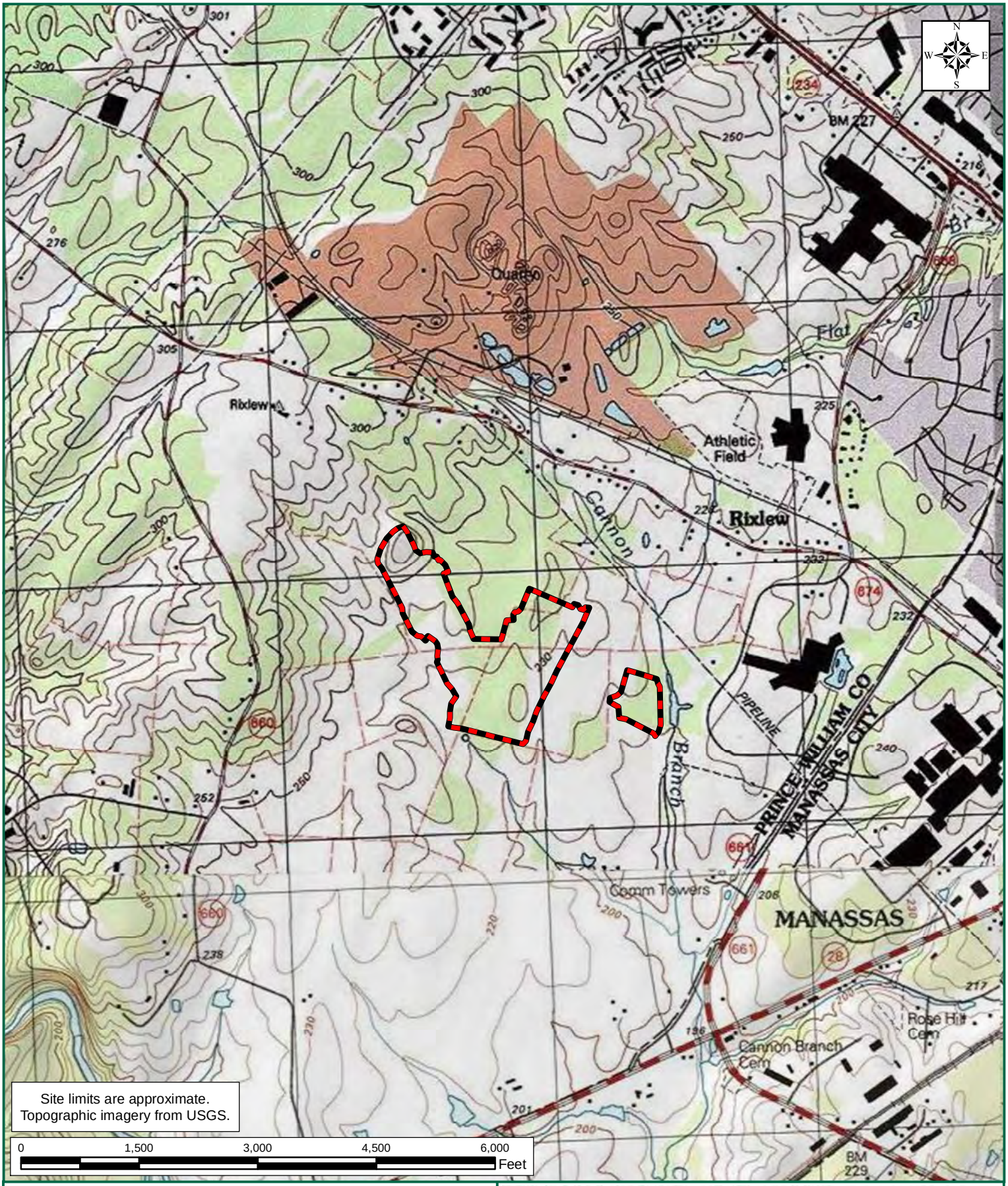
VADCR. November 2014. Nutrient Management Training and Certification Regulations 4VAC50-85. Virginia Soil and Water Conservation Board.

VADCR. July 2014. Virginia Nutrient Management Standards and Criteria. Division of Soil and Water Conservation: Richmond, VA.

Virginia Cooperative Extension. May 2011. Urban Nutrient Management Handbook. Funding by: VADCR; Produced by: Virginia Polytechnic Institute and State University.

FIGURES

Path: Y:\804\36158.004-GMU_Nutrient_Mgmt_Pl\GIS\Common Shared Exhibits\36158 - VIC -PW1.mxd



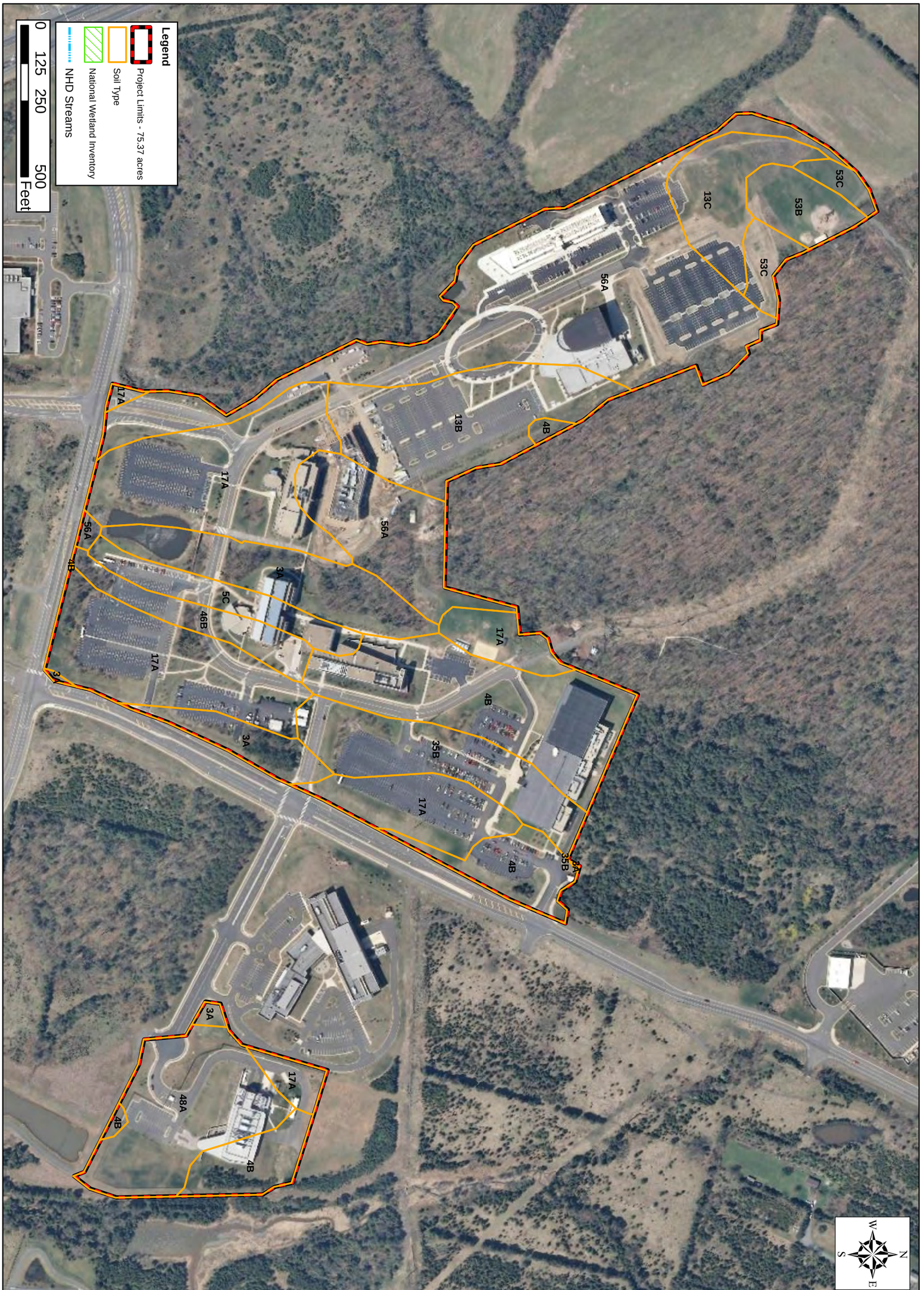
MASON - SCIENCE AND TECHNOLOGY CAMPUS
NUTRIENT MANAGEMENT PLAN
PRINCE WILLIAM COUNTY, VIRGINIA
FIGURE 1: VICINITY MAP

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

TIMMONS GROUP JOB NUMBER: *36158.004*
PROJECT STUDY LIMITS: *75.37 ACRES*
LATITUDE: *38° 45' 18.2" N*
LONGITUDE: *77° 31' 25.5" W*

U.S.G.S. QUADRANGLE(S): *GAINESVILLE*
DATE(S): *1998*
WATERSHED(S): *MIDDLE POTOMAC-ANCOSTIA-OCCOQUAN*
HYDROLOGIC UNIT CODE(S): *02070010*

Path: Y:\804\36158.004-GMU_Nutrient_Mgmt_Pl\GIS\Common Shared Exhibits\36158 - PW - EIM.mxd



TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS

THIS DRAWING PREPARED AT THE CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1648 www.timmons.com

Site Development | Residential | Infrastructure | Technology | Environmental

SHEET NO. 1 OF 1

JOB NUMBER 36158.004

MASON - SCIENCE AND TECHNOLOGY CAMPUS - NUTRIENT MANAGEMENT PLAN

PRINCE WILLIAM COUNTY, VIRGINIA

FIGURE 2: ENVIRONMENTAL INVENTORY MAP

SCALE 1" = 250'

CHECKED BY E. VIRTS

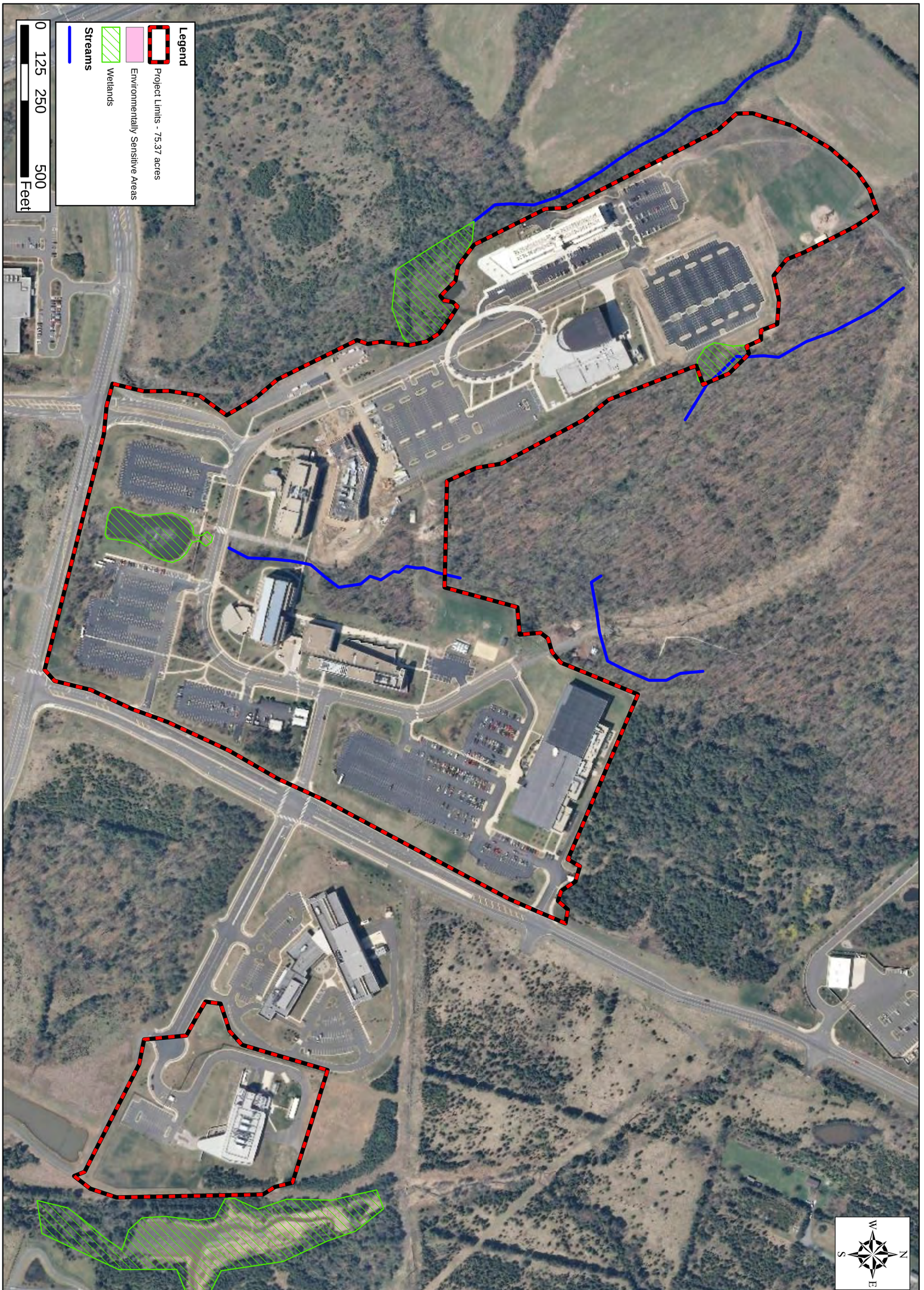
DESIGNED BY C. CHAPPELL

DRAWN BY B. NORRIS

DATE 07/21/2015

DATE	REVISION DESCRIPTION

Path: Y:\804\36158.004-GMU_Nutrient_Mgmt_Pl\GIS\Common Shared Exhibits\36158 - PW - EIM.mxd



TIMMONS GROUP

YOUR VISION ACHIEVED THROUGH OURS

THIS DRAWING PREPARED AT THE CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1648 www.timmons.com

Site Development | Residential | Infrastructure | Technology | Environmental

SHEET NO. 1 OF 1

JOB NUMBER 36158.004

MASON - SCIENCE AND TECHNOLOGY CAMPUS - NUTRIENT MANAGEMENT PLAN

PRINCE WILLIAM COUNTY, VIRGINIA

FIGURE 3: ENVIRONMENTALLY SENSITIVE AREAS MAP

SCALE 1" = 250'

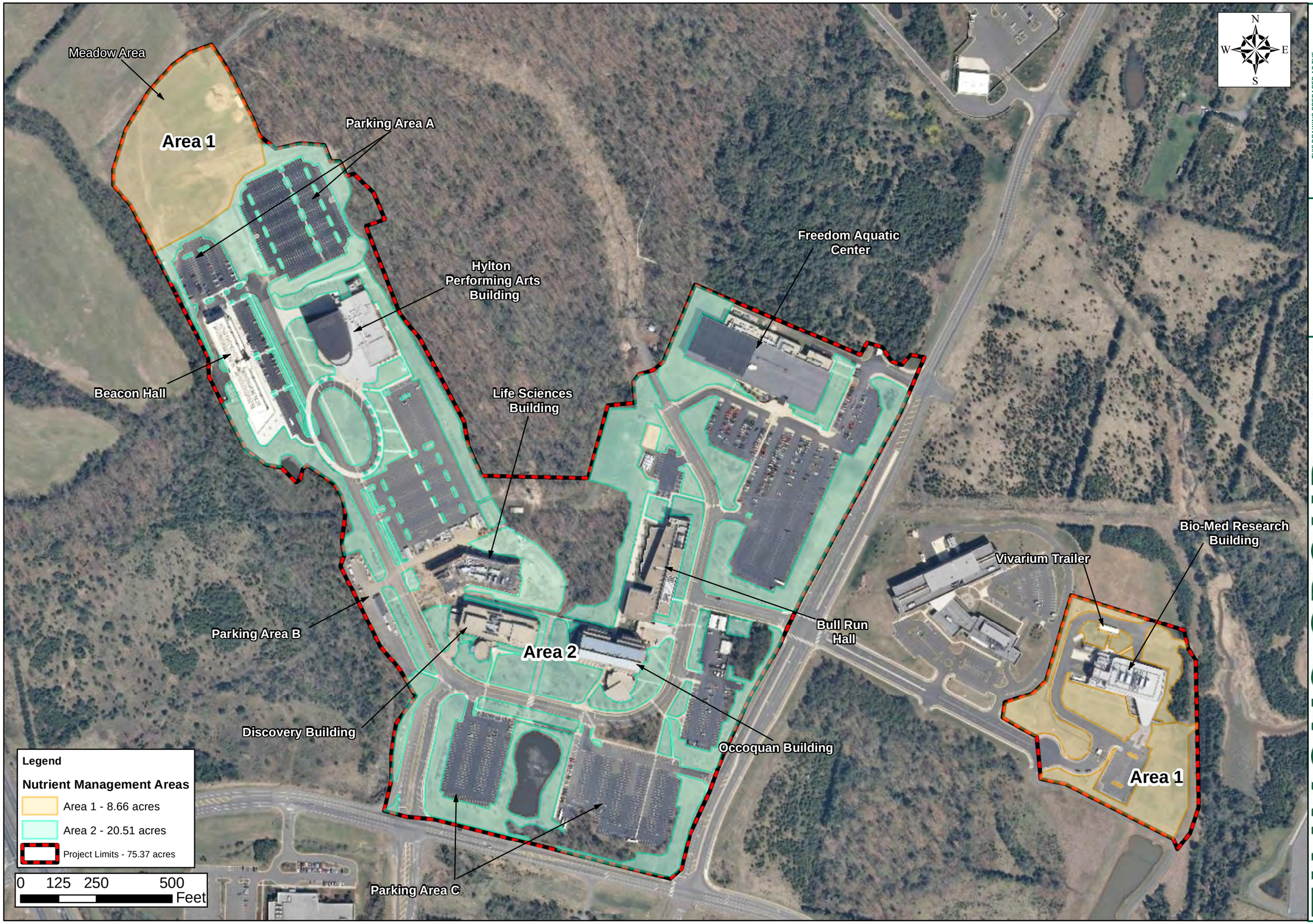
CHECKED BY E. VIRTS

DESIGNED BY C. CHAPPELL

DRAWN BY B. NORRIS

DATE 07/21/2015

DATE	REVISION DESCRIPTION



Path: Y:\804\36158.004-GMU_Nutrient_Mgmt_Plt\GIS\Common Shared Exhibits\36158 - PW - NMA.mxd

THIS DRAWING PREPARED AT THE CORPORATE OFFICE
1001 Boulders Parkway, Suite 300 | Richmond, VA 23225
TEL 804.200.6500 FAX 804.560.1648 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS

Site Development | Residential | Infrastructure | Technology | Environmental

DATE	REVISION DESCRIPTION

DATE 07/21/2015
DRAWN BY B. NORRIS
DESIGNED BY C. CHAPPELL
CHECKED BY E. VIRTS
SCALE 1" = 250'

TIMMONS GROUP

MASON - SCIENCE AND TECHNOLOGY CAMPUS - NUTRIENT MANAGEMENT PLAN
PRINCE WILLIAM COUNTY, VIRGINIA

FIGURE 4: NUTRIENT MANAGEMENT AREA MAP

JOB NUMBER 36158.004
SHEET NO. 1 OF 1

APPENDIX A
SOIL TEST SUMMARIES

Soil Test Summary - Campus Lawns

Customer Name:	Mason - Science and Technology Campus
Testing Lab:	Virginia Tech Soil Testing Laboratory
Sample Date:	6/24/2015
Planner Name	Ethan Virts
Certification Number	Certification #: 816

Managed Area ID	Soil pH	Buffer pH	Lab Test P (ppm)	Lab Test P (lbs/A)	VT (H/M/L)	Lab Test K (ppm)	Lab Test K (lbs/A)	VT (H/M/L)	Species
Bio Medical Research Center	5.8	6.03	4.5	9	L+	57	114	M	Tall Fescue
Freedom Aquatic Center	7.5	-	14.5	29	L+	81.5	163	M+	Tall Fescue
Hylton Performing Arts and Beacon Hall	6.8	6.36	11	22	M	73.5	147	M	Tall Fescue
Life Sciences and Discovery Hall	6.9	6.39	16	32	M+	101	202	H-	Tall Fescue
Meadow Area	6.1	6.19	5.5	11	L+	78	156	M+	Tall Fescue
Occoquan and Bull Run Hall	6.6	6.34	19	38	H-	67.5	135	M	Tall Fescue
Vivarium	6.1	6.12	7.5	15	M-	73	146	M	Tall Fescue
Parking Area A	7.2	-	12	24	M	128.5	257	H	Tall Fescue
Parking Area B	7.1	-	16.5	33	M+	70.5	141	M	Tall Fescue
Parking Area C	7.1	-	15	30	M	16.5	33	L	Tall Fescue

Notes:

APPENDIX B
NUTRIENT APPLICATION WORKSHEETS

NAME:	Mason - Science and Technology Campus					
Prepared:	8/14/15				Species:	Tall Fescue
Expires:	8/14/18					
Management Area	Application Month/Day	# of Apps	Application Interval	Fertilizer Type	Total NPK lbs/1000ft^2	
					N - P_2O_5 - K_2O	
Management Area #1	2/27 to 3/30	1		Water Soluble	0.70 - 2.00 - 1.00	
	3/30 to 12/6	4	> 30 days	Water Soluble	0.70 - 0.00 - 0.00	
	*Recommended Total Annual Application				3.50 - 2.00 - 1.00	
Management Area #2	2/27 to 3/30	1		Water Soluble	0.70 - 1.00 - 2.00	
	3/30 to 12/6	4	> 30 days	Water Soluble	0.70 - 0.00 - 0.00	
	*Recommended Total Annual Application				3.50 - 1.00 - 2.00	

Notes:	*The fertilizer recommendations listed above can be in the form of several different fertilizer products. If water insoluble nitrogen fertilizer is used, nitrogen can be applied at a rate of 0.9 lbs/1,000 sq. ft. at intervals at least 30 days apart between 2/27 and 12/6. However, the nutrient thresholds listed above are the maximums that should not be exceeded when applying water soluble nitrogen fertilizers. Applications of water soluble nitrogen fertilizer will not occur within 30 days of one another and must not exceed 0.7 lbs/1,000 sq. ft. The first nitrogen application should not be made until complete green-up of turf. *The full annual application of Phosphorus (P_2O_5) and Potassium (K_2O) should take place at the same time as the first nitrogen application. Phosphorus application should not take place in the form of 10-10-10 or 5-10-10 fertilizers in this management area due to high content of phosphorus in the soil already.
Management Area #1 Lime Recommendations:	Meadow Area: This soil sampling area requires 70 lbs of agricultural lime (ground, pulverized, or pelletized) per 1,000 sq. ft.. This lime application should take place in at least two applications of 50 lbs per 1,000 sq. ft. or less, at intervals of 1 to 6 months, until the full 70 lb. amount is applied. Vivarium Lawn: This soil sampling area requires 100 lbs of agricultural lime (ground, pulverized, or pelletized) per 1,000 sq. ft.. This lime application should take place in at least two applications of 50 lbs per 1,000 sq. ft. or less, at intervals of 1 to 6 months, until the full 100 lb. amount is applied. Bio Medical Research Center: This soil sampling area requires 120 lbs of agricultural lime (ground, pulverized, or pelletized) per 1,000 sq. ft.. This lime application should take place in at least three applications of 50 lbs per 1,000 sq. ft. or less, at intervals of 1 to 6 months, until the full 120 lb. amount is applied.
Management Area #2 Lime Recommendations:	*No lime application is recommended to areas within Management Area #2 given that the soil pH is sufficient. Soil tests can be conducted annually to determine if additional lime is needed to raise the soil pH during years 2 and 3 of this nutrient management plan implementation.

APPENDIX C
FERTILIZER APPLICATION RECORDS

Fertilizer Application Records

Customer Information		Management Area Information	
Name:	Mason - Science and Technology Campus	Management Area ID:	
Address:	10900 University Boulevard,	Management Area Size:	
	Manassas, VA 20110	Plant Species:	
		Notes:	
Phone #:			

Date (M/D/Y)	Supervisor/Applicator	Weather Conditions			Fertilizer Analysis	Rate	Amount Fertilizer Used	Application Equipment Used
		Temp	Wind Speed	Precip				

When was the last time your fertilizer equipment was calibrated???
For information on calibration see Chapter 10 of the "Urban Nutrient Management Handbook".
Available for download at http://pubs.ext.vt.edu/430/430-350/430-350.html

APPENDIX D
REFERENCE MATERIALS

Table 7.4. Recommended fertilization rates for newly planted ornamental plants during the first growing season (use only one of the fertilizers listed at the rate recommended).

Plant type/size	12-4-8	16-4-8	10-10-10	Application frequency
	Application rate/plant*			
1-gallon shrubs	1 tsp	1 tsp	1 tbsp	March, May, July
3-gallon shrubs	2 tsp	2 tsp	2 tbsp	March, May, July
5-gallon shrubs	3 tsp	3 tsp	3 tbsp	March, May, July
Trees under 4 feet	1 tbsp	1 tbsp	2 tbsp	March, July
Trees 4-6 feet	3 tbsp	3 tbsp	5 tbsp	March, July
Trees 6-8 feet	4 tbsp	4 tbsp	6 tbsp	March, July
	Application rate 100/sq ft			
Ground covers, annuals, and herbaceous perennials	0.5 lb	0.5 lb	1.0 lb	Each 4-6 weeks

Source: Georgia Cooperative Extension bulletin 1065 (2009).* When using slow-release or soluble fertilizers, follow label recommendations for application rate.

Table 7.5. Recommended application rates of various general-purpose granular fertilizers on established ornamental plants in the landscape.

Source	Application rate[a] 1,000 sq ft Pounds	1,000 sq ft Cups	100 sq ft Pounds	100 sq ft Cups	10 sq ft Tablespoons
10-10-10	10.0	20.0	1.0	2.0	4.0
8-8-8	12.5	25.0	0.5	2.5	5.0
13-13-13	6.0	12.0	0.75	1.5	3.0
12-3-6	6.0	12.0	0.75	1.5	3.0
12-4-8	6.0	12.0	0.75	1.5	3.0
12-6-6	6.0	12.0	0.75	1.5	3.0
16-4-8	6.0	12.0	0.5	1.0	2.0
4-12-12	25.0	50.0	2.5	5.0	10.0
5-10-10	20.0	40.0	2.0	4.0	8.0

Source: Georgia Cooperative Extension bulletin 1065 (2009).

[a]This rate will supply 1 pound of actual nitrogen per 1,000 square feet. For optimum growth of young shrubs, ground covers, and trees, three to five applications are recommended at six- to 10-week intervals from March to August. Application frequency varies with the amount of slow-release nitrogen in the product, so consult the label for specific recommendations. Established trees and shrubs will benefit from one to two applications during the growing season. Annual flowers and roses should receive applications at four- to six-week intervals from March to August. When using slow-release or specialty fertilizers, follow the manufacturer's recommendation on the container.

Section VI. Turfgrass Nutrient Recommendations for Home Lawns, Office Parks, Public Lands and Other Similar Residential/Commercial Grounds

Definitions

For the purposes of this section, the following definitions, as presented by the Association of American Plant Food Control Officials (AAPFCO), apply:

"Enhanced efficiency fertilizer" describes fertilizer products with characteristics that allow increased plant nutrient availability and reduce the potential of nutrient losses to the environment when compared to an appropriate reference product.

"Slow or controlled release fertilizer" means a fertilizer containing a plant nutrient in a form which delays its availability for plant uptake and use after application, or which extends its availability to the plant significantly longer than a reference "rapidly available nutrient fertilizer" such as ammonium nitrate, urea, ammonium phosphate or potassium chloride. A slow or controlled release fertilizer must contain a minimum of 15 percent slowly available forms of nitrogen.

"Water soluble nitrogen", "WSN" and "readily available nitrogen" means: Water soluble nitrogen in either ammonical, urea, or nitrate form that does not have a controlled release, or slow response.

Recommended Season of Application For Nitrogen Fertilizers - Applies to all Turf

A nitrogen fertilization schedule weighted toward fall application is recommended and preferred for agronomic quality and persistence of cool season turfgrass; however, the acceptable window of applications is much wider than this for nutrient management. The nutrient management recommended application season for nitrogen fertilizers to cool season turfgrasses begins six weeks prior to the last spring average killing frost date and ends six weeks past the first fall average killing frost date (see Figures 6-1 & 6-2). Applications of nitrogen during the intervening late fall and winter period should be avoided due to higher potential leaching or runoff risk, but where necessary, apply no more than 0.5 pounds per 1,000 ft^2 of water soluble nitrogen within a 30 day period. Higher application rates may be used during this late fall and winter period by using materials containing slowly available sources of nitrogen, if the water soluble nitrogen contained in the fertilizer does not exceed the recommended maximum of 0.5 pounds per 1,000 ft^2 rate. Do not apply nitrogen or phosphorus fertilizers when the ground is frozen.

The acceptable nitrogen fertilizer application season for non-overseeded warm season turfgrass begins no earlier than the last spring average killing frost date and ends no later than one month prior to the first fall average killing frost date (see Figures 6-1 & 6-2).

Figure 6-1

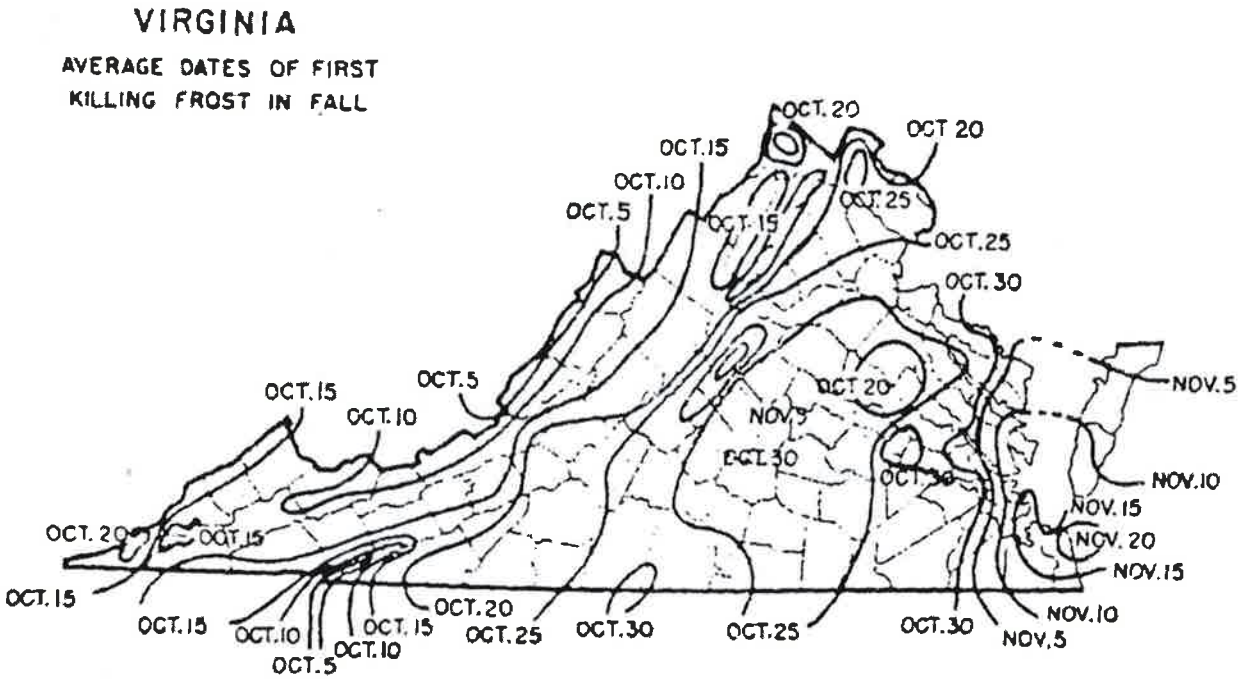
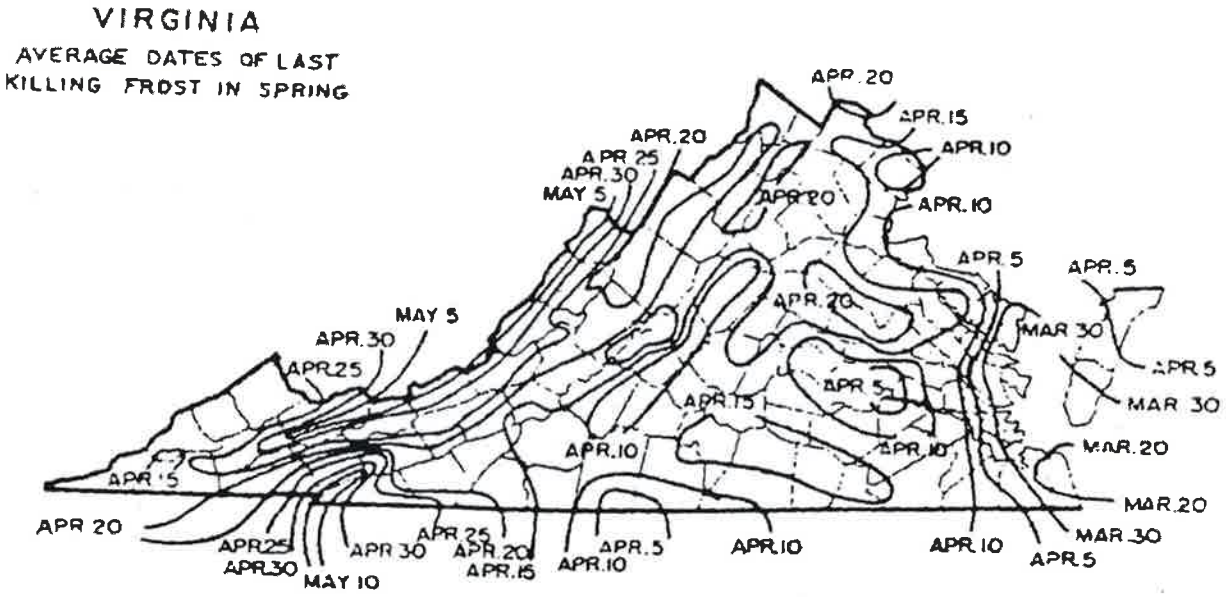


Figure 6-2



Per Application Rates

Do not apply more than 0.7 pounds of water soluble nitrogen per 1,000 ft^2 within a 30 day period. For cool season grasses, do not apply more than 0.9 pounds of total nitrogen per 1,000 ft^2 within a 30 day period. For warm season grasses, do not apply more than 1.0 pounds of total nitrogen per 1,000 ft^2 within a 30 day period. Lower per application rates of water soluble nitrogen sources or use of slowly available nitrogen sources should be utilized on very permeable sandy soils, shallow soils over fractured bedrock, or areas near water wells.

Annual Application Rates for Home Lawns and Commercial Turf

Up to 3.5 pounds per 1,000 ft^2 of nitrogen may be applied annually to cool season grass species or up to 4 pounds per 1,000 ft^2 may be applied annually to warm season grass species using 100 percent water soluble nitrogen sources. Lower rates of nitrogen application may be desirable on those mature stands of grasses that require less nitrogen for long-term quality. As a result, lower application rates will probably be more suited to the fine leaf fescues (hard fescue, chewings fescue, creeping red fescue, and sheep fescue) and non-overseeded zoysiagrass. Lower rates should also be used on less intensively managed areas.

Use of Slowly Available Forms of Nitrogen

For slow or controlled release fertilizer sources, or enhanced efficiency fertilizer sources, no more than 0.9 pounds of nitrogen per 1,000 ft^2 may be applied to cool season grasses within a 30 day period and no more than 1.0 pounds of nitrogen per 1,000 ft^2 may be applied to warm season grasses within a 30 day period.

Provided the fertilizer label guarantees that the product can be used in such a way that it will not release more than 0.7 pounds of nitrogen per 1,000 ft^2 in a 30 day period, no more than 2.5 pounds of nitrogen per 1,000 ft^2 may be applied in a single application. Additionally, total annual applications shall not exceed 80 percent of the annual nitrogen rates for cool or warm season grasses.

Phosphorus and Potassium Nutrient Needs (Established Turf)

Apply phosphorus (P_2O_5) and potassium (K_2O) fertilizers as indicated necessary by a soil test using the following guidelines:

Soil Test Level	Nutrient Needs (pounds per 1000 ft^2) *	
	P_2O_5	K_2O
L	2-3	2-3
M	1-2	1-2
H	0.5-1	0.5-1
VH	0	0

* For the lower soil test level within a rating, use the higher side of the range and for higher soil test level within a rating use the lower side of the recommendation range. (For example the recommendation for a P_2O_5 soil test level of L- would be 3 pounds per 1,000 ft^2.)

Do not use high phosphorus ratio fertilizers such as 10-10-10 or 5-10-10, unless soil tests indicate phosphorus availability below the M+ level.

Appendix L:
TMDL Action Plan

CHESAPEAKE BAY TMDL ACTION PLAN

PERMIT NUMBER VAR040106

Submitted to DEQ:
October 2015

Table of Contents

List of Tables

List of Figures

Executive Summary

George Mason University (Mason) developed this Chesapeake Bay Total Maximum Daily Load (TMDL) Action Plan as required in the 2013-2018 General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (Permit Term II MS4 Permit) and in accordance with the Virginia Department of Environmental Quality (DEQ) Chesapeake Bay TMDL Action Plan Guidance Document (Guidance Document) dated May 18, 2015. This Action Plan is for both the Fairfax Campus and Science and Technology Campus and required an evaluation of the 2009 regulated land cover and MS4 boundary, calculation of the pollutant of concern (POC) loading and first permit term required reductions, projects to meet the reductions, a review of Mason's current MS4 program and existing legal authority, and a summary of the public comment process.

For compliance with the first permit cycle ending June 30, 2018, Mason's POC required reductions are 22.53 lbs/yr for nitrogen, 2.27 lbs/yr for phosphorus, and 2,586.43 lbs/yr for total suspended solids (TSS). Mason's Means and Methods for providing compliance with the first permit cycle is to utilize credit from any existing oversized stormwater best management practices (BMPs) and through implementation of an approximate 250' urban stream restoration project on the Fairfax Campus.

The existing oversized BMPs provide 4.21 lbs/yr of nitrogen, 0.43 lbs/yr of phosphorus, and 488.02 lbs/yr of TSS. The urban stream restoration project will provide 18.75 lbs/yr of N, 17.00 lbs/yr of P, and 11,220 lbs/yr of TSS. Using these control measures, the first permit cycle required reductions will be ME and an additional credit of 0.23 lbs/yr of nitrogen, 15.16 lbs/yr of phosphorus, 9,121.59 lbs/yr of TSS will be applied towards meeting the second permit cycle required reductions. Mason estimates that it will cost $425,000 to implement the 250' urban stream restoration project on the Fairfax Campus.

Introduction

As legislated by the Virginia Stormwater Management Program (VSMP) Permit Regulations (9VAC25-870- 400 et. seq.), the Virginia Department of Conservation and Recreation (DCR) issued a VSMP General Permit (VAR040106) for small Municipal Separate Storm Sewer Systems (MS4) to George Mason University (Mason) on July 9, 2008. This permit was updated and extended effective July 1, 2013 by Virginia Department of Environmental Quality (DEQ). This permit holds Mason accountable for developing and implementing an MS4 Program to address the requirements contained in the permit.

In order to meet the Special Condition for the Chesapeake Bay TMDL (Section 1.C) in the General Permit, Mason has developed the following Chesapeake Bay TMDL Action Plan (Action Plan) for its Fairfax and Science and Technology Campuses. As the basis for development of the Action Plan, Mason utilized both the Chesapeake Bay TMDL Special Condition Guidance Document (Guidance Memo No. 15-2005 dated May 18, 2015) and the VSMP General Permit (VAR040106). Furthermore, Mason utilized locally available aerial imagery, the Virginia Geographic Information Network (VGIN), and the Virginia Environmental Geographic Information System (VEGIS) coupled with information from Mason's in-house GIS to prepare the Action Plan.

This Action Plan documents the information sources and methodologies used in preparing the required plan elements and presents the means and methods that will be utilized to achieve the required Pollutant of Concern (POC) load reductions by the end of the first permit cycle (July 1, 2018). The following plan elements are included as sections in this Action Plan:

- Review of Current MS4 Program and Existing Legal Authority - (Addresses Section I.C.2a (1) and I.C.2.a (2) of the MS4 Permit
- Data Sources Utilized and Estimate of MS4 Regulated Acreages – (Addresses Section I.C.2.a (4) and Section I.C.2.a (5) of the MS4 Permit)
- Estimated POC Loads and Required Reductions from Existing Sources – (Addresses Section 1.C.2.a (4) and Section I.C.2.a (5) of the MS4 Permit)
- Estimated POC Loads and Required Reductions from New and Grandfathered Sources – (Addresses Section 1.C.2.a (7) and Section I.C.2.a (8) of the MS4 Permit)
- Estimated POC Load Reductions from Existing BMPs - (Addresses Section I.C.2.a (6) of the MS4 Permit)
- Means and Methods Strategy, Schedule, and Estimated Costs – (Addresses I.C.2.a (6) and I.C.2.a (11) of the MS4 Permit)
- List of Future Grandfathered Projects – (Addresses I.C.2.a (10) of the MS4 Permit)
- Public Comment Process – (Addresses I.C.2.a (12) of the MS4 Permit)

Review of Current MS4 Program and Existing Legal Authority

As requested, Timmons Group (TG) performed a review of the Mason's current MS4 Program Plan and existing legal authorities in order to evaluate its ability to comply with the Special Condition for the Chesapeake Bay TMDL (Section I.C) in the MS4 Permit. Based on this review, it is our opinion that Mason does not require any new or modified legal authorities or policies at this time in order to meet the requirements of this special condition. The following is a list of Mason's relevant existing legal authorities and policies:

- Mason's MS4 Program Plan
- Mason's Illicit Discharge Detection and Elimination Policy
- Mason's Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management
- Mason's Stormwater Master Plan
- Mason's Design Manual

However, Mason may choose to coordinate with other adjacent MS4s (listed below) and explore the idea of establishing memorandums of understanding (MOU) to further clarify MS4 service boundary line(s) and inter-jurisdictional responsibilities for POC loads and subsequent required POC load reductions in the future. Appendix G of the *2014 MS4 Annual Report - Notice of Potential Interconnected MS4s* identified the following adjacent MS4s:

- Fairfax County (Fairfax Campus)
- City of Fairfax (Fairfax Campus)
- Virginia Department of Transportation (VDOT) (Fairfax and Science and Technology Campuses)
- Prince William County (Science and Technology Campus)

Data Sources Utilized and Estimate of MS4 Regulated Acreages

In order to determine the extent of Mason's MS4 service area and to estimate the regulated impervious and regulated pervious acres served by its MS4, a variety of different land cover data sources were investigated including Mason's in-house GIS data layers (aerial imagery from 2004 and 2013, topography, parcel boundaries, ponds, streams, and storm structures), aerial imagery from VGIN and VEGIS, and GIS data from Fairfax and Prince William Counties. After a review of these data sources and in accordance with DEQ's Guidance Document, the "VBMP2009" aerial imagery provided by VEGIS and VGIN was selected for use as the baseline aerial imagery for estimating the acreage of pervious, impervious, forested, and open water surface areas within the campuses. Mason's GIS data (best available) was used to supplement areas where land cover type was inconclusive from the aerial imagery.

Several of Mason's GIS data layers (topography, storm sewer, and parcel boundaries) were also used to attempt to analyze the extent of overlap from conveyances and associated drainage areas from neighboring MS4s. Unfortunately, the data available at this time (specifically outfall drainage areas) was not extensive enough to clearly differentiate which operator was responsible for which part of the system. And since no Memorandums of Understanding (MOUs) have been established between Mason and adjacent MS4 operators at this time, a conservative, "best professional judgement" decision was made (in accordance with Pages 5-6 of DEQ's Guidance Document) to use Mason's property boundaries ("jurisdictional" boundaries) for the two campuses as the MS4 service

area limits. As a result no inter- jurisdictional overlap areas were excluded from or included in Mason's MS4 service area. Mason reserves the right to refine the service area as additional datasets become available.

Analysis of available aerial imagery shows that both of Mason's campuses contain significant tracts of land that appear to be consistent with the definition of "forested lands" as shown in the footnote on page 5 of DEQ's Guidance Document. As such, Mason excluded these lands (shown on Figures 1 and 2) from the regulated urban impervious and regulated urban pervious cover calculations per the DEQ Guidance Document. Lands within Mason's MS4 service area that contained tree canopy based on the "VBMP2009" aerial imagery but did not appear to meet the aforementioned criteria for forested lands were classified as pervious lands.

Based on slide number 18 in DEQ's *Chesapeake Bay TMDL Action Plan Informational Session Presentation* (presented by the Office of VPDES Permits in December 2014), the following areas were also excluded from Mason's POC load generation and load reduction requirements calculations:

- Streams (open waters)
- Ponds receiving flow from streams (open waters)

Ponds that did not appear to receive flow from streams according to the "VBMP2009"aerial imagery or Mason's GIS data were classified as pervious areas.

No lands operated by a separate MS4 or lands regulated under a General VPDES Permit for Stormwater Discharges Associated with Industrial Activity (VAR05) were found within Mason's campus property boundaries. Also, in accordance with the DEQ Guidance Document, the pre-construction land use (predevelopment conditions) was used as a baseline for lands that were in transition as of June 30, 2009. Based on the VEGIS's "VBMP2009" aerial imagery several areas were found to be in transition at Mason's Fairfax and Science and Technology Campus. All of Mason's lands in transition initiated construction prior to June 30, 2009 and were completed between July 1, 2009 and June 30, 2014. All lands in transition were designed to meet an average land cover condition of 16% or less. As such no additional offsets are required under the Special Condition beyond those required for existing conditions. Table 1 – Mason's Lands in Transition as of June 30, 2009 provides a summary of the areas that were actively in transition as of June 30, 2009.

Table 1. Mason's Lands in Transition as June 30, 2009

Campus	Approximate Area (acres)
Fairfax	35.92
Science and Technology	27.10
Total	**63.02**

Tables 2 and 3 provide a summary of the estimated MS4 regulated acreages by land cover type for the Fairfax and Science and Technology campuses respectively.

Table 2. Mason MS4 Regulated Areas by Land Cover Type Fairfax Campus		
Land Cover Type	**Total Area (acres)**	**Regulated Area (acres)**
Impervious	185.01	185.01
Pervious	161.80	161.80
Forested*	298.82	298.82
Open Water*	5.28	0.00
Total	**650.91**	**645.63**

*Excluded from load calculations

Table 3. Mason MS4 Regulated Areas by Land Cover Type Science and Technology Campus		
Land Cover Type	**Total Area (acres)**	**Regulated Area (acres)**
Impervious	22.94	22.94
Pervious	34.73	34.73
Forested*	75.53	75.53
Open Water*	1.32	0.00
Total	**134.52**	**133.20**

*Excluded from load calculations

Figures 1 and 2 provide maps of the Fairfax and Science and Technology campuses respectively that depict the MS4 service area boundaries, regulated lands, and lands that have been excluded in accordance with DEQ's Guidance Document.

Figure 1

Fairfax Campus

2009 Regulated Area Map

MS4 Service Area

Regulated Area

Regulated

Forest (Excluded)

Open Waters (Excluded)

N

0 500 1,000 1,500

Feet

GEORGE MASON UNIVERSITY

Figure 2

Science and Technology Campus

2009 MS4 Regulated Area Map

MS4 Service Area

Regulated Area

Regulated

Forest (Excluded)

Open Water (Excluded)

N

0 500 1,000

Feet

GEORGE MASON UNIVERSITY

Estimated POC Loads and Required Reductions from Existing Sources

Once the regulated urban pervious acres and regulated urban impervious acres were estimated, Mason used the appropriate tables provided in the permit (Tables 2.b and 3.b in the permit) to estimate the existing source loads and required load reductions for the pollutants of concern for each of the campuses within Mason's MS4 service area. Tables 4 and 5 provide the estimated existing source loads for the Fairfax and Science and Technology campuses respectively. Tables 6 and 7 provide the estimated total pollutant load reductions required by the end of each permit cycle for the Fairfax and Science and Technology campuses respectively. Though theses tables present the required load reductions for all three permit cycles (5%, 35%, 60%, and total), only the 5% load reduction requirements need to be addressed under this Action Plan.

Table 4. Estimated Existing Source Loads
Fairfax Campus

Per Table 2b in the MS4 Permit: Calculation for Estimating Existing Source Loads for the Potomac River Basin (Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)

Subsource	POC	Total Existing Acres Served by MS4 as of 6/30/2009 (acres)	2009 EOS Loading Rate (lbs/acre)	Estimated Total POC Load Based on 2009 Progress Run (lbs)
Regulated Urban Impervious	N	185.01	16.86	3,119.27
Regulated Urban Pervious		161.80	10.07	1,629.33
Regulated Urban Impervious	P	185.01	1.62	299.72
Regulated Urban Pervious		161.80	0.41	66.34
Regulated Urban Impervious	TSS	185.01	1171.32	216,705.91
Regulated Urban Pervious		161.80	175.80	28,444.44

Table 5. Estimated Existing Source Loads Science and Technology Campus				
Per Table 2b in the MS4 Permit: Calculation for Estimating Existing Source Loads for the Potomac River Basin (Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)				
Subsource	**POC**	**Total Existing Acres Served by MS4 as of 6/30/2009 (acres)**	**2009 EOS Loading Rate (lbs/acre)**	**Estimated TotalPOC Load Based on 2009 Progress Run (lbs)**
Regulated Urban Impervious	N	22.94	16.86	386.77
Regulated Urban Pervious		34.73	10.07	349.73
Regulated Urban Impervious	P	22.94	1.62	37.16
Regulated Urban Pervious		34.73	0.41	14.24
Regulated Urban Impervious	TSS	22.94	1,171.32	26,870.08
Regulated Urban Pervious		34.73	175.80	6,105.53

Table 6. Estimated Total Pollutant Load Reductions Required Fairfax Campus							
Per Table 3b in the MS4 Permit: Calculation Sheet for Determining Total POC Reductions Required During the Permit Cycle for the Potomac River Basin (Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)							
Subsource	**POC**	**Total Existing Acres Served by MS4 as of 6/30/2009 (acres)**	**First Permit Cycle Required Reduction in Loading Rate (lbs/acre)**	**5% Total Reduction Required First Permit Cycle (lbs)**	**35% Total Reduction Required Second Permit Cycle (lbs)**	**60% Total Reduction Required Third Permit Cycle (lbs)**	**Total Reduction (lbs)**
Regulated Urban Impervious	N	185.01	0.08	14.80	103.61	177.61	**296.02**
Regulated Urban Pervious		161.80	0.03	4.85	33.98	58.25	**97.08**
Regulated Urban Impervious	P	185.01	0.01	1.85	12.95	22.20	**37.00**
Regulated Urban Pervious		161.80	0.001	0.16	1.13	1.94	**3.23**
Regulated Urban Impervious	TSS	185.01	11.71	2,166.47	15,165.27	25,997.61	**43,329.35**
Regulated Urban Pervious		161.80	0.77	124.59	872.10	1,495.03	**2,491.72**

Table 7. Estimated Total Pollutant Load Reductions Required Science and Technology Campus							
Per Table 3b in the MS4 Permit: Calculation Sheet for Determining Total POC Reductions Required During the Permit Cycle for the Potomac River Basin (Based on Chesapeake Bay Program Watershed Model Phase 5.3.2)							
Subsource	**POC**	**Total Existing Acres Served by MS4 as of 6/30/2009 (acres)**	**First Permit Cycle Required Reduction in Loading Rate (lbs/acre)**	**5% Total Reduction Required First Permit Cycle (lbs)**	**35% Total Reduction Required Second Permit Cycle (lbs)**	**60% Total Reduction Required Third Permit Cycle (lbs)**	**Total Reduction (lbs)**
Regulated Urban Impervious	N	22.94	0.08	1.84	12.85	22.02	**36.71**
Regulated Urban Pervious		34.73	0.03	1.04	7.29	12.50	**20.84**
Regulated Urban Impervious	P	22.94	0.01	0.23	1.61	2.75	**4.59**
Regulated Urban Pervious		34.73	0.001	0.03	0.24	0.42	**0.69**
Regulated Urban Impervious	TSS	22.94	11.71	268.63	1,880.39	3,223.53	**5,372.55**
Regulated Urban Pervious		34.73	0.77	26.74	187.19	320.91	**534.84**

Therefore, as can be calculated using the estimates shown in the tables, the total combined load reductions required by the end of the first permit cycle (July 1, 2018) for the Fairfax campus are 19.65 lbs. of nitrogen, 2.01 lbs. of phosphorus and 2,291.06 lbs. of total suspended solids. For the Science and Technology campus, the total combined load reductions required by the end of the first permit cycle are 2.88 lbs. of nitrogen, 0.26 lbs. of phosphorus, and 295.37 lbs. of total suspended solids. When combining the Fairfax and Science and Technology campuses, Mason's total required reduction is 22.53 lbs of nitrogen, 2.27 lbs of phosphorus, and 2,586.43 lbs of total suspended solids. Table 8 – Total Required Reduction for Mason summarizes the total required POC reductions for compliance with the first permit cycle (5%).

Table 8 - Total Required Reduction for Mason			
Campus	**5% POC Required Reduction (lbs)**		
Fairfax / Science and Technology	N	P	TSS
	22.53	2.27	2,586.43

Estimated POC Loads and Required Reductions from New and GrandfatheredSources

Mason's Design Manual (DM) governs the design, construction, renovation, and/or alteration of facilities or spaces on all of its campuses. Mason implemented the first DM in 2004 and has continued to revise the DM as required for consistency with revised regulations. The DM adopted the Commonwealth of Virginia's Stormwater Management Handbook (First Edition, 1999) for stormwater design compliance. Chapter 2 of the Virginia Stormwater Management Handbook (First Edition, 1999) requires stormwater management and BMP compliance by either utilizing the performance-based water quality criteria or the technology-based water quality criteria. Both the performance-based water quality criteria and the

technology-based water quality criteria are considered to be equivalent when implemented as described in the Virginia Stormwater Management Handbook.

The performance-based water quality criteria states that for land development, the calculated post- development nonpoint source pollutant runoff load shall be compared to the calculated pre-development load using the average land cover condition for the existing site. The average land cover condition in accordance with the Virginia Stormwater Management Handbook is described as followed:

> *"The definition of the average land cover condition is important to the successful implementation of the performance-based water quality criteria. An analysis of the Chesapeake Bay watershed identified the average land cover condition using the following categories: urban land use, forest cover, pasture land, conservation till acreage, and conventional till acreage. Using the pollutant load values from the N.U.R.P. studies, the average land cover condition was then used to establish a baseline existing land use condition pollutant load value of 0.45 lb./ac/yr. of phosphorous. Since the Simple Method is based on impervious cover, an equivalent percent impervious cover is needed. 16% impervious cover has been determined to be an equivalent pollutant load source for all of the urban and non-urban land uses which contribute nonpoint source pollution. These values (16% impervious cover and 0.45 lb./ac/yr. of phosphorous) represent the average land cover conditions for the Chesapeake Bay watershed. (Keep in mind that these values may be adjusted based on actual land use conditions within the locality or individual watersheds within the locality at the time of DCR or CBLAD program adoption, whichever occurred first.) This allows the designer to calculate, using the Simple Method, the pre- developed pollutant load using average land cover conditions, and the post-developed pollutant load using the project post-developed impervious cover. The difference between the pre- and post-developed pollutant load represents the increase in pollutant load which must then be controlled by an appropriate BMP."*

Since 16% impervious cover represents the average land cover condition for the Chesapeake Bay Watershed and the Virginia Stormwater Management Handbook (First Edition, 1999) requires the post- development pollutant runoff load to be consistent with the average land cover condition (16% impervious cover), it is assumed that the average land cover condition for post-development did not exceed 16% for "new sources" (construction initiated between June 30, 2009 and June 30, 2014) or "grandfathered" (construction initiated after July 1, 2014) projects on Mason's campuses where the performance-based approach was utilized.

The technology-based water quality criteria states that for land development, the post-developed stormwater runoff from the impervious cover shall be treated by an appropriate BMP as required by the post-developed condition percent impervious cover as specified in Table 2-3 of the Virginia Stormwater Management Handbook (First Edition, 1999). Since the technology-based water quality criteria requires appropriate BMP implementation based on post-development stormwater runoff percent impervious cover, it is assumed that all "new sources" (construction initiated between June 30, 2009 and June 30, 2014) and "grandfathered" (construction initiated after July 1, 2014) projects on Mason's campuses where the technology-based criteria was utilized were designed in accordance with the technology-based approach in the Virginia Stormwater Management Handbook (First Edition, 1999).

Because development projects on Mason's campuses are designed in accordance with Mason's DM and the Virginia Stormwater Management Handbook (First Edition, 1999), the post-development average land cover condition, after implementing appropriate BMPs should not exceed 16% imperviousness and therefore no additional load reductions for "new sources" and "grandfathered" projects is required. In conformity with Mason's design review processes, all "new sources" and "grandfathered" projects plans and specifications are reviewed for compliance with the Virginia Stormwater

Management Handbook (First Edition, 1999) and for potential over design of BMPs that would provide Mason with additional BMP crediting.

Estimated POC Load Reductions from Existing BMPs

Mason reviewed all available plan information to determine the estimated load reductions from existing BMPs on both the Fairfax campus and the Science and Technology Campus. The Masonvale site plan prepared by Bowman Consulting located in the northwestern corner of the Fairfax campus shows a total of nine (9) BMPs that include dry ponds, rain gardens, vegetated swales and pervious pavement. The BMPs at the Masonvale site were oversized resulting in treatment surplus of N (3.72 lbs), P (0.38 lbs), and TSS (431.27 lbs). The Life Sciences Building site plan prepared by Timmons Group located in the middle of the Science and Technology campus shows a total of three (3) bioretention facilities. The bioretention basins at the Life Sciences Building were oversized resulting in a treatment surplus of N (0.49 lbs), P (0.05 lbs), and TSS (56.75 lbs). The BMPs at the Masonvale site and the Life Sciences Building provide a total treatment surplus of N (4.21 lbs), P (0.43 lbs) and TSS (488.02 lbs). Table 9 − Estimated POC Load Reductions from existing BMPs summarizes the total POC load that Mason can claim towards compliance with the 5% POC required load reductions.

Table 9 - Estimated POC Load Reductions from Existing BMPs

BMP	N	P	TSS	Date Completed
Masonvale Site (lbs)	3.72	0.38	431.27	Oct. 2010
Life Sciences Building (3) Bioretention (lbs)	0.49	0.05	56.75	June 2011
Total (lbs)	**4.21**	**0.43**	**488.02**	

The Masonvale site initiated construction prior to June 30, 2009 and was completed between July 1, 2009 and June 30, 2014. The Masonvale site was designed to meet an average land cover condition of 16% or less. Therefore no additional offsets are required for the Masonvale site development.

After incorporating the Masonvale and Life Sciences Building BMP load reduction surplus (Table 9) from Mason's total 5% required reductions Mason is still required to provide reductions for N (18.32 lbs), P (1.84 lbs), and TSS (2,098.41 lbs) to comply with the 5% POC load reduction requirements. Table 10 − Total Required Reductions after Subtracting Estimated Load Reductions from Existing BMP Credit (lbs) summarizes Mason's total remaining required reductions for compliance with the 5% POC load reduction requirements.

Table 10 - Total Required Reductions After Subtracting Estimated Load Reductions from Existing BMPs (lbs)

Total Required Reductions for Fairfax/PWC (lbs)	5% POC Required Reduction (lbs)		
	N	P	TSS
	22.53	2.27	2,586.43
Estimated POC Load Reductions from existing BMPs (lbs)	4.21	0.43	488.02
Total Remaining Reductions Required for 5% Permit Cycle (lbs)	**18.32**	**1.84**	**2,098.41**

Means and Methods Strategy, Schedule, and Estimated Costs

Mason intends to provide compliance for the remaining 5% POC load required reductions for N, P, and TSS shown in Table 10 − Total Required Reductions after Subtracting Estimated Load Reductions from Existing BMP Credit (lbs), through an approximate 250 linear foot urban stream restoration project on a zero to fifth order stream that is not tidally influenced and is located on the Fairfax campus. The 250 LF proposed urban stream restoration project will be located on Fairfax's main campus with the final location determined after a stream feasibility assessment (BANCS Assessment) has been completed for the Fairfax campus. Mason anticipates that the proposed 250 LF urban stream restoration project will provide 5% compliance with N (18.75 lbs), P (17.00 lbs), and TSS (11,220 lbs). The proposed urban stream restoration project will utilize the interim approved removal rates (0.075 lb/lf/yr for N, 0.068 lb/lf/yr for P, and 44.88 lb/lf/yr for TSS) within appendix V.J of the TMDL Action Plan Guidance dated May 18, 2015 and generated from the Recommendations of the Expert Panel to Define Removal Rates for Individual Steam Restoration Projects, September 2014, to calculate the Total POC Removal Credit for the proposed 250LF urban stream restoration project. Table 12 − Estimated Stream Restoration Reduction POC Cost/LBS shows the approximate cost to remove N (18.75 lbs @ $20,000/LB), P (17.00 lbs @ $22,058.82/LB), and TSS (11,220 lbs @ $33.42/LB).

Table 11 - Estimated Stream Restoration Reduction Credits

Pollutant	N	P	TSS
Interim Approved Removal Rates (lbs/lf/year)	0.075	0.068	44.88
Stream Restoration Length (Linear Feet)	250	250	250
Total POC Removal Credit (lbs)	**18.75**	**17.00**	**11,220.00**

Table 12- Estimated Stream Restoration Cost and POC Cost/LBS

Stream Restoration (Linear Feet)	*Unit Cost	Total Cost	POC Cost/LB			Notes
			N	P	TSS	
250	$ 1,500	$ 375,000	$ 20,000.00	$ 22,058.82	$ 33.42	Meets 5% permit cycle requirements for all POC.
*Unit Cost information derived from Stream Restoration projects listed in Fairfax County DPWES Capital Projects Summary Reports dated April 2015. Does not include cost for stream feasibility assessment (BANCS Assessment).						

In accordance with the TMDL Action Plan Guidance and the Recommendations of the Expert Panel to Define Removal Rates for Individual Steam Restoration Projects, September 2014, Mason intends to perform urban stream restoration feasibility assessments for approximately 13,000 linear feet of stream on the Fairfax Campus to assure the location provided in this TMDL Action is appropriate and to determine future urban stream restoration project locations. Based on the results of the stream restoration feasibility assessment, Mason may adjust the location of their proposed stream restoration project to the most suitable location available. Table 13 − Mason Urban Stream Restoration Estimated Schedule and Costs shows the approximate schedule for this urban stream restoration project and estimated costs associated with this project.

Mason reserves the right to re-define the necessary actions to meet the required reduction.

Table 13 – Mason Urban Stream Restoration Estimated Schedule and Costs			
Permit Cycle	**Year**	**Action**	**Estimated Cost**
1	2015/2016	Stream Restoration Feasibility (BANCS Assessment)	$50,000.00
	2016	Stream Restoration Design and Permitting (250 LF)	$50,380.00
	2017	Stream Restoration Construction Activates	$324,620.00
	2018		
Total			**$425,000.00**

List of Future Grandfathered Projects

Mason does not have any future grandfathered projects to include in this TMDL Action Plan.

Public Comment Process

Mason encourages the public's involvement and participation in the development and implementation of its MS4 Program. In keeping with this objective, Mason posted a copy of its Draft Chesapeake Bay TMDL Action Plan on its website (htP://facilities.gmu.edu/ProjMgmtConst/LandDevelopment/ms4.cfm) to solicit public comment on the draft plan. All comments received from the public were taken into consideration when developing the final version of the Action Plan that was submitted to DEQ with its MS4 Annual Report in October of 2015.

Conclusion

Mason developed this first permit term Action Plan as required in the 2013−2018 Phase II MS4 Permit Number VAR040106 and in accordance with the DEQ Guidance Document dated May 18, 2015. This TMDL Action Plan concludes that the first permit term pollutant reduction requirements calculated will be met by implementing the proposed urban stream restoration project identified in the Means and Methods Strategy, Schedule, and Estimated Costs section of this TMDL Action Plan. Mason reserves the right to modify this TMDL Action Plan as needed to maintain compliance with its Phase II MS4 Permit.