



NASA Langley Research Center
Municipal Separate Storm Sewer System (MS4) Program Plan
“36 Month Update”
July 1, 2016 to June 30, 2017
Permit #VAR040092



Submitted to the Virginia Department of Environmental Quality in compliance with Permit No. VAR040092

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1 Introduction

This document represents NASA Langley Research Center’s (LaRC) plan to meet the requirements of 9 VAC 25-890-40 “General Virginia Stormwater Management Program (VSMP) Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems.” This Program Plan has been significantly updated and ensures LaRC compliance with the General Permit during Year 3 (July 1, 2015 – June 30, 2016).

NASA LaRC has reviewed and assessed existing stormwater management operations and policies at the Center against the General Permit requirements including the six minimum control measures and the TMDL special conditions requirements. Based on that review, NASA LaRC has developed an appropriate and cost effective Program Plan with the goal of minimizing stormwater pollution to the maximum extent practicable (MEP). This Program Plan outlines how LaRC will implement and enforce this Plan. The Standard Practice and Environmental Engineering Branch (SPEEB) is the organization primarily responsible for this Plan’s implementation.

2 MS4 Program Plan

This section of NASA LaRC’s MS4 Program Plan describes how LaRC will implement and demonstrate compliance with each of the six stormwater minimum control measures (MCM) listed in Section II B of the MS4 General Permit (VAR040092). For each MCM, the Program Plan discusses LaRC’s program, the goals of the program (now and into the future), addresses the requirements of the permit, and indicates program elements for compliance. Updates to the Program Plan will be implemented according to the schedule in Table 1 of MS4 General Permit (VAR040092). The following table is a summary of the required 36-month update that this version Program Plan addresses.

36-Month MS4 Program Plan Update Summary		
<i>Program Update Requirement</i>	<i>Permit Reference</i>	<i>Update Summary</i>
Other TMDL Action Plans (TMDLs approved between July 2008 and June 2013) – (Special Conditions for Approved Total Maximum Daily Loads (TMDL) Other Than Chesapeake Bay)	Section I B	LaRC currently has no waste load reductions associated with any TMDLs (except the Chesapeake Bay TMDL).



MCM I: Public Education and Outreach on Stormwater Impacts

LaRC is a non-traditional permit holder (Federal facility) with no resident population. In terms of public education, and in keeping with EPA guidance, LaRC defines “public” as the employee and contractor population within the fence line of the Center.

LaRC’s MS4 Public Education Outreach Program has **three primary goals**:

- Increasing 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 pollution concerns;
- Increasing target audience knowledge of hazards associated with illegal discharges and improper disposal of waste, including pertinent legal implications; and
- Implementing a diverse program with strategies that are targeted towards audiences most likely to have significant stormwater impacts.

Education Priorities Rational and Target Audience - Section II B 1 c (1-2)

LaRC’s MS4 Public Education and Outreach Plan, as required by the General Permit, emphasizes three high-priority water quality issues. These priorities were selected because they are currently the most pressing stormwater-related impacts that LaRC encounters. The following describes the high priorities selected, the rationale behind the selection, the target audience and the estimated audience size:

1. Construction Site Erosion and Sediment Control (ESC) Best Management Practices (BMPs)

Rationale: NASA LaRC is continuing to implement its 20-year Revitalization Plan. This plan calls for a substantial amount of demolition and construction activities in order to reduce LaRC’s footprint, reduce aging infrastructure, and create a more environmentally sustainable campus. It is anticipated that several structures are to be demolished during this MS4 permit cycle, and several major construction/renovation projects will begin. This high priority recognizes the need for education and outreach for participants in construction projects with a focus on ESC BMPs. It is important that personnel involved in the construction process understand the importance of ESC BMPs, and the most effective methods for implementation and maintenance of ESC BMPs.

Target Audience: NASA employees (and onsite contractors) involved in project planning, project design, construction, project management, inspection, and quality assurance. This is primarily the Center Operations Directorate (COD) employees. Facility Environmental Coordinators (FECs) are also a target audience.

Estimated Audience Size: Approximately 150 people

2. Dumpster Maintenance: Illicit Discharge Detection and Elimination (IDDE)

Rationale: There have been incidents in the past program year of poor dumpster maintenance, including leaking dumpsters. These incidents were identified and resolved through the IDDE program; however, there is reason to believe all employees are not fully aware of requirements related to risks associated with dumpsters to the MS4 and then need for proper dumpster maintenance in order to prevent non-stormwater discharges. Outreach to LaRC employees is needed to increase awareness of these



requirements, to understand the impacts of illegal dumping into the storm system, and to ultimately avoid discharging any non-stormwater materials into the storm sewer.

Target Audience: NASA LaRC Employees (especially FECs and maintenance contractors).

Estimated Audience Size: Approximately 3,000 NASA LaRC Employees.

3. Chesapeake Bay TMDL and LaRC's TMDL Action Plan

Rationale: Meeting the reductions required under the Chesapeake Bay TMDL will be a long-term challenge, as laid out in the DEQ-approved TMDL Action Plan. The Center Operations Directorate (COD) will be primary organization for meeting the challenges of the Chesapeake Bay TMDL. COD is responsible for managing long term maintenance of SWM facilities, grounds maintenance, ensuring projects are designed appropriately, etc. Targeted outreach and training for COD personnel is needed to create awareness and understanding of these current and future requirements so that they may continue to be incorporated in plans for building construction and renovation as well as infrastructure improvements.

Target Audience: Center Operations Directorate (COD).

Estimated Audience Size: Approximately 3,000 NASA LaRC Employees

Relevant Messages/Outreach Material Summary - Section II B 1 c (3)

NASA LaRC will utilize a combination of relevant messages and outreach materials to effectively educate target audiences about high priority areas. The following techniques will be used in combination to adequately educate audiences:

@LARC Web Announcements: The Center has a mechanism for posting daily announcements to the main employee web portal and therefore reach all employees on a daily basis. This mechanism also allows for tracking of the number of hits for any article of outreach item that we post to our program website, making it a very useful tool for keeping tracking of the number of employees we reach with each item.

Website Education Resources: NASA LaRC will continue to maintain and update a comprehensive web site that includes current information about environmental regulations and the Center's environmental programs. The goal is to provide Center personnel with up-to-date information regarding pollution prevention and to provide employees with links to other educational environmental web sites (such as EPA and DEQ websites).

The public version of the SPEEB website can be found here: <http://environmental.larc.nasa.gov/water/ms4/>

Outreach Articles and Blog Posts: SPEEB has prepared and continues to prepare articles concerning the Center operations, potential impacts to stormwater, and steps that personnel can take to minimize pollutants in stormwater runoff. Articles will continue to be posted and announced via the @LaRC site and on the Environmental Website. Center employees will be notified via the @LaRC announcement system when new articles are available on the website. The goal is to disseminate the information about stormwater impacts to as many LaRC employees and contractors as possible.

The public version of the SPEEB Blog can be found here:
<http://environmental.larc.nasa.gov/blog/>



Employee Email Messages: Mass emails are an effective mechanism to get messages to a large group of employees. Mass emails can be sent to the entire workforce, select organizations, and even select job groups (such as FECs). Email messages can cover training opportunities or any stormwater-related topic that a target audience may need education or guidance on.

Training Programs: The goal of any of LaRC's water-related training programs is to educate employees on stormwater management and the impacts of stormwater pollution on local waterways. Please see the Annual Training Plan in MCM 6 for information on the training program.

Facility Multimedia Environmental Audits and Interviews: LaRC performs at least 40 facility multimedia environmental audits annually. These audits include interview questions about water quality concerns for the facility, ideas for pollution prevention, and observations for any water quality concerns. These audits provide an opportunity to get feedback from FECs, who act as additional eyes and ears for SPEEB. It also provides an opportunity for SPEEB employees to educate the workforce in the field on stormwater issues.

Weekly Meetings: MS4 staff meet weekly with the on-site maintenance contractor to review and discuss ongoing projects with erosion and sediment control. These meetings provide an opportunity for the MS4 staff to be involved with each site, to provide input and direction, and to filter educational information from the project manager to project personnel.

Public Participation with Education and Outreach Development - Section II B 1 c (4)

NASA LaRC encourages and appreciates employee feedback during education and outreach development. This is accomplished in two primary ways: (1) the Environmental Management System (EMS) Environmental Management Committee (EMC), and (2) an annual request for input on outreach on the internal @LaRC announcement webpage.

Environmental Management System (EMS) Environmental Management Committee (EMC): LaRC's EMS EMC's charter is, "To assist with the development, implementation, maintenance / operation and continual improvement of LaRC's Environmental Management System in accordance with NPR 8553.1B. The EMC is responsible for identifying, categorizing, and prioritizing LaRC's environmental risks and impacts; as well as developing and implementing objectives, targets, and programs to address the highest priority risks/impacts."

The EMC team consists of a cross section of employees from different organizations, which allows for diverse feedback and opinions. Since Water Quality has been selected as an EMS high priority in previous years, the EMC is involved in developing the program – including MS4 related efforts. The EMC meets on a quarterly basis.

Annual Request for Input on Outreach Goals on the internal @LaRC Announcement Webpage: Annually, starting in Permit Year 2, SPEEB posts announcements to the intranet homepage (@LaRC) calling for Center feedback on stormwater-related education and outreach.

Prior to developing the Permit Year 4 Annual Outreach Plan (MCM 1), LaRC solicited public comment via the employee @LaRC announcement system. Notices ran on 5/10/2015 and 5/11/2015, and had 574 views. The call asked employees what they felt was the most pressing stormwater issues the Center faces and where SPEEB should focus educational efforts. Two public comments were received. One suggested that the Center increase outreach on the availability of GIS maps that identify stormwater drains and outfalls, and increased education on BMPs (such as the permeable pavers at one of the newly-constructed buildings). The second comment was received from a member of the NASA Langley communications community who was



interested in the results of the solicited public comment and in working together to identify the most effective communication channels at LaRC.

Outreach Plan - Section II B 1 c (5)

The following chart depicts LaRC’s anticipated Annual Outreach Plan for Permit Year 4 (July 1, 2016 – June 30, 2017):

<i>High Priority</i>	<i>Target Audience and Size</i>	<i>Outreach Goal</i>	<i>Outreach Type and Timeframes</i>
Construction ESC BMPs	NASA employees and onsite contractors involved in construction processes; FECs – 150	50% of audience annually	Educational Article - 1 x year Environmental ESC BMP Flyer –Annual distribution SPEEB Environmental Website’s Public Construction and ESC section – Reviewed, Updated and Promoted via @LaRC 2 x year
Dumpster Maintenance: IDDE	General Center Population - 3000 FECs	25% of audience annually	Educational Article – 1 x year Standard Operating Procedure or Flyer – Annual Distribution SPEEB Environmental Website’s Public IDDE Section - Reviewed, Updated and Promoted via @LaRC 2 x year
TMDL Education	General Employee Population - 3000	25% of audience annually	Educational Articles – 2 x year BMP education via posted signs -6 signs SPEEB Environmental Website’s Public TMDL Website - Reviewed, Updated and Promoted via @LaRC 2 x year

Annual Review of Program Outreach Effectiveness - Section II B 1 c (6)

NASA LaRC will annually evaluate the effectiveness of its Public MCM 1 program materials and delivery mechanisms to reach target audiences. LaRC will evaluate the education and outreach program for:

- (1) Appropriateness of the high-priority stormwater issues;
- (2) Appropriateness of the selected target audiences for each high-priority stormwater issue;
- (3) Effectiveness of the message or messages being delivered; and
- (4) Effectiveness of the mechanism or mechanisms of delivery employed in reaching the target audiences.

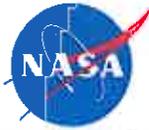


In May 2016, the program was reviewed according to the permit requirements. While the content and delivery mechanisms were observed to be effective, MS4 program staff decided to select two new high priorities for the Year 4 (“36 Month Update”) Program Plan. These new priorities focus on items that will benefit from increased outreach and education methods for personnel at LaRC.

Annual Reporting Requirements - Section II B 1 (g)

LaRC will include the following information in each annual report:

- (1) A list of the education and outreach activities conducted during the 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 were reached; and
- (2) A list of the 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 that will be reached, and an estimated percentage of the target audience or audiences that will be reached.



MCM 2: Public Involvement and Participation

NASA LaRC feels it is important to engage with the public, participate in local events, and promote participation with the surrounding communities. NASA management strongly encourages public involvement and these efforts are strongly supported.

Public Notices - Section II B 2 a (1)

It is LaRC's policy to comply with all federal, state, and local public notice requirements. LaRC has a multitude of public notice requirements associated with environmental compliance including, but not limited to, EPCRA Tier II and TRI reporting, various levels of NEPA notification actions, CERCLA notification actions, DEQ VPDES permitting, and DEQ air permitting. All public notices documentation is kept on file with NASA SPEEB and is available for viewing at any time.

Maintaining an Updated MS4 Program Plan - Section II B 2 a (2a)

Maintaining an updated MS4 Program Plan is an essential element to a successful MS4 management program. The responsibility for maintaining an updated Program Plan is with SPEEB. Updates to the MS4 Program Plan will be completed at a minimum of once a year and in compliance with Table 1 of the General Permit. Planned future updates to the MS4 Program Plan have been summarized in Section III (page 32) of this submittal. SPEEB will post a copy the most up-to-date version of MS4 program plan on LaRC's Environmental webpage at: <http://environmental.larc.nasa.gov/water/ms4/>

Notice to LaRC employees that the Program Plan has been updated and is available will be made through the internal @LaRC system. This system allows for notification to all employees. Records of these actions will be kept on file with SPEEB and in the @LaRC archives.

Posting Annual Reports - Section II B 2 a (2b)

SPEEB will post each annual report within 30 days of submittal to the DEQ and retain copies of annual reports online for the duration of the General Permit. The annual reports will be posted at: <http://environmental.larc.nasa.gov/water/ms4/>

Notice to LaRC employees that a new MS4 Annual Report is available will be made through the internal @LaRC system. This system allows for notification to all employees. Records of these actions will be kept on file with SPEEB and in the @LaRC archives.

Public Comment on MS4 Program Plan - Section II B 2 a (2c)

Prior to applying for renewed permit coverage, LaRC will notify the "public" (employees and contractors) and provide for receipt of comments on the proposed permit reissuance and MS4 Program Plan. This notification will be made at least 3 months in advance of reapplication to ensure adequate time for public comment and consideration.



Public Participation - Section II B 2 (b)

LaRC will participate, through promotion, sponsorship, or other involvement, in a minimum of four local events/activities annually. The activities shall be aimed at increasing public participation to reduce stormwater pollutant loads; improve water quality; and support local restoration and clean-up projects, programs, groups, meetings, or other opportunities for public involvement. NASA LaRC will utilize the @LaRC announcement webpage to promote local programs and events. Local programs such as Hampton Roads (HR) Green, the Chesapeake Bay Foundation, Hampton Clean City Commission, Master Gardeners, etc., and events like local Clean the Bay Days and the City of Newport News Rain Barrel Workshops will be promoted. The goal is to disseminate this information to as many LaRC employees as possible.

LaRC also participates in several internal “public” events such as an annual Earth Day and Arbor Day celebration. Stormwater-related educational information will be disseminated at these types of internal public events as they relate to the event. For example, at Arbor Day, event information on tree plantings and riparian buffer importance will be made available.

Annual Reporting Requirements - Section II B 2 (d)

LaRC will include the following information in each annual report:

- (1) A web link to the MS4 Program Plan and annual report; and
- (2) Documentation of compliance with the public participation requirements of this section.



MCM 3: Illicit Discharge Detection and Elimination (IDDE)

LaRC has worked hard over the years to develop an effective IDDE program. This version of the Program Plan continues to support and build upon previous efforts taken to build this program over the last decade.

Storm Sewer System Map - Section II B 3 a

LaRC has a robust GIS Department with experienced mapping capabilities. SPEEB has worked with the GIS team to develop an accurate MS4 map. LaRC's current storm sewer system map shows all conveyances channels, ditches, direction of flow, locations of MS4 outfalls with a unique identifier, topography, delineated drainage basins for each outfall, and the named water bodies.

LaRC will meet the requirement to have a complete and updated storm sewer system map and information table within 48 months of permit coverage (and likely before then).

The base stormwater map layer can be found at (inside firewall only):

<https://gis-portal.ndc.nasa.gov/arcgis/home/webmap/viewer.html?webmap=3a47a3cece5543339c8ac7d47ce65e4a>

Illicit Discharge Prohibition - Section II B 3 b

Illicit discharges are prohibited via Langley Procedural Requirements (LPR) 8500.1, also known as the "Environmental Program Manual." These policies are made available to Center personnel through the Langley Management System (LMS), the Environmental web site, and are also included in various Environmental Training sessions. The following statement is the Center's policy in LPR 8500.1 Section 5.2.3.1:

"5.2.3.1 The "Illicit Discharge Detection and Elimination" minimum control measure of Virginia's General MS4 Permit requires the Center to effectively prohibit non-stormwater discharges into the storm sewer system and implement appropriate enforcement procedures and actions. LaRC defines an illicit discharge as any discharge to the MS4 that is not composed entirely of stormwater, except for discharges allowed under the Center's VPDES permit, a discharge approved by DEQ in writing as a de minimis discharge that does not contain a significant amount of pollutants, waters used for firefighting operations/line flushing, and A/C condensate. Illicit discharges are not allowed on the Center and are subject to an array of enforcement actions."

IDDE Procedures - Section II B 3 c

NASA LaRC has written procedures to detect, identify, and address unauthorized non-stormwater discharges, including illegal dumping, to the MS4. These procedures are written in LaRC's IDDE Handbook. This handbook serves as an IDDE program summary and adequately addresses all of the requirements of General Permit Section II B 3 c. The Handbook discusses outfall screening, methodologies, inspection protocols, time frames, and source elimination.

Please see Appendix A for a copy of NASA LaRC's IDDE Handbook.



Public IDDE Reporting - Section II B 3 d

All LaRC employees are encouraged to report illicit discharges. Periodically, SPEEB runs @LaRC articles about illicit discharges and how to report them. Also, many of the environmental-related training programs detail IDDE and the importance of employee reporting.

Employees can report illicit discharges or illegal dumping activities to NASA SPEEB (specifically the Water Program Manager) by phone, email, or via the SPEEB website reporting link.

The IDDE reporting website can be found here: <http://environmental.larc.nasa.gov/water/idde/>

Annual Reporting - Section II B 3 b

LaRC will include the following information in each annual report:

- (1) A list of any written notifications of physical interconnection given by NASA LaRC to other MS4s;
- (2) The total number of outfalls screened during the reporting period, the screening results, and detail of any follow-up actions necessitated by the screening results; and
- (3) A summary of each investigation conducted by the operator of any suspected illicit discharge. The summary must include: (i) the date that the suspected discharge was observed, reported, or both; (ii) how the investigation was resolved, including any follow-up, and (iii) resolution of the investigation and the date the investigation was closed.



MCM-4: Construction Site Stormwater Runoff Control

NASA Langley Research Center has Annual Standards and Specifications for Stormwater Management (SWM) and Erosion and Sediment Control (ESC) that are integral components of LaRC's design, construction, maintenance, and management of the Center's facilities and operations. The primary regulatory driver for NASA LaRC Annual Standards and Specifications is the VSMP regulations (9 VAC 25-870), the General VPDES Permit for Discharges of Stormwater from Construction Activities (9 VAC 25-880/VAR10), Erosion and Sediment Control Law (9 VAC 25-840), EISA Section 438, and LaRC's MS4 permit (VAR040092). The NASA LaRC Annual Standards and Specifications for SWM and ESC submittal have been developed to provide detailed information regarding LaRC's compliance with all regulatory requirements.

Legal Authorities/Oversight Requirements - Section II 4e(1)

LaRC primarily uses contractors for land disturbing activities such as construction, deconstruction/demolition, and renovation projects. Therefore, the most effective policy tool for LaRC is contract and specification language requiring compliance with our MS4 program, DEQ's VSMP permit (9 VAC 25-880), DEQ's Erosion and Sediment control regulations (9 VAC 25-840), and NASA LaRC's Annual Standards and Specifications for ESC and SWM. Construction contracts include specific language requiring that the contractor remains compliant.

The NASA Environmental Master Specifications Section 01 35 40.00 41 is included in all construction contracts. This serves as LaRC's "regulatory mechanism" to ensure compliance. Please see section "3.3 Water Quality" of the NASA Environmental Master Specifications in Appendix B for language requiring the contractor to remain compliant.

Written Plan Review Requirements - Section II 4e(2)

Section 5.0 of NASA LaRC's Annual Standards and Specifications for ESC and SWM detail LaRC's stormwater construction program including ESC, SWMP, P2 and SWPPP Plan review and Plan revisions. The Annual Standards and Specifications for ESC and SWM also have the necessary documents used during plan reviews such as ESC and SWM Plan review checklists. This document and all necessary written plan review requirements can be found in Appendix C.

VSMP Specifications and Standards- Section II B 4 e(3)

NASA LaRC's Annual Standards and Specifications for ESC and SWM completely detail LaRC's stormwater construction program. The Annual Standards and Specification have been reviewed and approved by DEQ. This document can be found in Appendix C.

Inspection Procedures - Section II B 4 e(4)

Section 6.0 of NASA LaRC's Annual Standards and Specifications for ESC and SWM addresses stormwater construction inspection procedures. This document also has the necessary documents and templates used during inspections such as inspection report forms and corrective action notices. This document and all necessary written inspection procedures can be found in Appendix C.



Progressive Compliance and Enforcement Program - Section II B 4 e(5)

Section 7.0 of NASA LaRC's Annual Standards and Specifications for ESC and SWM addresses LaRC's stormwater construction program including the progressive compliance and enforcement strategies. This document can be found in Appendix C.

Roles and Responsibilities - Section II B 4 e(6)

Section 2.0 of NASA LaRC's Annual Standards and Specifications for ESC and SWM completely details NASA roles and responsibilities as related to the construction stormwater management program. NASA LaRC does not rely on any other entity to implement portions of the MS4 Program Plan. This document can be found in Appendix C.

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Annual Reporting - Section II B 4 (f)

LaRC will include the following information in each annual report:

- (1) The total number of regulated LDAs;
- (2) Total number of acres disturbed;
- (3) Total number of inspections conducted; and
- (4) A summary of the enforcement actions taken, including the number of and type.



MCM 5: Post-construction Stormwater Management

VSMP regulations, especially the new Technical Criteria Part II B, and the federal EISA Section 438 requirements have reinforced the importance of an effective post-construction stormwater management program. Permanent stormwater management facilities are used to limit/reduce pollutant loads and to maintain or restore predevelopment hydrology of the property with regard to temperature, rate, volume and duration of flow. NASA LaRC understands that these functional BMPs require long-term inspection and maintenance. LaRC has worked to develop a post-construction stormwater management program within the available resources of the Center. The efforts are combined among SPEEB, COD, Projects Engineering Branch (PEB), Maintenance and Operations Branch (MOB), and the Grounds Maintenance contract.

Additionally, NASA LaRC's Annual Specifications for ESC and SWM addresses post construction stormwater management. This document is being included by reference into MCM 5.

Legal Authorities - Section II B 5 (d) (1)

NASA LaRC ensures that required design criteria for stormwater runoff controls are implemented on development and redevelopment projects and that adequate post-construction stormwater management is implemented primarily through the annual NASA LaRC's Annual Specifications for ESC and SWM. This document has all the necessary written procedures for a successful program. In addition to the NASA LaRC Annual Standards and Specifications for ESC and SWM, projects are expected to comply with NASA Environmental Master SPEC Section 01 35 40.00 41, NASA Environmental Design Standards, and feedback through the design review process. These documents are incorporated by reference into NASA LaRC Annual Standards and Specifications for ESC and SWM. In combination these documents guide projects on proper ESC and SWM program implementation. The Environmental Design Standards apply to design work. The Master SPEC Section 01 35 40.00 41 apply to construction activity.

Please see Appendix B for a copy of the NASA Environmental Master SPEC Section 01 35 40.00 41.

Please see Appendix C for a copy of the NASA LaRC's Annual Standards and Specifications for ESC and SWM.

Written Procedures for SWM Facility Design/Installation - Section II B 5 (d) (2)

Sections 3.1 – 3.8 of NASA's Annual Standards and Specifications for ESC and SWM address SWM facility design criteria; however, the entire document should be considered when evaluating compliance with the Permit requirements. Please see Appendix C for a copy of the NASA LaRC's Annual Standards and Specifications for ESC and SWM.

In addition to the NASA LaRC's Annual Standards and Specifications for ESC and SWM which help ensure compliance with planning and design, the contractual NASA Environmental Master SPEC Section 01 35 40.00 41 utilizes language to help ensure compliance with MCM 5 during construction. Section 3.3.4 of the NASA Environmental Master SPEC Section 01 35 40.00 41 has written procedures for SWM facilities. Please see Appendix B for a copy of the NASA Environmental Master SPEC Section 01 35 40.00 41.

Inspection Policy for SWM Inspections - Section II B 5 (d) (3)

Section 10.0 of the NASA LaRC Annual Standards and Specifications for ESC and SWM addresses post-construction SWM inspections; however, the entire document should be considered when evaluating



compliance with the Permit requirements. Please see Appendix C for a copy of the NASA LaRC's Annual Standards and Specifications for ESC and SWM.

Private Owned SWM Facilities - Section II B 5 (d) (4)

There are no privately owned stormwater management facilities at NASA LaRC. All stormwater management facilities are operated-owned, inspected, and maintained by NASA.

Operator Owned SWM Facilities - Section II B 5 (d) (5)

Section 10.1 – 10.3 of the NASA LaRC Annual Standards and Specifications for ESC and SWM addresses post-construction SWM inspections and maintenance; however, the entire document should be considered when evaluating compliance with the Permit requirements. A copy of the inspection report from used by NASA SPEEB for post construction inspections can be found in Appendix C of the NASA LaRC Annual Standards and Specifications for ESC and SWM.

Roles and Responsibilities - Section II B 5 (d)(6)

NASA LaRC's Annual Standards and Specifications for ESC and SWM completely detail LaRC's stormwater post-construction program including roles and responsibilities. This document can be found in Appendix C.

Basic roles and responsibilities are as follows:

- MS4 MCM 5 Oversight – SPEEB is the primary entity responsible for ensuring that the MS4 Program Plan is properly updated and implemented. SPEEB will lead the way for advocating for funding to implement this program.
- SWM Facility Design– Design Contractors, COD, PEB, and SPEEB all have responsibilities and roles to play to ensure that SWM facilities are properly designed. Each of the entities is responsible for participating during LaRC's design process. This is discussed in LaRC's Annual Standards and Specifications for ESC and SWM.
- SWM Facility Inspection – SPEEB and LaRC's construction inspection contractor are the primary entities on Center for SWM facility inspection. SPEEB will conduct long-term maintenance inspections and the construction inspection contractor performs inspections during construction.
- SWM Maintenance – SPEEB, COD, MOB and LaRC's Grounds Maintenance Contractor all have various responsibilities to ensure maintenance is completed. SPEEB, COD and MOB perform oversight and funding for these operations. The Grounds Maintenance contractor is primarily responsible for the maintenance work.

NASA LaRC does not rely on any other entity to implement portions of the MS4 Program Plan.

Annual Reporting - Section II B 5 e

In each Annual Report, LaRC will submit a spreadsheet database submittal that includes the following:

- (1) The stormwater management facility type;
- (2) A general description of the facility's location, including the address or latitude and longitude;
- (3) The acres treated by the facility, including total acres, as well as the breakdown of pervious and impervious acres;



- (4) The date the facility was brought online (MM/YYYY). If the date is not known, the operator shall use June 30, 2005, as the date brought online for all previously existing stormwater management facilities;
- (5) The sixth order hydrologic unit code (HUC) in which the stormwater management facility is located;
- (6) The name of any impaired water segments within each HUC listed in the 2010 § 305(b)/303(d) Water Quality Assessment Integrated Report to which the stormwater management facility discharges;
- (7) Whether the stormwater management facility is operator-owned or privately-owned;
- (8) Whether a maintenance agreement exists if the stormwater management facility is privately owned; and
- (9) The most recent inspection of the stormwater management facility. LaRC will also annually track and report the total number of inspections completed and, when applicable, the number of enforcement actions taken to ensure long-term maintenance.



MCM 6: Pollution Prevention/Good Housekeeping for Operations

Over the last several MS4 permit cycles, LaRC has been building a quality stormwater pollution prevention (P2) program. LaRC uses a variety of operational and maintenance BMPs to ensure that Center operations are accomplished in a way as to minimize or prevent pollutant discharges. In addition to the MS4 permit, LaRC also operates under an individual VPDES permit that permits cooling tower blowdown, compressor blowdown, and few select processes. This permit has a DEQ approved Operations and Maintenance (O&M) manual that covers many aspects of this MCM as well, especially maintenance procedures. This O&M manual is included by reference into the MS4 Program Plan.

Written Procedures for Operations and Maintenance Activities - Section II B 6 f (1)

In compliance with MS4 requirements, LaRC implements the following written procedures designed to minimize or prevent pollutant discharge from: (i) daily operations such as road, street, and parking lot maintenance; (ii) equipment maintenance; and (iii) the application, storage, transport, and disposal of pesticides, herbicides, and fertilizers. These written procedures are designed to:

- Prevent illicit discharges;
- Ensure the proper disposal of waste materials, including landscape wastes;
- Prevent the discharge of municipal vehicle wash water into the MS4 without authorization under a separate VPDES permit;
- Prevent the discharge of wastewater into the MS4 without authorization under a separate VPDES permit;
- Require implementation of best management practices when discharging water pumped from utility construction and maintenance activities;
- Minimize the pollutants in stormwater runoff from bulk storage areas (e.g., salt storage, topsoil stockpiles) through the use of best management practices;
- Prevent pollutant discharge into the MS4 from leaking municipal automobiles and equipment; and
- Ensure that the application of materials, including fertilizers and pesticides, is conducted in accordance with the manufacturer's recommendations.

Daily Operations Pollution Prevention and Good Housekeeping Program

Outfall Booms and Treatment Devices

Inspections are performed and documented weekly at MS4 outfalls by SPEEB. If any abnormal conditions are identified, a work request is completed and a Work Order is sent to the LaRC maintenance contractor to correct the problem promptly. Absorbent pads and booms are placed at Outfalls 003, 008, 009, and 012 as a cautionary pollution prevention measure. The Center's maintenance contractor performs weekly preventive maintenance (PM) at these four outfalls. The weekly PM consists of: (1) Making a visual inspection at the outfall; (2) Inspecting the outfall for oil and/or trash; (3) Removing any trash accumulated in the outfall; (4) Replacing the oil boom and/or absorbent pads as needed; and (5) Reporting any abnormal conditions or corrective actions needed to the SPEEB.

Street Sweeping

Street sweeping is LaRC's preferred method to prevent stormwater pollution coming from our streets. Street sweeping is aimed at collecting debris and floatables prior to being washed into the MS4 and discharged into local waterways. Pavement street sweeping is scheduled four times annually (Jan/Apr/July/Oct) through a contracted service company. Grounds maintenance is in charge of managing the street sweeping contract and reporting street sweeping data to SPEEB for tracking and reporting. Street sweeping data, including cubic yards of debris collected, can be viewed by contacting SPEEB.



Catch Basin Maintenance

LaRC has 761 catch basins on Center. Many of these are located in streets and parking areas. These catch routine sediment and debris that accumulates over time. The grounds maintenance contract was developed with catch basin maintenance procedures and requirements. Catch basins are cleaned of all debris that has accumulated, and all drain lines to and from the basin are kept free of blockage and open to drain freely. The grounds maintenance contractor disposes or composts the debris off Center on the same day of collection. Catch basin maintenance data, including cubic yards of debris collected, can be viewed by contacting SPEEB.



Ditch Maintenance

NASA LaRC has an extensive system of grass-lined ditches (~62,000 linear feet) and paved ditches (~2,800 linear feet). The grounds maintenance contractor has the responsibility for ditch maintenance. The contract has written procedures for ditch maintenance. The contract requires that vegetative growth in drainage ditches be cut to a height of 2 inches on the bottom and sides. All wood and brush, cuttings, trash and debris are to be removed and disposed of the same day of cleaning. Mouths of ditches, inlets and outlets shall be cleared of sediment, vegetation and debris to allow unrestricted flow of water. Where ditch bottoms are paved, all mud and debris is to be removed from the paved surface and disposed of properly the same day of cleaning. All paved ditches surfaces are cleaned once per year per the contract. All non-paved ditches are cleaned and maintained four times per year. Ditch maintenance data, including cubic yards of debris collected, can be viewed by contacting SPEEB.

Leaf Collection Activities

The grounds maintenance contract requires the selected contractor to perform leaf collection and removal of pine straw, pinecones, limbs and other debris across the Center three times per year (October, November and January). All leaf debris collected is composted on Center or at Big Bethel landfill's composting operation. Leaf collection data, including cubic yards of debris collected, can be viewed by contacting SPEEB.

Landscape Maintenance/Debris

LPR 8500.1 prohibits the grounds maintenance contractor from blowing or sweeping yard trimmings into the MS4. Additionally, this language was put directly into their scope of work. Grass clippings are returned to the lawn to restore important nutrients. The grounds contractor also periodically trims shrubs, bushes and trees. This type of woody debris is collected and composted off-Center at Big Bethel landfill.

“Municipal” Yard Inspections

SPEEB will inspect all yard-type areas, the hazardous waste facility and the composting area throughout the year. Issues such as evidence of illegal dumping, illicit connections to the storm sewer system, and flows during dry weather will be looked for and eliminated if found. SPEEB will also look for good housekeeping and if any P2 practices could be implemented. A minimum of four “yard” inspections will be completed each Permit Year.

Multi-Media Environmental Audits

SPEEB conducts at least 40 multi-media environmental audits per fiscal year in facilities with the largest potential environmental threats. These audits include identifying potential threats to the stormwater system (leaky equipment, checking sump pumps, secondary containment for drums, etc.) and providing ways to reduce any identified threats.



Equipment Maintenance

Dewatering of Utility Construction and Maintenance Activities

Periodically LaRC needs to dewater utility pits, especially water from the steam tunnels. Many of these areas collect rainwater and steam condensate over time. LaRC’s Center-wide maintenance contractor has the responsibility to pump these areas out. SPEEB has worked with this contractor on procedures for pumping these out in an environmental-friendly way.

- For rainwater pump outs, the contractor pumps water to a grassy area for filtration through the grass away from any storm drainage conveyances (if possible).
- If water shows any signs of sediment-related issues, the dewatering operation must use a dewatering bag prior to discharge over a grassy area.
- If the water has any concerns for pollutants (heavy metals, oil/grease from hydraulic lines, etc.) the contractor notifies SPEEB to take a water sample for analysis by a local lab. Once the analysis of the water is complete, SPEEB makes the decision on the way to properly dispose of the water such as discharge to HRSD (with written approval), pump and haul off Center, or discharge to the ground (if no pollutants are present).
- For construction-related dewatering operations, the contractor must dewater in accordance with their approved SWPPP. Contractors are notified to work with SPEEB on developing a dewatering plan from construction areas. Typically, SPEEB requires dewatering bags or similar BMPs for this type of action.

Spill Containment Areas for Equipment Storage

The Building 1187 area is the primary storage area for many pieces of maintenance equipment such as emergency generators. This equipment is stored under a permanent canopy to limit exposure to stormwater. In addition, all of this equipment is stored in a large poured concrete/asphalt spill containment berm. The area also has easy access to spill containment kits. Employees in this area have been and will continue to be trained to look for illicit discharge and on proper spill response.



Salt Storage

NASA LaRC uses salt and brine solutions on roadways and sidewalks during wintery conditions. All winter salt products are stored inside or in tanks and have no exposure to stormwater.

Underground Storage Tanks (USTs)

NASA LaRC has four (4) active USTs on Center. All USTs at LaRC are equipped with electronic leak-detection systems. In addition, product inventory records are maintained by operating personnel at each facility where USTs are located. Facilities maintenance support contractors visually inspect the ASTs each time they are filled with product. In addition, documented AST inspections are performed in accordance with Virginia AST and EPA SPCC regulations. Records of AST inspections are kept in the SPEEB files.

Application, Storage, Transport and Disposal of Pesticides, Herbicides, and Fertilizers

LaRC's policy regarding the use of pesticides, herbicides and fertilizers is to follow Integrated Pest Management (IPM) practices whenever possible and to use the absolute minimum amount of pesticides,



herbicides, and fertilizers on Center as necessary. LaRC has no applicable lands where nutrients are applied to a contiguous area of more than 1 acre.

Fertilizers

Much of the Center's land and foliage is allowed to grow naturally, without any fertilizer. Grass clippings are returned to the lawn to restore important nutrients and avoid the need for fertilizers. In general, LaRC does not routinely apply fertilizers. Fertilizers are used when planting new trees, shrubs, and grass areas (post disturbance, etc.) to help establish the new vegetation. Once established, vegetation is not fertilized unless the health of the vegetation (spot treatments) requires it.

Pesticides

Of the Center's 764 acres of land, less than one-twentieth of one percent is treated with pesticides. These treatments are on an as needed basis and applications are limited to minimal quantities. The Grounds Maintenance contractor manages the pesticide program at NASA LaRC. Pesticides include insecticides, herbicides, rodenticides, termiticides and avicides. The contractor uses only EPA approved/registered pesticides upon approval and issuance of a NASA safety permit for the use of potentially hazardous materials. The pesticides are mixed, stored and applied according to their current Federal use restrictions. As required by law, records of restricted use pesticides are maintained by the contractor. IPM practices are used by the contractor wherever possible and application is performed or supervised by state-certified applicators and/or registered technicians. Chemical spraying is performed only on still days and is delayed when unfavorable weather or other conditions exist which would unduly increase the hazard to personnel or the environment.

General pest control at LaRC is performed by way of service request and involves the mitigation of cockroaches, water bugs, ants, rodents, fleas, mites, spiders, wasps and other arthropoda. Wood destroying pest control, animal and bird control, ornamental and turf pest control are other operations performed by the contractor on an as needed basis. The contractor also performs scheduled and preventative maintenance pesticide application at NASA LaRC. Food processing areas of building 2102 are treated on a twice-monthly preventative maintenance schedule.

Herbicides

Herbicide application provides non-crop control of emerged annual and perennial weeds with glyphosate used exclusively. Herbicides are not applied to large grassy areas, these areas are allowed to grow naturally and only receive routine mowing. Herbicides are typically only used to treat areas fence lines, right of ways, outdoor electrical substations and large gravel fenced enclosures. Application rates are based on product label recommendations. Between 800 and 1000 gallons of diluted herbicides are applied annually at NASA LaRC.

Storage of Pesticides, Herbicides, and Fertilizers

All products are stored in Buildings 1285 (Landscape Maintenance and Storage Facility) and have no exposure to stormwater. There are also no floor drains and the buildings have the necessary equipment to clean up any spills. All products are stored in elevated locked cabinets at Building 1285 to minimize flooding-related issue should that situation arise. All products are tracked in the Chemical Management Tracking System (CMTS). The CMTS system is updated by the Facility Coordinator when products are purchased, used, transferred, or disposed of. The system also houses an MSDS for each product. At any time, LaRC has accurate data on all products stored on Center through the CMTS.

Disposal

The Grounds Maintenance contract is written with specific language requiring the proper disposal of these products. All products are disposed of in accordance with product labels and state regulations.



High Priority Facilities Analysis- Section II B 6 f (2)

NASA LaRC has assessed all facilities on Center for their potential of discharging pollutants. In general, LaRC has a low risk for facilities discharging pollutants due to various procedures in place and LaRC’s practice of material storage with no exposure to stormwater. Additionally, many facilities addressed in the MS4 permit are already covered under LaRC’s VPDES Permit #VA0024741 or LaRC’s General VPDES for Vehicle Wash Facilities (VAG750198). Facilities covered under a separate VPDES permit shall adhere to the conditions established in that permit and are excluded from this requirement. LaRC only identified the composting facility/area as a high priority facility.

Composting Facility/Area – The Center operates an informal composting area and landscape material storage area in the fields near B1285. This area is primarily used for composting leaves and other landscaping debris (gumballs, small branches, etc.). The area selected is surrounded by grass and has no storm inlets or ditches nearby. The potential for any stormwater runoff is limited; however, this area could be improved. This operation poses the greatest risk (not covered by another DEQ permit) for stormwater runoff. Additionally, LaRC is interested in expanding its composting operation, so the risk to the MS4 could be expanded. LaRC will develop and implement a specific stormwater pollution prevention plans (SWPPP) for this high-priority facility. LaRC will development and implement this SWPPP within 48 months of coverage.

Nutrients and Turf Management - Section II B 6 f (3)

LaRC will continue to strictly limit the use of nutrients and fertilizer application on pervious turf areas. LaRC has no applicable lands where nutrients are applied to a contiguous area of more than 1 acre.

Annual Training Plan - Section II B 6 f (4)

NASA LaRC has developed an annual training plan including a schedule of training events that ensures implementation of the training requirements as follows:

Training Requirements	Selected Audience	Training Program(s) and Frequency
Training for applicable field personnel in the recognition and reporting of illicit discharges	Facility Environmental Coordinators	Annual FEC Training – 3 classes
	Standard Practice and Environmental Engineering Branch (SPEEB), employees and Jacobs (primary Center contractor) Personnel, and any interested LaRC personnel	Illicit Discharge Specific Stormwater Management Training – 1 class
	Personnel who handle waste on Center.	LaRC Annual Waste Management/ Spill Response Training – 4 classes
Training for applicable employees in good housekeeping and pollution	Grounds Maintenance Contractor	Grounds Specific Stormwater Management Training– 1 class



prevention practices that are to be employed during road, street, and parking lot maintenance		
Training for applicable employees in good housekeeping and pollution prevention practices that are to be employed in and around maintenance and public works facilities.	Facility Environmental Coordinators	Annual FEC Training – 3 classes
	Jacobs (primary Center contractor) Personnel	Maintenance Specific Stormwater Management Training – Biennial
Ensure that employees, and require that contractors, who apply pesticides and herbicides are properly trained or certified in accordance with the Virginia Pesticide Control Act (§ et seq. of the Code of Virginia).	Grounds Maintenance Contractor	LaRC's Ground Contract requires that the selected contractor have properly trained and certified personnel to work on Center.
Ensure that employees and contractors serving as plan reviewers, inspectors, program administrators, and construction site operators obtain the appropriate certifications as required under the Virginia Erosion and Sediment Control Law	Standard Practice and Environmental Engineering Branch (SPEEB)	LaRC's VSMP Specifications and Standards are written to ensure LaRC has properly certified personnel for both SWM and ESC. Please see Section 2.0 of Appendix C for more specific information on current staff and their certifications.
Training for applicable employees in good housekeeping and pollution prevention practices that are to be employed in and around recreational facilities.	Facility Environmental Coordinators	Annual FEC Training – 3 classes
	General LaRC population	Illicit Discharge Specific Stormwater Management Training – 1 class
Emergency response employees shall have training in spill responses.	All applicable Center Personnel.	LaRC Annual Waste Management/ Spill Response Training- 4 classes

Annual Reporting - Measurable Goals - Section II B 6 g

LaRC will include the following information in each annual report:

- A summary report on the development and implementation of the daily operational procedures;
- A summary report on the development and implementation of the required SWPPPs;



- A summary report on the development and implementation of the turf and landscape nutrient management plans that includes:
 - (a) The total acreage of lands where turf and landscape nutrient management plans are required; and
 - (b) The acreage of lands upon which turf and landscape nutrient management plans have been implemented; and
- A summary report on the required training, including a list of training events, the training date, the number of employees attending training and the objective of the training.



TMDL Special Conditions Compliance other than Chesapeake Bay TMDL

LaRC is not currently subject to any TMDL waste load allocations (WLA) outside of the Chesapeake Bay TMDL. A previous TMDL for the Back River (Bacteria) has been pulled back, revised, and reissued. The final TMDL did not assign a WLA to NASA LaRC due to a lack of sources as indicated in the final study. No updated TMDL action plans are required at this time (aside from the Chesapeake Bay TMDL).

Total Maximum Daily Load (TMDL) Special Conditions Compliance

NASA LaRC has developed a Chesapeake Bay TMDL Action Plan. This action plan was submitted with the Year 2 Annual Report and was approved by DEQ on December 11, 2015. Please see Appendix D for a copy of the DEQ approval letter.



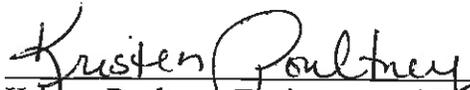
3 Future Program Plan Updates Schedule

Outfall Map Completed – (MCM 3 – Illicit Discharge Detection and Elimination) – Applicable to new boundaries identified as “urbanized” areas in the 2010 Decennial Census	Section II B 3 a (3)	To be completed by June 30, 2017 and submitted with the 2017 Annual Report
SWPPP Implementation – (MCM 6 – Pollution Prevention/Good Housekeeping for Municipal Operations)	Section II B 6 b (3)	To be completed by June 30, 2017 and submitted with the 2017 Annual Report.
NMP Implementation – (MCM 6 – Pollution Prevention/Good Housekeeping for Municipal Operations)	Section II B 6 b (3)	Does not apply to NASA LaRC, fertilizer is not applied to urban pervious surfaces.



4 Signed Certification Statement in accordance with 9 VAC 25-890-40

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations."



Kristen Poultney, Environmental Branch Head

6/27/16
Date

Note: The Center Director has authorized the position of Environmental Branch Head and Acting Environmental Branch to have signatory authority for all MS4 related submittals (excluding the registration statement). This was done in a letter dated May 25, 2015 which was submitted and approved by DEQ Tidewater Region Office MS4 staff.



Appendix A: NASA LaRC's IDDE Handbook

NASA Langley Research Center

Illicit Discharge Detection and Elimination (IDDE) Handbook

A resource guide for employees



**Developed by the NASA LaRC Standard Practice and Environmental Engineering
Branch for compliance with MS4 Permit Minimum Control Measure Three**

Section 1 - Introduction

This handbook has been prepared to ensure compliance with the Department of Environmental Quality's *General Permit for Discharges under the Virginia Stormwater Management Program and the Virginia Stormwater Management Act* (General Permit #VAR040092). Specifically, this handbook covers the requirements listed in General Permit Section II 3 *Illicit Discharge Detection and Elimination*.

The Center's Illicit Discharge Detection and Elimination (IDDE) program is managed by the Standard Practice and Environmental Engineering Branch (SPEEB). For any questions regarding the MS4 program or illicit discharges please contact:

Peter Van Dyke
Water Program Manager
757-864-7517
peter.vandyke@nasa.gov

Ande Remington
Environmental Specialist
757-864-2451
ande.remington@nasa.gov

Section 2 - IDDE Policy

LaRC has worked diligently to develop an effective illicit discharge detection and elimination program. This version of the Program Plan continues to support and build upon previous efforts taken to build this program over the last decade. This manual provides written procedures to detect, identify, and address unauthorized nonstormwater discharges, including illegal dumping, to the small MS4 as required in General Permit No. VAR040092, Section II 3 C.

Illicit discharges are prohibited via Langley Procedural Requirements (LPR) 8500.1, also known as the "Environmental and Energy Program Manual." These policies are made available to Center personnel through the Langley Management System (LMS), the Environmental web site, and are also included in various Environmental Training sessions. LPR policies are LaRC's most effective legal mechanism as the Center does not have municipal ordinances. The following statement the Center's policy in LPR 8500.1 Section 5.2.3.1:

"5.2.3.1 The "Illicit Discharge Detection and Elimination" minimum control measure of Virginia's General MS4 Permit requires the Center to effectively prohibit non-stormwater discharges into the storm sewer system and implement appropriate enforcement procedures and actions. LaRC defines an illicit discharge as any discharge to the MS4 that is not composed entirely of stormwater, except for discharges allowed under the Center's VPDES permit, a discharge approved by DEQ in writing as a de minimis discharge that does not contain a significant amount of pollutants, waters used for firefighting operations/line flushing, and A/C condensate. Illicit discharges are not allowed on the Center and are subject to an array of enforcement actions."

Section 3 - What does an Illicit Discharge look like anyway?

Illicit discharges can come in and from a seemingly endless amount of places and take many forms. There are three primary classifications of illicit discharge as defined by the EPA:

Continuous	Discharges occur most or all of the time, are usually easier to detect, and typically produce the greatest pollutant load.
Intermittent	Discharges occur over a shorter period of time (e.g., a few hours per day or a few days per year). Because they are infrequent, intermittent discharges are hard to detect, but can still represent a serious water quality problem, depending on their flow type.
Transitory	These discharges are extremely hard to detect with routine monitoring, but under the right conditions, can exert severe water quality problems on downstream receiving waters. These discharges occur rarely, usually in response to a singular event such as an industrial spill, ruptured tank, sewer break, transport accident or illegal dumping episode.

Illicit discharges can be from:

- Disposal of vehicle maintenance fluids into a storm drain;
- Hosing or washing loading areas in the vicinity of storm drain inlets;
- Leaking dumpsters flowing into a storm drain inlet;
- Old and damaged sanitary sewer line leaking fluids into a cracked or damaged storm sewer line;
- Illegal dumping;
- Allowing unauthorized wash water with soaps or detergents into a storm drain inlet;
- Washing silt, sediment, concrete, cement or gravel into a storm drain;
- Dewatering of trenches or excavations for utility maintenance or construction; and/or
- A measurable flow during dry weather that contains pollutants or pathogens

Dry weather discharges are composed of one or more possible flow types:

- Sewage flows produced from sewer pipes;
- Washwater flows are generated from a wide variety of activities and operations;
- Liquid wastes refer to a wide variety of flows, such as oil, paint, and process water that enter the storm drain system;
- Tap water flows are derived from leaks and losses that occur during the distribution of drinking water in the water supply system; and
- Groundwater and spring water flows occur when the local water table rises above the bottom elevation of the storm drain and enters through cracks or joints.

Illicit connections can also be considered illicit discharges. Essentially, an illicit connection is any man-made conveyance that is connected to a MS4 without a permit, excluding roof

drains and other similar type connections. Examples of illicit connections include, but are not limited to, the following:

- Sanitary sewer piping that is connected directly from a building to the stormwater system;
- A sink plumbed to storm;
- A basement or shop floor drain that is connected to the stormwater system; or
- A cross connection between the municipal sanitary sewer and the stormwater system.

Examples of Potential Illicit Discharges



Section 4 - Investigation Procedures

Illicit discharges and connections can be identified in a variety of ways. Notifications can be made through employee, construction site operators, inspectors, or other routine environmental site activities. By far the most common way to pinpoint illicit discharges is a dry weather field screening program. Methodologies for dry weather screening are indicated below.

Incident Reporting

The Environmental and Energy Program Manual (LPR 8500.1) also provides information on applicable regulatory requirements and procedures related to spill control at LaRC. The

Center's Hazardous Materials Spill Contingency Plan, Oil Discharge Contingency Plan, and Oil Spill Prevention Control and Countermeasure (SPCC) Plan have been combined into one document called the NASA LaRC Integrated Spill Contingency Plan (ISCP). The plan is available in the LaRC LMS as LPR 8715.12. Any LaRC personnel or on-site contractors who discover a release of material shall respond by calling the LaRC Emergency Dispatcher at 911 (from land line phone on Center). Alternate phone numbers for the Emergency Dispatcher are: 757-864-2222 (Cell Phone) or 757-864-5500 (Business Number). The LaRC Emergency Dispatcher will initiate spill response with the LaRC Fire Department. Center employees can also call the Environmental staff at 757-864-3500 for concerns over potential illicit discharges. In addition, MS4 Program Staff and contact information are identified above in Section 1 – Introduction.

Employee Illicit Discharge Reporting

All LaRC employees are encouraged to report illicit discharges and illegal dumping activities. Periodically, SPEEB runs @LaRC articles about the IDDE and how to report it. Also, many of Environmental training programs detail IDDE and the importance of employee reporting. Employees can report illicit discharges or illegal dumping activities to NASA SPEEB (specifically the Water Program Manager) by phone, email, or via the SPEEB website reporting link.

The IDDE reporting website can be found here:
<https://sites-e.larc.nasa.gov/environmental/water/idde/>

Outfall Screening

LaRC has sixteen (16) outfalls. A prioritization for schedule for field screening is not needed given the small number of outfalls. As there are fewer than 50 outfalls in the MS4, all outfalls are inspected at least annually as required in MS4 Permit Section II B 3 c. (1)(b). MS4 Program staff inspect and screen outfalls on a much more frequent basis, usually weekly and/or in response to site specific concerns where a discharge from construction or other operations is believed to have occurred. LaRC's individual VPDES permit requires monthly documented outfall inspections.

Dry Weather Field Screening Methodologies

The following methodology will be used to determine the source of all illicit discharges. NASA Langley's outfall network consists largely of smaller diameter outfalls and a simple drainage network that is well mapped, suspected illicit discharges will be investigated using the EPA method of following up the network or the "Up the Trunk" approach, where field crews start with the manhole closest to the outfall, and progressively move up the network, inspecting manholes until indicators reveal that the discharge is no longer present. The goal is to isolate the discharge between two storm drain manholes.

Only trained inspectors should perform IDDE field screening activities. All field investigations should be fully documented. The following general information and documentation applies to this methodology:

- The Dry weather field screening shall be conducted using the Dry Weather Outfall Inspection and Illicit Discharge Detection and Elimination Report form. This form can be found in Appendix A of this document.
- Inspectors may pull rain fall data on the time of the last rain and the amount of the last rain from <http://www.wunderground.com/cgi-bin/findweather/hdfForecast?query=23681> Langley Air Force Base has a station associated with this site.
- Inspectors may pull site descriptions and information on the drainage system (topography, drainage flow, conveyance type) from LaRC's GIS database.

Response Timeframes and Methodology for Source Identification

The following timeframes apply to any investigations to identify and locate the source of any observed continuous or intermittent nonstormwater discharges: (i) illicit discharges suspected of being sanitary sewage or significantly contaminated must be investigated first and (ii) investigations of illicit discharges suspected of being less hazardous to human health and safety such as noncontact cooling water or wash water may be delayed until after all suspected sanitary sewage or significantly contaminated discharges have been investigated, eliminated, or identified. Discharges authorized under a separate VPDES or state permit require no further action.

If an illicit discharge is found, but within six months of the beginning of the investigation neither the source nor the same nonstormwater discharge has been identified, then LaRC will document such in accordance with Section II B 3 f. If the observed discharge is intermittent, LaRC will document that a minimum of three separate investigations were made in an attempt to observe the discharge when it was flowing. If these attempts are unsuccessful, LaRC will document such in accordance with Section II B 3 f. All documentation will kept in the MS4 files with SPEEB.

Mechanisms for Source Elimination

MS4 program staff is located in NASA Langley's Standard Practice and Environmental Engineering Branch, which is organized under the Center Operations Directorate (COD). COD is the directorate responsible for center operations including maintenance of stormwater and wastewater infrastructure. SPEEB works closely with other Branches within COD to ensure environmental compliance at the Center. LaRC's Environmental Policies are documented in LPR 8500.1, Environmental and Energy Program Manual and specifically addresses illicit discharges as prohibited as indicated above in "Section 2 - IDDE Policy." This policy document, as well as specific contract language, serves as the Center's legal authority to eliminate identified sources of illicit discharges. In addition, all of the areas within the NASA Langley MS4 boundaries are owned by and under the control of NASA.

NASA SPEEB can advocate for funding, if needed, based on IDDE policies, the MS4 Permit, and general compliance. Should an illicit discharge need funding to be eliminated, SPEEB will lead the effort to obtain funding. If an illicit discharge is found within a specific project or organization, SPEEB may require that organization to eliminate the illicit discharge at their expense.

The Center also has two contracts in place to help eliminate illicit discharges. The Grounds Management Contract is a vehicle that can be used to eliminate illicit discharges, especially any related to trash, debris, and sediment. The Center Maintenance contract is a vehicle that can be used to eliminate improper equipment discharges, cross connections, improperly plumbing, drips/leaks/spills, etc. This contract has a short and urgent crew that can be tasked with this type of work.

Methodology for Follow-Up Investigation and Tracking

A similar methodology to source identification will be used as a follow-up investigation to verify the elimination of illicit discharges. Again, NASA Langley's outfall network consists largely of smaller diameter outfalls and a simple drainage network that is well mapped. Once sources of illicit discharge have been addressed, field crews will re-visit the isolation point between the two manholes from the source identification and re-assess the upstream manhole to verify elimination of the suspected source. In addition, to ensure the source has been correctly identified and eliminated, field crews will again assess the individual drainage network from the outfall up stream of the network. If an illicit discharge was more equipment or plumbing based, SPEEB will revisit the site and ensure the plumbing was corrected, cross connection eliminate, leak stopped, etc.

Public Notification and Participation

MS4 staff will investigate any complaints received from employees or contractors on Center and conduct follow-up inspections where necessary to ensure corrective measures have been implemented by the responsible party. Neighboring areas outside the MS4 would also be notified in the event that an illicit discharged is suspected of being hazardous to human health and safety.

All LaRC employees are encouraged to report illicit discharges. Periodically, SPEEB runs @LaRC articles about the IDDE and how to report it. Also, many of Environmental training programs detail IDDE and the importance of employee reporting. Employees can report illicit discharges or illegal dumping activities to NASA SPEEB (specifically the Water Program Manager) by phone, email, or via the SPEEB website reporting link.

Annual reports for the MS4 permit are posted on a website accessible to all Center employees. As indicated above, any reports of illicit discharge investigation will be included in this reporting package and therefore will be viewable by the public.

Record Keeping

NASA SPEEB will track (1) dates that an illicit discharge was observed and/or reported, (2) the results of the investigation, (3) any follow-up to the investigation, (4) resolution to the investigation, and (5) the date that the investigation was closed. Records will be kept of these inspection forms as well as any correspondence from reporting as well as work orders, or other records of corrective actions as appropriate. These documents will be kept on the Center's Environmental Management Branch (Standard Practice and Environmental Engineering Branch server). In the event of an illicit discharge investigation, a report will be filed to indicate the observation dates (along with the field forms), the results of the investigation, follow-up actions, resolution of the investigation as well as the date the investigation was closed. This report will become part of the permit record and will be included in annual reporting for the MS4.

APPENDIX A

Outfall and IDDE Inspection Report	
Team Member:	Investigation Date:
Outfall #: _____ Receiving Waterbody: _____	
Date/Quantity of Last Rainfall Event _____	
Site Description (Conveyance Type) _____	
Width of Water Surface _____ Approximate Depth of Flow _____	
Approximate Flow Velocity _____ Flow Rate _____	
DOCUMENT VISUAL OBSERVATIONS BELOW:	
1. Is there a dry weather flow? Yes <input type="checkbox"/> No <input type="checkbox"/>	
2. If "YES", what is the outfall flow estimate?	
3. Are there any indications of an intermittent flow? Yes <input type="checkbox"/> No <input type="checkbox"/>	
4. Are there any indications of illegal dumping? Yes <input type="checkbox"/> No <input type="checkbox"/>	
5. Are there any indications of pollution? Yes <input type="checkbox"/> No <input type="checkbox"/>	
6. When was the last rainfall and how much rain fell?	
DOCUMENT PHYSICAL OBSERVATIONS BELOW:	
(a) ODOR: None Sewage Sulfide Oil/gas Rancid/sour Other:	
(b) COLOR: None Other:	
(c) TURBIDITY: None Cloudy Opaque	
(d) FLOATABLES: None Oil Sheen Sewage Other:	
(e) DEPOSITS/STAINS: Non Sediment Oily Other:	
(f) VEGETATION CONDITION: Normal Excessive Growth Inhibited growth	

(g) DAMAGE TO OUTFALL STRUCTURES/STRUCTURAL CONDITION:

Comments:

(h) BIOLOGY

7. Is there a suspected illicit connection? Yes No

If "YES", what is the suspected source?

8. Has the investigation of suspected illicit connection been completed? Yes No

9. Was the source of the illicit connection found? Yes No

If "YES", identify the source:

What plan of action will follow to eliminate the illicit connection?

Resolution:

Inspector's Name:

Title:

Signature:

Date:



**Appendix B: NASA Environmental Master Specifications Section 01 35
40.00 41**

01 35 23.00 41 (MAY 2012)

NOTE: This guide specification covers the requirements for section scope.

SECTION 01 35 40.00 41

NASA LANGLEY ENVIRONMENTAL REQUIREMENTS
01/16

NOTE: Section updated, M. Proctor 1-15-16

Section updated, M. Proctor 9-25-15

Section updated, M. Proctor 7-2-15

Section updated, M. Proctor & P. Van Dyke 2-19-15

Section updated, Mason Proctor 8-21-14

Section updated (G added to submittals), Mason Proctor 7-31-14

Section updated, P. Van Dyke 5-27-14

Section updated, Mason Proctor 5-8-14

Section updated 4-10-14, Mason Proctor

Section updated 3-10-14 (P. Van Dyke)

Section updated, per Mason Proctor, 8-6-13.

NOTE: The requirements defined herein are job related environmental requirements and can be selected by the engineer in accordance with the contract's requirements. Specific deviations, deletions, or modifications of the requirements relative to a given subheading are not permitted without concurrence of the LaRC Environmental Office.

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of these specifications to the extent referenced. The publications are referred to in the text by the basic designation only.

The listed versions of the following references were used during the development of this design and are the Government approved versions to be used herein. There may be newer versions of certain references that have been released since the commencement and/or approval of the design effort. However, in order to comply with the Government technical requirements, not all of the latest versions of the listed references were adopted and the versions listed herein shall be utilized.

AMERICAN NURSERY & LANDSCAPE ASSOCIATION (ANLA)

ANSI/ANLA Z60.1 (2004) American Standard for Nursery Stock

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA SW-846 (Third Edition; Update IV) Test Methods for Evaluating Solid Waste: Physical/Chemical Methods

LANGLEY RESEARCH CENTER (LaRC)

LPR 8500.1E (May 2015) Environmental and Energy Program Manual

VSMP Program Summary (2014) VSMP Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management

STATE OF VIRGINIA ADMINISTRATIVE CODE (VAC)

9 VAC 5-40-90 Standard for Fugitive Dust/Emissions
 9 VAC 20-60 Title 9, Agency 20, Chapter 60: Hazardous Waste Management Regulations
 9 VAC 25-840 Title 9, Agency 25, Chapter 840: Erosion And Sediment Control Regulations
 9 VAC 25-870 Title 9, Agency 25, Chapter 870: Virginia Stormwater Management Program (Vsmp) Regulation
 9 VAC 25-880 General Permit for Discharges of Stormwater from Construction Activities

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 112 Oil Pollution Prevention
 40 CFR 262 Standards Applicable to Generators of Hazardous Waste
 40 CFR 265 Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
 40 CFR 273 Standards For Universal Waste Management
 40 CFR 279 Standards for the Management of Used Oil

- 40 CFR 61 National Emission Standards for Hazardous Air Pollutants
- 40 CFR 761 Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
- 49 CFR 172 Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
- 49 CFR 173 Shippers - General Requirements for Shipments and Packagings
- 49 CFR 178 Specifications for Packagings

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ)

- DEQ-VSWCB-013 (2011) Virginia Erosion and Sediment Control Handbook, Third Edition

1.2 SUBMITTALS

The Contractor shall submit documents to LaRC Environmental as required in the Section(s) of these specifications that are applicable to the project. The following provides a complete list of document submittals included in these specifications with a reference to the applicable Section(s):

SD-01 Preconstruction Submittals

- LF 461, Environmental Project Planning Form ; G (Submitted by Program Manager/Project Initiator prior to project initiation)
- Waste Management Plan; G
- Stormwater Pollution Prevention Plan (SWPPP); G
- DEQ Construction General Permit Registration Statement; G
- DEQ Construction General Permit Coverage Letter; G - Virginia Stormwater Management Program (VSMP) General Permit for Discharges of Stormwater from Construction Activities
- Emergency Spill Plan; G
- Erosion and Sediment Control Plan (ESC Plan); G
- Stormwater Management Plan (SWM Plan); G

SD-02 Shop Drawings

- SWM Plan as-builts; G

SD-06 Test Reports

- Waste Sampling Analytical Reports; G
- Waste Profiles; G

SD-07 Certificates

- Hazardous Waste Manifest and LDR; G
- Asbestos Manifest; G
- Asbestos Return Manifest; G
- PCB Manifest; G
- Shipping Document; G

SD-11 Closeout Submittals

- DEQ Construction General Permit Notice of Termination Letter; G
- Project Materials Usage Spreadsheet and MSDS's; G
- Lead and Chromium Waste Generation Report; G
- Construction and Demolition Debris Recycling/Diversion Report; G

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 PROJECT REVIEWS AND INSPECTIONS

3.1.1 Environmental Project Planning Form - LF 461

LaRC Environmental requires the completion of a LF 461, Environmental Project Planning Form, for all projects except for those activities listed on the "LF 461 Excluded Activities List". This list is available on the LaRC Environmental website. The Project Manager/Project Initiator is responsible for completing and submitting the LF 461 to LaRC Environmental at the earliest planning stages of the project. No on-site work shall begin until there is confirmation that a LF 461 has been submitted and the Program Manager/Project Initiator has received comments and project requirements from LaRC Environmental.

The Project Manager/Project Initiator is responsible for ensuring that the Contractor is provided, in writing, all comments and environmental requirements associated with the LF 461, and any updates, and the Contractor is responsible for complying with such, as well as the requirements included in these specifications.

NOTE: An LF 461 is required for any project or activity requiring a digging permit.

3.1.2 Environmental Inspections, Corrective Action and Enforcement Policy

LaRC Environmental will routinely conduct inspections of project sites on LaRC involving new construction, renovation, repair, demolition and other infrastructure related activities to ensure compliance with environmental regulations and permits, Waste Management Plans, contract environmental specifications, and other environmental requirements throughout the

duration of the project. The "NASA Projects Environmental Field Inspection Form" will be used to document inspections. The Contractor is independently responsible for the knowledge of and compliance with all Federal, State and local environmental laws and regulations.

Upon completion of the inspection, SPEEB Environmental staff will immediately document in the "NASA LaRC-Corrective Action Notice" any observed deficiencies, concerns, corrective actions or non-compliances. This report will be provided by e-mail to the appropriate NASA and Prime Contractor Project Managers and the Contracting Officer. SPEEB will conduct follow-up inspections at least weekly until SPEEB is satisfied the problem is resolved. The Prime Contractor's Project Manager will be responsible for responding to the Corrective Action Notice in writing to SPEEB, with a copy to the Contracting Officer, within seven days from receipt of the Corrective Action Notice explaining what has been done or what will be done to remedy the inspection's findings. In cases of immediate or imminent danger to life or the environment, the responsible Contractor may be required to 'cease and desist' and/or may be subject to other appropriate enforcement actions by LaRC, federal or state authorities.

If findings or deficiencies are not satisfactorily resolved in a timely manner, SPEEB will coordinate with LaRC OP and the Office of Chief Counsel to evaluate what actions are necessary. One or more of the following enforcement actions may be taken:

- 1) SPEEB will notify the Contracting Officer of non-compliance activity and request that the responsible Contractor be informed of the urgency for corrections and consequences if not corrected.
- 2) If repeat findings/deficiencies continue to recur and as a result are recognized as significant risk to LaRC environmental compliance, or damage to the environment is a result, then a contractual action will be taken through the Contracting Officer. Formal contractual actions (as provided in the FAR) can include, but are not limited to, cure notices, formal contract non-conformance notices, stop work orders, withholding of payment, negative evaluation reports in formal systems such as Federal Government's Contractor Performance Assessment Reporting System (CPARS), and/or contract termination.
- 3) A "cease and desist" order may be authorized by SPEEB. The Head of the SPEEB is the delegated cease and desist authority for any operations that, in the professional judgment of the SPEEB Environmental staff, have an immediate and negative impact on the environment or that jeopardize the Center's compliance with permit requirements and applicable environmental regulations.
- 4) Notification of the Contractor's non-compliance activity to Virginia Department of Environmental Quality enforcement officials at the discretion of SPEEB.

Additionally, failure to fully comply with regulatory requirements could result in adverse Federal or State regulatory action and/or criminal prosecution. Citations and fines for violations of environmental laws and regulations are dependent upon the applicable law and the nature of the violation. Legal actions include civil charges with monetary penalties for businesses/organizations for noncompliance and criminal charges against individuals for willful violations and/or withheld or falsified information. Penalties can range from an injunction to hefty fines to prison time, depending on the nature of the violation.

3.2 AIR QUALITY

3.2.1 Emissions Controls

Fugitive Dust Emissions - The Contractor shall control fugitive dust emissions in accordance with Virginia Regulation 9 VAC 5-40-90 (Standard for Fugitive Dust/Emissions). The Contractor shall take reasonable precautions to prevent particulate matter from becoming airborne during the project. Examples of such reasonable precautions include:

- o Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads, or the clearing of land;
- o Application of asphalt, oil, water, or suitable chemicals on dirt roads, materials stockpiles, and other surfaces which may create airborne dust; the paving of roadways and the maintaining of them in a clean condition;
- o Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials. Adequate containment methods shall be employed during sandblasting or other similar operations;
- o Open equipment for conveying or transporting materials likely to create objectionable air pollution when airborne shall be covered or treated in an equally effective manner at all times when in motion; and
- o The prompt removal of spilled or tracked dirt or other materials from paved streets and of dried sediments resulting from soil erosion.

Volatile Organic Compounds (VOCs) - The Contractor shall store volatile organic liquids, including fuels and solvents, in closed, labeled containers. Volatile organic liquids shall not be stored with materials that have a high capacity to adsorb VOC emissions or in occupied spaces.

3.3 WATER QUALITY

3.3.1 Basic Erosion and Sediment Control (ESC)

Regardless of project size or amount of land disturbance, the Contractor is responsible for ensuring that adequate erosion and sediment controls are utilized on site to prevent sediment from leaving the activity at all times. ESC practices selected for use shall be designed, installed and maintained in accordance with the DEQ-VSWCB-013, Virginia Erosion and Sediment Control Handbook, 3rd Edition (as amended).

3.3.2 NASA Stormwater Management Program Authority

NASA LaRC has the necessary authorization from VA DEQ to review and approve stormwater-related Plans in house. NASA is the program authority for Sections 3.3.3, 3.3.4, and 3.3.5 of this Specification. NASA's Stormwater Management Program, including government oversight procedures, Plan review procedures, enforcement procedures, and Contractor expectations are summarized in a document titled VSMP Program Summary, 2014 VSMP Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management. This is a VA DEQ reviewed and approved program summary. A copy of this document can be obtained through the Contracting Officer.

3.3.3 Erosion and Sediment Control Plan (ESC Plan)

Land Disturbing Activities (LDAs) greater than or equal to 2,500 square feet require the Contractor to develop a site specific Erosion and Sediment Control Plan that complies with Virginia Erosion and Sediment Control Law and Regulations (9 VAC 25-840) and meets the state's 19 minimum standards outlined in 9 VAC 25-840-40 (as applicable). ESC practices selected for use shall be designed, installed and maintained in accordance with the Virginia Erosion and Sediment Control Handbook, 3rd Edition (as amended). The ESC Plan shall include site plan(s)/detailed maps for the work site that clearly show the siting of the ESC practices and best management practices. The Virginia Uniform Coding System for ESC Practices shall be used on all site plan submittals. The ESC Plan shall include a statement describing the Contractor's maintenance responsibilities required for the ESC controls. The Contractor shall submit the ESC Plan to the Contracting Officer for review and approval.

The Contractor shall have a certified Virginia Responsible Land Disturber (RLD) on staff and associated with any project over 2,500 square feet. A copy of the certification shall be submitted in the ESC Plan.

3.3.4 Stormwater Management Plan (SWM Plan)

For LDAs disturbing over 2,500 square feet, projects shall comply with VSMP Regulations Part II B - Technical Criteria for Regulated Land-Disturbing Activities (9 VAC 25-870-32 through 9 VAC 25-870-92). A complete SWM Plan must meet the requirements of 9 VAC 25-870-55. This includes the following elements: (1) Information on the type of and location of stormwater discharges, information on the features to which stormwater is being discharged including surface waters or karst features if present, and pre-development and post-development drainage areas; (2) Contact information including the name, address, telephone number, and email address of the owner; (3) A narrative that includes a description of current site conditions and final site conditions; (4) A description of the proposed stormwater management facilities and the mechanism through which the facilities will be operated and maintained after construction; (5) Information on the proposed stormwater management facilities, including the type of facilities; location including geographic coordinates; acres treated; and the surface waters into which the facility will discharge; (6) Hydrologic and hydraulic computations, including runoff characteristics; (7) Virginia Runoff Reduction Method (VRRM) compliance sheets; (8) Documentation and calculations verifying compliance with the water quality and quantity requirements (Part II B of the regulations) of these regulations; and (9) A map or maps of the site that depicts the topography of the site.

For projects with an approved SWM Plan (completed during the design phase, primarily large construction projects) it is the construction Contractor's responsibility to implement the Plan and its design features. A copy of the approved SWM Plan can be obtained through the Contracting Officer if applicable.

For projects that do not have an approved SWM Plan associated with the design (primarily demolition and smaller projects), it is the Contractor's responsibility to develop and implement a SWM Plan.

At the completion of the project, a construction record drawing(s) ("as-built") for permanent stormwater management facilities shall be

provided bearing the seal and signature of a Virginia registered professional, certifying that the stormwater management facilities have been constructed in accordance with the approved SWM plan. The Contractor shall submit a SWM Plan as-builts to the Contracting Officer.

3.3.5 Stormwater Pollution Prevention Plan (SWPPP)

For LDAs over 1 acre, a full SWPPP submittal shall be developed in accordance with 9 VAC 25-870 and 9 VAC 25-880. All SWPPPs must contain the following:

- o Erosion and Sediment Control Plan (See Section 3.3.3);
- o Stormwater Management Plan (See Section 3.3.4);
- o Pollution Prevention (P2) Plan; and
- o Information specifying any additional control measures to meet the requirements of existing Total Maximum Daily Loads (TMDL).

Within the SWPPP the Contractor shall develop a site specific P2 Plan in accordance with 9 VAC 25-870-56. The P2 Plan must identify potential sources of pollutants that may reasonably be expected to affect the quality of stormwater discharges from the construction site and a description of control measures that will be used to minimize pollutants in stormwater discharges from the construction site must be developed before land disturbance. This Plan shall be included in the Contractor's SWPPP submittal.

At a minimum, the P2 Plan must be designed, installed, implemented, and maintained to: (1) Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge; (2) Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on the site to precipitation and to stormwater; and (3) Minimize the discharge of pollutants from spills and leaks.

The SWPPP must also address the following requirements to the extent otherwise required by state law or regulations and any applicable requirements of a state permit: (1) Control stormwater volume and velocity within the site to minimize soil erosion; (2) Control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion; (3) Minimize the amount of soil exposed during construction activity; (4) Minimize the disturbance of steep slopes; (5) Minimize sediment discharges from the site - erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site; (6) Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration, unless infeasible; (7) Minimize soil compaction and, unless infeasible, preserve topsoil; (8) Stabilization of disturbed areas must, at a minimum, be initiated immediately whenever any clearing, grading, excavating, or other earth disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days; and (9) Utilize outlet structures that withdraw water from the surface, unless infeasible, when discharging from

basins and impoundments.

The Contractor shall submit the SWPPP to the Contracting Officer for Government review and approval. If the plan is determined to be inadequate, LaRC Environmental will specify such modifications and/or terms and conditions that will allow approval of the SWPPP plan and notify the Contracting Officer of changes needed. The Plan shall be resubmitted until approval is granted. No LDAs may commence without an approved SWPPP.

3.3.6 Construction General Permit (CGP) Coverage

LDAs greater than or equal to one (1) acre require Construction General Permit coverage under the Virginia Stormwater Management Program (VSMP) General Permit for Discharges of Stormwater from Construction Activities from the Department of Environmental Quality (DEQ). The Virginia Stormwater Management Program Permit Regulations can be found in 9 VAC 25-870 and the General Permit for Discharges of Stormwater from Construction Activities can be found in 9 VAC 25-880.

After SWPPP approval (see Section 3.3.5), the Contractor shall register for CGP coverage from DEQ in accordance with 9 VAC 25-880-50. The Contractor is considered the Permit Operator and is responsible for all CGP registration fees. See below for the applicable construction permit fees per 9 VAC 25-870-820:

DEQ CGP PERMIT FEE SCHEDULE

Site Size	DEQ Fee
1 to <5 acres	\$2,700.00
>5 acres to <10 acres	\$3,400.00
>10 acres to <50 acres	\$4,500.00

The Contractor shall submit a copy of the DEQ Construction General Permit Registration Statement to the Contracting Officer for review and approval prior to submittal to DEQ. LaRC Environmental will ensure correct information is presented on the Contractor's Registration Statement. Upon approval, the Contractor shall submit the DEQ Construction General Permit Registration Statement and applicable fee to DEQ.

The Contractor may begin LDAs once a DEQ Construction General Permit coverage letter has been received. No LDAs shall commence without a NASA-approved SWPPP and DEQ-issued CGP coverage. The Contractor shall submit a copy of the DEQ Construction General Permit coverage letter to the Contracting Officer once received.

The Contractor shall be responsible for terminating permit coverage once the project site has reached final stabilization and verified by the Contracting Officer. Final Stabilization is defined in 9 VAC 25-880-1 as soil disturbing activities have been completed and a permanent vegetative cover has been established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, mature enough to survive, and will inhibit erosion. The Contractor shall provide the Contracting Officer with a copy of the DEQ Construction General Permit Notice of Termination

Letter.

3.3.7 Prohibited Illicit Discharges

The Contractor shall ensure no illicit discharges occur at the project site. An "illicit discharge" is any non stormwater discharge to the storm drain system, except as expressly allowed by LaRC's VPDES permits, the project-specific VSMP General Permit for Discharges of Stormwater from Construction Activities, and/or a discharge approved in writing by NASA. Water from firefighting, hydrant flushing, and A/C condensate are not considered illicit discharges. Examples of illicit discharges include the following:

- o Dumping of trash or debris
- o Disposing of vehicle/equipment maintenance fluids into a storm drain
- o Leaking dumpsters flowing into a storm drain inlet
- o Pouring paints, stains, hazardous materials into a storm drain
- o Cleaning paint brushes/applicators in or near a storm drain
- o Allowing wash waters with soaps, detergents, or paint debris into a storm drain inlet
- o Washing silt, sediment, concrete, cement or gravel into a storm drain
- o Allowing uncontrolled release of sediment into a storm drain inlet
- o A measurable flow during dry weather that contains any other pollutants

3.4 PROJECT MATERIAL AND CHEMICAL STORAGE, USE, AND REPORTING REQUIREMENTS

3.4.1 Storage Requirements

The Contractor shall ensure that all project materials and chemicals required to perform work are:

- o Stored in an isolated and secure area at the project site to prevent release to the environment.
- o Labeled properly and used according to the manufacturer's guidelines, and that containers are kept closed except for when in use.
- o Removed from NASA LaRC after project completion.

3.4.2 Use and Tracking Requirements

 NOTE: The requirements below are primarily targeted to the materials conveyed and used on-site by the Contractors/Subcontractors without access to the LaRC's Chemical Material Tracking System (CMTS).

The Contractor shall track the usage of certain project materials/chemicals brought on the Center. Project materials the Contractor shall track include, but are not limited to:

1. Metals. Metals used in construction, rehab, or other project activities shall be tracked in pounds by alloy such as stainless steel, copper, brass, lead, carbon steel, etc.
2. Asphalt. Paving material shall be tracked in total tons of new

asphalt laid and total tons of old asphalt removed. Exception: asphalt material used for or removed from parking lots.

- 3. Lead-Acid Batteries. The installation, maintenance, or removal of lead-acid batteries shall be tracked by number of batteries installed, maintained, or removed and total weight of each battery type.
- 4. Paints, which shall be tracked by total amount used.
- 5. Fuels and Oils. The use of fuels and oils, or their removal from existing equipment, shall be tracked by total amount and type of fuel and oil used or removed. Exception: fuels and oils used in or removed from motor vehicles.
- 6. Coolants and Refrigerants, which shall be tracked by total amount used. Exception: coolants and refrigerants being tracked in LaRC's electronic Refrigerant Compliance Manager tracking system.
- 7. Lead-containing products, such as solder, cable sheathings/sleeves, coatings, etc. Products containing lead shall be tracked by total weight of the materials used.
- 8. Other chemicals and products (solvents, cleaners, lubricants, degreasers, adhesives, acids, etc.), which shall be tracked by type of material and amount used.

Tracking shall not be required if the materials are being used for simple building maintenance and basic administrative, housekeeping, and janitorial services. A pre-prepared Project Materials Usage Spreadsheet will be provided from LaRC Environmental as an option for the Contractor to use for tracking purposes.

3.4.3 Reporting Requirements

The Contractor shall submit the project materials usage spreadsheet and MSDS's to LaRC Environmental upon completion of the project. If the project extends into a new calendar year, the Contractor shall provide the data for all materials used in the preceding year by January 31st of the new calendar year.

3.5 WASTE MANAGEMENT AND DISPOSAL

NOTE: Waste Management Responsibility will be determined early in the planning stages of the project. The Waste Management Requirements (Government responsible) will apply for waste generated by Jacobs personnel during in-house routine maintenance tasks. All other Projects/Tasks (Jacobs or NASA) that generate hazardous waste will be reviewed by LaRC Environmental to determine if the Government or Contractor will be responsible for the disposal of the waste. Information submitted through the LF 461 process for the Project/Task will be used to determine responsibility for waste disposal.

3.5.1 General

Hazardous Waste Management Requirements:

Hazardous waste will be collected in Satellite Accumulation Area (SAA). SAA's shall be located at or near the point of waste generation and be under the control of the operator of the process generating the waste. Each hazardous waste container located at an SAA shall be marked with the words "Hazardous Waste" and the identity of the waste. Each container at an SAA shall be closed at all times (unless adding waste), and shall be maintained in good condition (non-leaking). No more than 55 gallons TOTAL of hazardous waste or 1 quart of acute hazardous waste can be accumulated at an SAA. In addition, the Contractor shall inspect all SAAs on a weekly basis and document the inspection. An example inspection sheet can be obtained from SPEEB. The management and handling of hazardous waste will be accordance with 40 CFR 262 and State regulations.

Universal Waste Management Requirements:

Universal waste (UW) containers will be kept closed at all times except when adding or removing waste. All containers containing UW shall be labeled with a universal waste label indicating specific contents and a start date. UW shall be recycled by the Contractor through an EPA approved recycling center. Universal waste will include batteries, devices containing elementary mercury and mercury containing lamps. The Contractor shall inspect the UW areas on a weekly basis and document the inspection. The management and handling of Universal waste will be in accordance with ALL requirements in 40 CFR 273.

Other waste listed below shall be managed in accordance using the following requirements in the noted sections:

Asbestos - Managed according to section 3.6 titled "ASBESTOS WASTE DISPOSAL REQUIREMENTS".

PCB's - Manage according to Section 3.7 titled "PCB REMOVAL AND DISPOSAL REQUIREMENTS".

Oil (non-transformer) and Oily Debris - Manage according to Section 3.8 titled "FUEL AND OIL MANAGEMENT REQUIREMENTS".

Wastewater - Manage according to Section 3.3 titled "WATER QUALITY" and Section 23 25 00.00 41 CHEMICAL TREATMENT OF WATER FOR MECHANICAL SYSTEMS.

Soil - Manage according to section 3.10.2 titled "EXCAVATION OPERATIONS".

Construction and Demolition Debris - Manage according to Section 3.9 titled "Construction and Demolition Debris".

Typical Waste Streams: Listed below are examples of typical waste streams that can be expected during the Demolition or Renovation of facilities. The list is not all inclusive and it's ultimately the Contractors responsibility to identify and ensure proper management and disposal of all waste streams generated by the Demolition or Renovation of facilities.

- a. PCB Ballast and Contaminated Items: All PCB ballasts and PCB

contaminated items must be placed in a DOT approved container when removed. Non-leaking PCB ballasts and leaking PCB ballasts will be stored in separate containers. Leaking PCB ballasts need to have sufficient material in the disposal container to absorb the liquid and will be managed as PCB equipment. All containers must be kept tightly sealed at all times except when adding waste. Containers used to accumulate PCBs must be marked with a PCB label and be dated when first PCB items was placed in the container (considered as the out of service date). A log shall be maintained which should have the date and amounts of PCB items added to the container. Full PCB waste containers can only be stored in the work area for 30 days. By the 31st day, the container will be moved to be PCB storage facility. All PCB containers must be shipped offsite to an approved LaRC disposal facility within 270 days of the out of service date on the container. The management and handling of all PCB items will be in accordance with ALL requirements in 40 CFR 761.

- b. Mercury Contained Lamps: Mercury contained lamps include but are not limited to straight fluorescent bulbs and black lights, U-style and circular fluorescent bulbs, compact fluorescent lamps and high intensity discharge lamps. Mercury contained lamps will be placed into a container labeled as "Universal Waste" with the words "Used Lamps" immediately following removal from the light fixture. At no time will used mercury contained lamps be removed from a fixture unless there is a properly labeled container immediately available for that used lamp. The containers will be managed according to requirements in section 3.5.1.
- c. Devices Containing Elemental Mercury: Devices containing elemental mercury including but not limited to thermostats, switches, thermometers, manometers, barometers, gas flow regulators, hydrometers, shall be managed as universal waste. Devices containing elemental mercury will be placed into a properly labeled container immediately following removal. The containers will be kept closed at all-time except when adding waste. All devices containing elemental mercury must be labeled with a universal waste label. Devices containing elemental mercury shall be recycled by the Contractor through an EPA approved recycling center. The management and handling of devices containing elemental mercury will be in accordance with ALL requirements in 40 CFR 273.
- d. Used Batteries: Used batteries include but are not limited to lead acid, NiCad, silver-oxide, mercury-oxide, lithium, zinc-air, zinc-carbon, and alkaline batteries. Used batteries will be placed into a properly labeled container immediately following removal. Proper containers must be structurally sound, adequate to prevent breakage, and be compatible with contents of the batteries. All used battery containers shall be labeled as "Universal Waste" with the words "Used Batteries" and the date when first battery was added.
- e. Used Oil: All oil that is removed from equipment/pumps will be managed as used oil. The oil will be stored in DOT-approved containers. The containers will be labeled with a non-hazardous waste label and contents will be identified as "Used Oil". The used oil will be sampled in accordance with 40 CFR 279.11 used oil specifications requirements and analyzed for PCBs. The management and disposal of used oil shall be in accordance with ALL requirements in 40 CFR 279.
- f. Building Debris: Prior to land filling, the Contractor shall be

responsible for obtaining the composite building debris sample. The Contractor shall ensure that the samples are representative of the building debris. One sample per building will be required to be analyzed using the Toxicity Characteristic Leaching Procedure (TCLP) Metals, using EPA protocol 1311. The Government is responsible for analysis unless the Contractor is held responsible in accordance with section 3.5.1.2.

- g. Non PCB Ballast: All non PCB Ballasts including electronic ballast shall be recycled through an EPA approved recycling center. Disposal of non PCB ballasts in the trash is strictly prohibited.
- h. Smoke Detectors: Both photoelectric and ionization smoke alarms contain plastic and electronic circuit boards. Ionization technology also includes a chamber containing radioactive material. The Contractor shall be responsible for ensuring all smoke detectors are collected in Government provided containers. The Government will dispose.
- i. Aerosol Cans: All aerosol cans generated shall be collected in containers labeled and managed as Hazardous Waste. SAA requirements will apply.

3.5.1.1 Waste Management Requirements (Government Responsible)

This section includes the requirements for waste generating projects whereby the Government will be responsible for providing labeled waste containers, analytical testing and the proper disposal of the waste (unless otherwise specified).

The Government requires information on all waste streams that will be generated on the project. Information includes but not limited to, description and amount of anticipated hazardous waste, collection and management procedures for hazardous waste and non-hazardous waste and description of materials that can possibly be recycled.

Contractor employees who handle waste on-site shall be thoroughly familiar with LaRC waste handling, packaging and emergency procedures relevant to their responsibilities. Contractor employees performing these duties shall be trained before they begin work. The prime Contractor is responsible to ensure that training is provided and the Government can be contacted for appropriate training materials.

The Contractor will be audited by LaRC Environmental to ensure that all applicable waste regulations and proper waste practices are being followed. The Contractor shall take appropriate actions to ensure compliance with all Federal, State and Local regulations. Section 3.1.2 (Inspection, Corrective Action and Enforcement Policy) will be adhered to for non-compliance activities. Disposal of hazardous waste into the storm or sanitary sewer is prohibited at all times.

In the event of a spill, the Contractor shall call 911 (using on center phones) or 757-864-2222 and provide the necessary information requested. All possible means to contain and/or prevent entry to storm drains or waterways shall be initiated. The Contractor shall provide spill response materials including, but not limited to, containers, adsorbent, shovels, and personal protective equipment. Spill response materials shall be available at all times in which hazardous materials/wastes are being handled or transported. Spill response materials shall be compatible with

the type of material being handled. Spill cleanup resulting from Contractor actions shall be the responsibility of the Contractor.

3.5.1.2 Waste Management Requirements (Contractor Responsible)

This section includes the requirements for waste generating projects whereby the Contractor shall be responsible for disposing of waste generated at the project site.

The Contractor shall provide all labor, equipment, analytical testing, packaging/containers, materials, labels, placards and all materials, services and transportation necessary to safely store, remove and dispose of all waste in accordance with all Federal, State, and local laws and regulations. Disposal of hazardous waste shall be conducted in accordance with Resource Conservation Recovery Act (RCRA), Federal regulations, and State regulations (9 VAC 20-60). Disposal of hazardous waste into the storm or sanitary sewer is prohibited at all times.

At least ten (10) working days prior to project startup, the Contractor shall submit a Waste Management Plan (WMP) to LaRC Environmental for review and approval. No work shall begin until the WMP is approved by LaRC Environmental. The WMP shall cover the management of all generated waste anticipated during the project and provide enough detail to describe how the Contractor will manage, store, and dispose of all waste generated at the project site. A WMP template is available for use for the Environmental Office.

At a minimum, the WMP shall specifically address the following:

1. Identification of all hazardous waste, regulated waste, non-hazardous waste, and recyclable/scrap materials/debris that will be generated.
2. For each waste stream that is identified, the WMP shall include:
 - a. Amount/volume (may be estimated).
 - b. The types of DOT-approved shipping containers/packages to be used.
 - c. The means by which all hazardous materials and waste containers will be labeled/marked and stored. See section 3.4.1 (Storage Requirements) for further guidance.
 - d. The management procedures that will be implemented at the project site to ensure compliance with all applicable Federal, State, and local laws and regulations. This includes hazardous waste staging and temporary storage requirements.
 - e. The name and address of the disposal/recycling facility.
3. The name, position and title of the Transportation and Disposal Coordinator (TDC) for the project. The Contractor shall designate a TDC who shall serve as the single point of contact for all waste management matters and be competent and aware of all waste management requirements associated with the project.

The TDC shall have overall responsibility to ensure waste management compliance at the project site including, but not limited to, accurate identification and classification of hazardous waste and hazardous

materials; determination of proper shipping names; identification of marking, labeling, packaging and placarding requirements; completion of waste profiles, hazardous waste manifests, asbestos waste shipment records, PCB manifests, bill of lading, exception and discrepancy reports; and all other environmental documentation.

- 4. The TDC shall be trained to the requirements of RCRA Hazardous Waste Management Training in accordance with 40 CFR 262 and 40 CFR 265 and DOT Hazmat Employee Training in accordance with 49 CFR 172 and 49 CFR 173.
- 5. Contractor employees who will be handling waste on-site shall be thoroughly familiar with LaRC waste handling, packaging and emergency procedures relevant to their responsibilities. Contractor employees performing these duties shall be trained before they begin work.

NOTE: The required training documentation for each individual shall be provided in the WMP. Those individuals without the required training will NOT be allowed to work until proper documentation is provided.

Throughout the duration of the project, the Contractor shall comply with the waste management procedures as specified in the WMP and applicable requirements in Section 01 35 40.00 41 NASA LANGLEY ENVIRONMENTAL REQUIREMENTS. The Contractor will be inspected by LaRC Environmental to ensure that all waste management requirements are being followed at the project site. Section 3.1.2 (Inspection, Corrective Action and Enforcement Policy) will be adhered to for non-compliance activities.

The Contractor shall ensure that all waste is labeled and packaged in accordance with 49 CFR 172 and 49 CFR 178. The Contractor shall use only DOT-approved drums/shipping containers that are compatible with the waste. Reuse of "Product Drums" is strictly prohibited. The Contractor shall also provide other packaging related materials such as materials used to cushion or fill voids in over packed containers, etc. Sorbent materials shall not be capable of reacting dangerously with, being decomposed by, or being ignited by the hazardous materials being packaged.

The Contractor shall ensure that all hazardous waste containers are managed at the project site in accordance with 40 CFR 262.34(a).

The Contractor shall coordinate any waste sampling activities with LaRC Environmental to ensure proper waste characterization. All test methods shall comply with EPA SW-846, Methods for Evaluating Solid Waste.

At least ten (10) days prior to waste shipment, the Contractor shall submit, to LaRC Environmental, all waste sampling analytical reports and all waste profiles for approval.

At least three (3) days prior to waste shipment, the Contractor shall submit, to LaRC Environmental, the hazardous waste manifest and LDR for approval and signature.

The Contractor shall transport and dispose of all hazardous waste generated at the project site using NASA approved Treatment, Storage and Disposal Facilities (TSDF) (see Attachment 1) as specified in the WMP. If the

Contractor wants to use a non-NASA approved TSDF, the Contractor shall submit a NASA TSDF audit package to LaRC Environmental for approval at least thirty (30) days prior to waste shipment. Disposal of hazardous waste at a non-NASA approved TSDF is strictly prohibited.

In the event of a spill, the Contractor shall call 911 (using on-Center, land-line phones) or 757-864-2222 and provide the necessary information requested. All possible means to contain the spill and prevent entry to storm drains or waterways shall be initiated. The Contractor shall provide spill response materials including, but not limited to, containers, absorbent materials (ex: Oil-Dri, spill mats), shovels, and personal protective equipment. Spill response materials shall be available at all times when hazardous materials/wastes are being handled or transported. Spill response materials shall be compatible with the type of material being handled. Spill cleanup resulting from Contractor actions shall be the responsibility of the Contractor.

3.5.2 Lead and Chromium Waste Reporting Requirements

Following completion of the project, the Contractor shall submit a Lead and Chromium Waste Generation Report to LaRC Environmental that includes the following:

1. The weight of any waste that is contaminated with lead or chromium (e.g., paint debris, sandblast grit, rinse/wash water).
2. Records shall include the amount in pounds of waste generated, the amount of lead and/or chromium in the waste, a copy of the analysis or testing report, the name and complete address of the facility the waste is sent to and what that facility plans to do with the waste (e.g., treatment or disposal).

3.6 ASBESTOS WASTE DISPOSAL REQUIREMENTS

The Contractor shall dispose of asbestos waste in accordance with 40 CFR 61 and Chapter 9, Asbestos, in LPR 8500.1E, Environmental and Energy Program Manual. Transportation of asbestos material off-site shall be in accordance with DOT Regulations, 49 CFR 173.1090.

Upon request to and approval by LaRC Environmental, the Contractor may use an on-site staging area for the asbestos. The Contractor shall be responsible for transporting the properly packaged asbestos waste to the staging area. Containers in staging area used for AB storage shall be labeled with visible AB warning labels on all sides.

At least two (2) days prior to asbestos waste shipment, the Contractor shall provide LaRC Environmental with the asbestos manifest for review and signature. The asbestos manifest must include the following information:

1. Generator: Identifies NASA Langley Research Center as owner and waste generator. Address of waste generator shall be:

NASA Langley Research Center
 Attn: Mason Proctor
 Standard Practice and Environmental Engineering Branch
 Mail Stop 133
 Hampton, VA 23681
 Telephone: (757) 864-4232

2. The name and address of the local, State or EPA Regional Office responsible for administering the asbestos NESHAP program. Address of responsible agency shall be:

Department of Labor and Industry, Occupational Health
13 South 13th Street
Richmond, VA 23219

3. The name and telephone number of the contractor responsible for the removal of asbestos at the building site.
4. The approximate quantity in cubic meters and in cubic yards.
5. The name and physical site location of the State-approved landfill disposal site.
6. The name, address, and telephone number of the transporter(s).
7. The date transported.

The Contractor shall be responsible to submit a copy of the asbestos return manifest, signed by the owner or operator of the designated disposal site, to LaRC Environmental within 35 days of the date it was transported off-site. If a copy of the waste shipment record is not received within 45 days, the State or EPA regional office will be contacted in accordance with 40 CFR 61.150(d) (3).

3.7 PCB REMOVAL AND DISPOSAL REQUIREMENTS

The Contractor shall perform PCB removal and disposal in accordance with 40 CFR 761.

All transformers and electrical equipment that have fluids containing any concentration of PCBs must be drained before being transported off the Center for disposal. Transformer oil will be sampled in accordance with 40 CFR 279.11 used oil specifications requirements and analyzed to acquire PCB ppm content. The Contractor will be responsible for ensuring that the transformer oil is managed and disposed of in accordance with requirements in 40 CFR 761.60. The only exception to this is transformers or capacitors that can be contained without modification in a drum or other leak proof container. Request for transporting transformers without removing the fluids are issued only by permission by environmental and include special requirements.

Items and fluids that contain 50 ppm PCB or greater are considered as PCB and shall follow applicable federal regulations.

Items and fluids that contain less than 50 ppm PCB are considered non-PCB and are excluded from federal regulation with the exception of disposal requirements. See section 3.8 titled "Fuel and Oil Containing Equipment/Tanks (Non PCB), of this section for additional requirements.

For PCB removal and disposal projects, the Contractor shall:

- a. At least 10 days prior to project start up, submit an Emergency Spill Plan to LaRC Environmental. The Plan shall define the procedures and materials that will be used by the Contractor in the event of a spill or leak of any amount of PCBs.

- b. Notify LaRC Environmental prior to draining any equipment to ensure proper accumulation containers are used.
- c. Temporarily store PCB items (e.g., transformers, capacitors), for a period of time, not to exceed 30 days, from the date of removal from service.
 - o Storage shall be coordinated with LaRC Environmental to ensure proper storage practices.
 - o A notation shall be attached to the PCB item or PCB container housing which indicates the date of removal from service (considered as the out of service date), its weight, and PCB content.
- d. Package all PCB items for transportation according to applicable DOT regulations (49 CFR).
- e. Perform sampling and analyses of PCB items/oil to determine PCB concentration. Submit analytical reports to LaRC Environmental. Refer to section 3.8.2 for additional requirements.
- f. Provide LaRC Environmental with the name and location of the ultimate disposal facility (only NASA approved facilities may be used for disposal of PCB items).
- g. Ensure all PCB containers are shipped offsite to an approved disposal facility within 270 days of the out of service date on the container.

At least five (5) working days prior to PCB shipment, the Contractor shall submit a completed PCB manifest to LaRC Environmental for review and signature.

In the event of a spill, immediately call the LaRC Emergency Dispatcher at 911 (from land-line on Center) or at 757-864-2222 (cell phone). Also, notify LaRC Environmental. Perform cleanup as required under 40 CFR 761.

All personnel, including supervisors, involved with PCB spill prevention and cleanup shall be trained in accordance with Federal/State regulations 40 CFR 61, Subpart G.

No PCB site operations shall be performed if spill materials and qualified personnel defined under the Emergency Spill Plan are not at the site prior to starting any PCB operations.

3.8 FUEL AND OIL MANAGEMENT REQUIREMENTS

3.8.1 Portable/Temporary Fuel Storage Tanks

For projects requiring the use of portable/temporary fuel storage tanks, the Contractor shall ensure that the storage and refilling practices comply with 40 CFR 112. It is preferred that fuel storage tanks be of double-walled design. Tanks shall be equipped with a functioning liquid level gauge and with the required normal and emergency vents. If so equipped, the dispenser and dispensing hose shall be in good condition. Drip pans or absorbent pads must be used in fueling areas in the event that there are drips during fueling.

If a double-walled tank is not available, a single-walled tank with a

secondary containment dike or berm can be used. The dike or berm shall be impervious to oil and be constructed so that any discharge will not permeate, drain, infiltrate, or otherwise escape before cleanup occurs. The secondary containment capacity shall be no less than 110 percent of the maximum tank volume plus 5 inches of freeboard. If the dike or berm is equipped with a drain valve, the valve must be of manual, open-and-closed design and must be kept in the closed position. Any rainwater collected in the containment dike/berm shall not be drained until the Contractor performs a visual inspection and verifies that there is no oil contamination of the water (ex: no oil sheen). Only then shall the rainwater be drained.

3.8.2 Fuel and Oil Containing Equipment/Tanks (Non PCB)

For projects involving removal and disposal of fuel or oil containing equipment/tanks, the Contractor shall ensure that the equipment is completely drained prior to removal/disposal (an exemption to this requirement may be granted by LaRC Environmental in a case-by-case basis). The Contractor shall notify LaRC Environmental prior to draining equipment/tanks to ensure proper accumulation containers are used and to verify if the fuel/oil requires any testing. Removed fluids shall be managed in accordance with 40 CFR 279.

Oil containing less than 50 ppm PCB is considered non-PCB and is excluded from federal regulation with the exception of disposal requirements. Oil containing between 2-50 ppm shall be marketed to incinerators or burners defined in 40 CFR 761 or an EPA approved chemical treatment facility. The Contractor shall submit a shipping document to LaRC Environmental for signature prior to removing the oil from the center.

3.8.3 Oily Debris

Any oily debris generated at the project site shall be accumulated at locations convenient to generation sites and stored in containers labeled as "Non-Hazardous Waste" and the identity of the substance. The Contractor shall be responsible for coordinating accumulation and disposal of oily debris with LaRC Environmental.

3.9 CONSTRUCTION AND DEMOLITION DEBRIS REQUIREMENTS

Construction and demolition debris is any solid waste generated from the alteration, construction, destruction, rehabilitation, or repair of any manmade physical structure including buildings, utilities, roadways, parking lots, sidewalks and other general infrastructure. Examples include: brick, concrete, and other masonry materials, stone, glass, wall coverings, drywall, framing and finishing lumber/metals, roofing materials, plumbing fixtures (toilets, sinks, water heaters, pipes, heating equipment, furnaces, duct work), electrical wiring and components containing no hazardous fluids or refrigerants, non-asbestos insulation, and wall-to-wall carpeting. Prior to land filling, the Contractor shall be responsible for composite building debris sampling. The Contractor shall ensure that the samples are representative of the building debris. One sample per building will be required to be analyzed using the Toxicity Characteristic Leaching Procedure (TCLP) Metals, using EPA protocol 1311.

3.9.1 Debris/Recycling Management

Prior to project start-up, the Contractor shall submit a WMP that includes identified recyclable materials to LaRC Environmental in accordance with

applicable Waste Management Plan requirements sections 3.5.1.1 or 3.5.1.2. The Contractor shall separate recyclable and salvageable materials from non-recyclable materials at the project site. The Contractor shall store, protect, and recycle to the maximum extent possible, but at a minimum, 50 percent of construction and demolition debris generated at the project site. The Contractor shall provide the necessary containers, bins and storage areas to facilitate effective segregation and identification of all waste materials. Recyclable materials shall be handled to prevent contamination of materials from incompatible products and materials.

3.9.3 Reporting Requirements

The Contractor shall be responsible for tracking the disposition of construction and demolition debris. Tracking shall include total weight of all materials disposed in a landfill and the weight of materials diverted from a landfill. Diversion includes, but is not limited to: incinerated for energy recovery, recycled, composted or reused. Potential materials for recycling and the recycling process shall be identified in the Waste Management Plan provided by the Contractor.

The Contractor shall submit a monthly construction and demolition debris recycling/diversion report to LaRC Environmental identifying the diversion method and weight of each material within 10 working days after the end of each month. Weight tickets, shipping documents and manifests can be used to confirm diversion/recycling.

3.10 EXCAVATION OPERATIONS

3.10.1 Unexpected Discovery

In the event that excavation activities result in the unexpected discovery of historic artifacts, archaeological resources, petroleum contaminated soil, or hazardous waste, the Contractor shall immediately stop work and notify LaRC Environmental. Work shall not resume until LaRC Environmental provides clearance at the job site.

3.10.2 Soil Management and Disposal

3.10.2.1 Soil Sampling

The Contractor shall be responsible for sampling excavated soil prior to removal from LaRC property. The soil shall be analyzed for TCLP (metals only), BTEX, TPH (DRO and GRO ranges), TOX and PCB. The Contractor shall be responsible for any additional sampling and analysis that may be required by the disposal facility. The Contractor shall submit analytical reports to LaRC Environmental prior to removal from the Center.

Soil sampling done before site work begins is the preferred method as this practice allows the Contractor to remove the soil from the site as it is generated without storing the soil while waiting for sample results.

3.10.2.2 Soil Storage

Upon approval from LaRC Environmental, the Contractor shall be allowed to store soil at the project site or at another approved site pending results of soil analysis or for the purpose of reusing for fill or grading. The Contractor shall secure and control the area to ensure erosion and sediment controls are in place to prevent loose soil from entering the storm sewer. The Contractor shall include the soil storage area in the SWPPP and ESC

Plans and perform inspections as required by the Erosion and Sediment Control regulations.

3.10.2.3 Soil Disposal

Soil that reveals levels below the regulatory limits of required tests shall be properly disposed off LaRC property. The Contractor shall not dispose of excess soil on-site unless approved by LaRC Environmental. Soil that is above any regulatory limits shall be disposed at an appropriately permitted landfill and/or an approved treatment facility. The Contractor shall submit the name, address, and permit number of the permitted landfill used for disposal to LaRC Environmental prior to removal of the soil from LaRC. The Contractor shall be responsible for any disposal permits and fees associated with off-site disposal.

3.11 NATURAL RESOURCE MANAGEMENT

3.11.1 General Requirements

The Contractor shall manage and control activities at the project site to minimize interference with and damage to vegetation and wildlife.

The Contractor shall immediately notify the Contracting Officer in the event that it is determined that project activities may adversely impact wildlife (e.g., damage to or removal of nests or other animal dwellings). LaRC Environmental shall be notified of the event.

3.11.2 Tree Protection

The Contractor shall protect trees within their project sites that are indicated to be left in place from mechanical or other injury. The Contractor shall install tree protection in accordance with Virginia Erosion and Sediment Control Handbook, DEQ-VSWCB-013. In general, tree protection should be sufficient to eliminate trunk damage, root zone impacts, surface impacts, and limb impacts. Stockpiles or other heavy material storage under the drip line of a tree is prohibited. Trees shall be protected with adequate fencing, to the drip line, if the project site allows. At a minimum the limits of clearing shall be located inside the drip line of the tree and in no case closer than 5 feet to the trunk. If tree protection does not extend to the dripline, the Contractor shall be responsible for aeration and fertilization of the tree after construction is complete.

If a tree designated to be protected is damaged or killed during work the Contractor shall coordinate with LaRC Environmental to develop a replacement strategy at the Contractor's expense.

3.11.3 Tree Damage Mitigation

If the roots of a tree are exposed during the course of the work, the Contractor shall be responsible for ensuring roots are properly cared for to prevent unnecessary drying or damage. Any roots larger than 3 inches in diameter shall be clean cut prior to reburial.

If a tree designated to be protected is damaged or killed during work, the Contractor shall inform and coordinate with LaRC Environmental in developing a replacement strategy at the Contractor's expense.

3.11.4 Replacement Tree and Shrub Strategy

For each removed, a combination of trees totaling the DBH (diameter at breast height) of the tree removed shall be planted. Location of the replacement trees shall be coordinated with the Contracting Officer and approved by LaRC Environmental. Replacement trees shall be warrantied for a period of one (1) year.

Depending on location, the following tree and shrub species are acceptable for planting at LaRC:

Acceptable Trees Species: Street/Parking Area Trees	
Littleleaf Linden	Tilia Cordata
Red Maple	Acre Rubrum
Shumard Oak	Quercus Shumardii
Willow Oak	Quercus Phellos
White Oak	Quercus Alba
Lacebark Elm	Ulmus Parvifolia
**Trees shall be a minimum 2.5" caliper B&B specimens	

Acceptable Trees Species: Landscape/Building Area	
Shumard Oak	Quercus Shumardii
Southern Red Oak	Quercus Falcata
Tulip Popular	Liriodendron Tulipifera
American Sycamore	Platanus Occidentalis
American Beech	Fagus Grandifolia
Holly spp.	Ilex Opaca'
Thornless Honeylocust	Gleditsia Triacanthos Inermis
Sweetbay Magnolia	Magnolia Virginiana
**Trees shall be a minimum 2.5" caliper B&B specimens	

Acceptable Trees Species: Specimen/Ornamental	
Eastern Redbud	Cercis Canadensis
Whitebud	Cercis Canadensis
Fringe Tree	Chionanthus spp
Serviceberry	Amelanchier Arborea
Ironwood	Carpinus Carolina
**Trees shall be a minimum of 5 gallon container size or comparable B&B	

Acceptable Native Trees Species - Shrubs	
American Beautyberry	Baccharis Halimifolia
Artic Fire Dogwood	Cornus Sericea 'ARTIC FIRE'
Winterberry	Ilex Verticillata
Blue Wood	Aster Cordifolius
Inkberry	ILEX GLABRA
Arrowwood	Viburnum Dentatum
**Shrubs shall be a minimum of 3 gallon container size	

3.11.5 Tree/Vegetation Planting

Prior to installation, the Contractor shall notify the Contracting Officer to allow for inspection of the plant material. To be considered acceptable, plants shall be free of dead or dying branches and branch tips and shall bear foliage of normal density, size, and color. The Contractor shall not install any plant material without notifying the Contracting Officer and approval by LaRC Environmental.

The Contractor shall ensure that plants are selected and planted in accordance with nursery standards prepared by the American Nursery and Landscape Association (ANSI/ANLA Z60.1), including fertilization, mulching, and watering. Any container-type material, including burlap and wire baskets, is to be completely removed prior to planting. Mulch is to be applied to a depth of 3-4 inches and extending a minimum of 18 inches from the trunk. Mulch shall be pulled 1-2 inches from the trunk. When necessary for stability, trees shall be staked and guyed in at least two directions. Guy wires, with protective tubing, or staking straps may be used.

The Contractor shall guarantee plant material for one year following completion of the project. All plants determined to be dead or in an unacceptable condition during and at the end of the guarantee period shall

be replaced by the Contractor at no cost to NASA LaRC. Replacements shall closely match adjacent specimens of the same species. Replacements shall be subject to all requirements stated in this specification. The guarantee of all replacement plants shall extend for an additional period of one year from the date of their acceptance after replacement.

3.11.6 Seeding

All areas to be seeded shall be tilled or disked to a depth of 3-4 inches and raked or smoothed to remove debris, clods, surface stone 2 inches in diameter or larger and weeds. Grades on the areas to be seeded shall be maintained in true, even and compacted conditions to prevent the formations of depressions. Areas to be seeded that have washed or eroded shall be brought to grade and compacted thoroughly by the Contractor prior to seeding.

Permanent seeding of disturbed areas shall be done in accordance with the Virginia Erosion and Sediment Control Handbook, DEQ-VSWCB-013.

-- End of Section --



**Appendix C: NASA LaRC's Annual Standards and Specifications for
ESC and SWM**



NASA Langley Research Center

Annual Standards and Specifications:
Erosion and Sediment Control (ESC)

&

Stormwater Management (SWM)

July 1, 2016 – June 30, 2017

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i. Abbreviations and Acronyms

BMP - Best Management Practice
Board – State Water Control Board
Center - Langley Research Center
CGP – Construction General Permit (VAR10)
CPAR – Contractor Performance Assessment Reporting System
DEQ - Virginia Department of Environmental Quality
EMS – Environmental Management System
ESC - Erosion and Sediment Control
LaRC – Langley Research Center
LAPD – Langley Procedural Document
LDA – Land Disturbing Activity
LID – Low Impact Development
LPR – Langley Procedural Requirements
MS4 - Municipal Small Storm Sewer System
NASA - National Aeronautics and Space Administration
NPD – NASA Policy Directive
NPR – NASA Procedural Requirements
SPCC - Spill Prevention Control and Countermeasure
SPEEB – Standard Practice and Environmental Engineering Branch
SWM - Stormwater Management
SWPPP - Storm Water Pollution Protection Plan
TMDL – Total Maximum Daily Load
VESCL&R - Virginia Erosion and Sediment Control Law and Regulations
VRRM - Virginia Runoff Reduction Method
VSMP - Virginia Stormwater Management Program
VPDES –Virginia Pollutant Discharge Elimination System
WLA – Waste Load Allocation

1.0 Introduction

NASA Langley Research Center has incorporated Annual Standards and Specifications for Erosion and Sediment Control (ESC) and Stormwater Management (SWM) that are integral components of LaRC's design, construction, maintenance, and management of the Center's facilities and operations. The primary regulatory driver for NASA LaRC Annual Standards and Specifications is the VSMP regulations (9 VAC 25-870), the General VPDES Permit for Discharges of Stormwater from Construction Activities (9 VAC 25-880/VAR10), Erosion and Sediment Control Law (9 VAC 25-840) and LaRC's MS4 permit (VAR040092). The *NASA LaRC Annual Standards and Specifications for ESC and SWM* submittal has been developed to provide detailed information regarding LaRC's compliance with all regulatory requirements.

NASA LaRC Annual Standards and Specifications for ESC and SWM shall be administered by the NASA LaRC Standard Practice and Environmental Engineering Branch (SPEEB) and shall apply to all design, construction, redevelopment and maintenance activities undertaken by LaRC, either by its internal workforce or contracted to external entities, where such activities are regulated by ESC and SWM regulations and EISA Section 438. These Standards and Specifications lay out the process for a successful and compliant project.

NASA LaRC Annual Standards and Specifications for ESC and SWM are submitted to the DEQ for review and approval on an annual basis. NASA LaRC shall ensure that project specific plans are developed and implemented in accordance with these Annual Standards and Specifications. This submittal constitutes NASA LaRC's commitment to effective stormwater management.

2.0 NASA LaRC ESC and SWM Personnel

NASA SPEEB shall be the plan approving authority for land disturbing activities (LDA) at LaRC. The following is a breakdown in responsibilities and titles in regard to *NASA LaRC Annual Standards and Specifications for ESC and SWM*. Responsibilities may be combined in terms of staffing resources only if the person responsible for the task(s) is qualified. Certifications shall be in accordance with the *Virginia Erosion and Sediment Control and Stormwater Management Certification Regulations (9VAC25-850)*;

The following roles and responsibilities are designated to ensure compliance with *NASA LaRC Annual Standards and Specifications for ESC and SWM*:

- 2.1 SWM/ESC Annual Standards and Specifications Administrator (Administrator) shall have overall management and coordination responsibilities for the *NASA LaRC Annual Specifications for ESC and SWM*. This person will reside within NASA SPEEB. This person shall be at a minimum a DEQ dual-certified Program Administrator.
- 2.2 SWM/ESC Plan Reviewer (Reviewer) shall be responsible for reviewing plans to ensure compliance with the *NASA LaRC Annual Standards and Specifications for ESC and SWM* and applicable SW/ESC laws and regulations. The Reviewer shall be responsible to review and approve ESC Plan, SWM Plans, and SWPPPs. This person will reside within NASA SPEEB. This person shall be at a minimum a DEQ dual-certified Plan Reviewer.
- 2.3 SWM/ESC Inspector (Inspector) shall have the responsibility for inspecting erosion and sediment control practices to evaluate compliance with the approved Plans and associated laws, regulations, and the *NASA LaRC Annual Standards and Specifications for ESC and SWM*. The Inspector shall be responsible to inspect erosion and sediment control measures to ensure proper installation in accordance with the permitted plan and record the state and effectiveness of such measures in an effort maximize site erosion and sediment control. They shall also be responsible to inspect the construction and effectiveness of permanent stormwater management controls, verify that all required documents are available on-site for view/review, including but not limited to, land disturbance permit, permitted plans, inspections log, VSMP permits, SWPPP, etc. This person will reside within NASA SPEEB. This person shall be at a minimum a DEQ dual-certified Inspector.
- 2.4 Personnel certified as a dual Combined Administrator for ESC and SWM may serve the role of Administrator, Inspector and Plan Reviewer for ESC and SWM at NASA.
- 2.5 The following personnel are currently designated to ensure and verify compliance with erosion and sediment control and stormwater management regulations on all LaRC projects:

Dual Combined Administrator(s) on Staff:

Peter Van Dyke, Certification #DCA01084 (Expires 4/17/2018)

(757) 864-7517

Peter.vandyke@nasa.gov

Todd Herbert, Certification # DCA0167 (Expires 7/20/2018)

(757) 864-6236

Brandon.t.herbert@nasa.gov

Provisionally Certified Staff:

Andrea Remington, ESC and SWM Inspector and Plan Reviewer
(757) 864-2451
Ande.remington@nasa.gov

3.0 LDA Project Requirements and Technical Criteria

3.1 *NASA LaRC Annual Standards and Specifications for ESC and SWM* are composed of general specifications. The following regulations and guidance documents have been incorporated by reference into *NASA LaRC Annual Standards and Specifications for ESC and SWM*. All parts of these incorporated regulations apply to LDAs at LaRC.

- Virginia Erosion and Sediment Control Regulations (9 VAC 25-840)
- Virginia Stormwater Management Program Regulations (9 VAC 25-870)
- Virginia Erosion and Sediment Control and Stormwater Management Certification Regulations (9 VAC25-850)
- Chesapeake Bay Preservation Area Designation and Management Regulations (9 VAC 25-830)
- Virginia Stormwater Management Handbook, 1999, as amended
- Virginia Erosion and Sediment Control Handbook, 3rd Edition, as amended
- Technical Bulletins, as amended, on DEQ website
- 40 CFR 450.21
- Langley Procedural Requirements 8500.1
- LaRC Master SPEC Section 01 35 40.00 41
- NASA LaRC Environmental Design Standards

Compliance with all of the regulations and documents listed above is required.

3.2 In addition to the *NASA LaRC Annual Standards and Specifications for ESC and SWM*, projects shall comply with NASA LaRC Environmental Master SPEC Section 01 35 40.00 41 and NASA LaRC Environmental Design Standards. These documents are incorporated by reference into *NASA LaRC Annual Standards and Specifications for ESC and SWM*. In combination, these documents guide NASA on proper ESC and SWM program implementation. The NASA LaRC Environmental Design Standards primarily apply to design aspects of projects. The NASA LaRC Master SPEC Section 01 35 40.00 41 applies primarily to construction activity contracts.

3.3 Any LDA over 2,500 square feet shall comply with *NASA LaRC Annual Standards and Specifications for ESC & SWM* as applicable. However, only LDAs disturbing more than one acre of land are required to obtain VA DEQ *General VPDES Permit for Discharges of Stormwater from Construction Activities* (CGP/VAR10) coverage from DEQ.

3.4 For LDAs disturbing over 2,500 square feet, designs shall comply with *VSMP Regulations Part II B – Technical Criteria for Regulated Land-Disturbing Activities* (9 VAC 25-870-32 through 9 VAC 25-870-92).

3.5 Each LDA over 2,500 square feet or when deemed necessary by NASA SPEEB, shall prepare a site specific Erosion and Sediment Control (ESC) Plan that is compliant with the *Virginia Erosion and Sediment Control Regulations* (9 VAC25-840). This plan must be approved by NASA SPEEB

prior to any land disturbing work commencing or application for CGP coverage (for LDAs over 1 acre). More specific details on ESC plan requirements can be found in Section 4.1.

- 3.6 Each LDA over 2,500 square feet or when deemed necessary by NASA SPEEB, shall prepare a site specific Stormwater Management (SWM) Plan that is compliant with the *Virginia Stormwater Management Program (VSMP) Regulations (9 VAC 25-870)*. This plan must be approved by NASA SPEEB prior to any land disturbing work commencing or application for CGP coverage (for LDAs over 1 acre). Specific details on SWM plan requirements can be found in Section 4.2 and in the NASA Environmental Design Standards.
- 3.7 For LDAs disturbing over 1 acre of land, the activity requires coverage under CGP/VAR10. It is the responsibility of the Contractor to apply for the CGP coverage. The Permit will be issued in the selected contractor's name as the construction operator and they responsible for all permit fees.

The CGP requires the construction site operator to develop and implement a site specific Stormwater Pollution Prevention Plan (SWPPP). The SWPPP must be prepared and approved by NASA prior to submitting a registration statement for permit coverage to DEQ. The SWPPP is to be retained at the construction site along with a copy of the permit and permit coverage letter. The operator has the lead in developing, implementing and maintaining the SWPPP and committing the resources necessary to prevent pollution.

- 3.8 Construction operators (contractors) must utilize responsible personnel and obtain certifications or qualifications for erosion and sediment control and stormwater management comparable to those required for NASA. At a minimum, operators shall have a certified Responsible Land Disturber (RLD) on staff. Prior to engaging in a LDA, the Operator must provide NASA the name of the individual holding a valid RLD Certificate who will be responsible for the land disturbance. This information and a copy of the RLD certificate is also required in the SWPPP submittal.

4.0 ESC Plan, SWM Plan, P2 Plan and SWPPP Requirements

The following provides information and requirements on Plan submittals required for compliance with ESC and SWM requirements and regulations.

4.1 Erosion and Sediment Control Plan

4.1.1 An ESC plan consistent with the requirements of the Virginia Erosion and Sediment Control Law and regulations must be designed and implemented during construction activities. The ESC plan must clearly show compliance with the state's 19 minimum standards listed in 9 VAC 25-840-40. The ESC must also provide information on the Operator's RLD. Prior to land disturbance, this plan must be approved by NASA SPEEB. Please see Section 5.0 for details on the Plan review and approval process.

4.1.2 ESC practices selected for use shall be designed and installed in accordance with the Virginia Erosion and Sediment Control Handbook, 3rd Edition (as amended).

4.1.3 An ESC Plan shall adequately cover the following:

- Control of the volume and velocity of stormwater runoff within the site to minimize soil erosion;
- Control of the stormwater discharges, including peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion;
- Minimizes the amount of soil exposed during the construction activity;
- Minimizes the disturbance of steep slopes;
- Minimizes sediment discharges from the site in a manner that addresses (i) the amount, frequency, intensity, and duration of precipitation; (ii) the nature of resulting stormwater runoff; and (iii) soil characteristics, including the range of soil particle sizes present on the site;
- Provides and maintains natural buffers around surface waters, directs stormwater to vegetated areas to increase sediment removal, and maximizes stormwater infiltration, unless infeasible;
- Minimizes soil compaction and, unless infeasible, preserves topsoil;
- Ensures that stabilization of disturbed areas will be initiated immediately whenever any clearing, grading, excavating, or other land-disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 days; and
- Utilizes outlet structures that withdraw stormwater from the surface (i.e., above the permanent pool or wet storage water surface elevation), unless infeasible, when discharging from sediment basins or sediment traps.

4.2 Stormwater Management Plan

4.2.1 A stormwater management plan consistent with the requirements of the Virginia Stormwater Management Act and regulations, in particular *Part II B – Technical Criteria for Regulated Land-Disturbing Activities* (9 VAC 25-870-62 through 9 VAC 25-870-92), must be designed prior to construction and implemented during construction. Prior to land disturbance, this Plan must be approved by NASA SPEEB. Please see Section 5.0 for details on the Plan review and approval process.

A complete SWM Plan shall include the following elements:

- Information on the type of and location of stormwater discharges, information on the features to which stormwater is being discharged including surface waters or karst features if present, and pre-development and post-development drainage areas;
 - Contact information including the name, address, telephone number, and email address of the owner;
 - A narrative that includes a description of current site conditions and final site conditions;
 - A description of the proposed stormwater management facilities and the mechanism through which the facilities will be operated and maintained after construction;
 - Information on the proposed stormwater management facilities, including the type of facilities; location including geographic coordinates; acres treated; and the surface waters into which the facility will discharge;
 - Hydrologic and hydraulic computations, including runoff characteristics;
 - Documentation and calculations verifying compliance with the water quality and quantity requirements (Part II B of the regulations) of these regulations;
 - A map or maps of the site that depicts the topography of the site and includes: (a) All contributing drainage areas; (b) Existing streams, ponds, culverts, ditches, wetlands, other water bodies, and floodplains, (c) Soil types, geologic formations if karst features are present in the area, forest cover, and other vegetative areas; (d) Current land use including existing structures, roads, and locations of known utilities and easements; (e) Sufficient information on adjoining parcels to assess the impacts of stormwater from the site on these parcels; (f) The limits of clearing and grading, and the proposed drainage patterns on the site; (g) Proposed buildings, roads, parking areas, utilities, and stormwater management facilities; and (h) Proposed land use with tabulation of the percentage of surface area to be adapted to various uses, including but not limited to planned locations of utilities, roads, and easements.
 - If an operator intends to meet the requirements established in 9 VAC25-870-63 or 9 VAC25-870-66 through the use of off-site compliance options, where applicable, then a letter of availability from the off-site provider must be included.
- 4.2.2 Compliance with the water quality design criteria set in 9 VAC 25-870-63 shall be determined by utilizing the Virginia Runoff Reduction Method (VRRM). The BMPs approved in 9 VAC 25-870-65 and listed in the Virginia Stormwater BMP Clearinghouse Website are approved for use as ways to reduce the phosphorus load and runoff volume in accordance with the VRRM.
- 4.2.3 Elements of the SWM Plan that include activities regulated under Chapter 4 (§ ~~54.1-400~~ et seq.) of Title 54.1 of the Code of Virginia shall be appropriately sealed and signed by a professional registered in the Commonwealth of Virginia pursuant to Article 1 (§ ~~54.1-400~~ et seq.) of Chapter 4 of Title 54.1 of the Code of Virginia.
- 4.3 Pollution Prevention (P2) Plan
- 4.3.1 A P2 Plan that identifies potential sources of pollutants that may reasonably be expected to affect the quality of stormwater discharges from the construction site and describe control measures that will be used to minimize pollutants in stormwater discharges from the construction site must be developed before land disturbance. This Plan shall be included in the larger SWPPP submittal.
- 4.3.2 At a minimum, the P2 Plan must be designed, installed, implemented, and maintained to: (1) Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge; (2) Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides,

herbicides, detergents, sanitary waste, and other materials present on the site to precipitation and to stormwater; and (3) Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures.

- 4.3.3 The P2 plan shall include effective best management practices to prohibit the following discharges in accordance with 40 CFR 450.21(e): (1) Wastewater from washout of concrete, unless managed by an appropriate control; (2) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials; (3) Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance; and (4) Soaps or solvents used in vehicle and equipment washing.
- 4.3.4 Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, are prohibited unless managed by appropriate controls. LPR 8500.1 and Master SPEC Section 01 35 40.00 provide additional detail on prohibited illicit discharges.

4.4 Stormwater Pollution Prevention Plan (SWPPP) Requirements

- 4.4.1 All SWPPPs shall be compliant with 9 VAC 25-870-54 and 9 VAC 25-880-70 (as applicable). A SWPPP shall include, but not be limited to, an approved ESC plan, an approved SWM plan, a P2 plan for regulated land-disturbing activities, and a description of any additional control measures necessary to address a TMDL.
- 4.4.2 The SWPPP requirements may be fulfilled by incorporating by reference other plans such as (i) an ESC plan, (ii) an agreement in lieu of a plan as defined in 9 VAC 25-840-10, (iii) a SWM plan, (iv) a SPCC plan developed for the site under § 311 of the federal Clean Water Act or (v) BMP programs otherwise required for the facility provided that the incorporated plan meets or exceeds the SWPPP requirements.
- 4.4.3 All plans incorporated by reference into the SWPPP become enforceable by NASA LaRC and DEQ. If a plan incorporated by reference does not contain all of the required elements of the SWPPP of Section II D, the operator must develop the missing elements and include them in the required SWPPP.
- 4.4.4 If a specific Waste Load Allocation (WLA) for a pollutant has been established in an approved TMDL and is assigned to stormwater discharges from a construction activity, additional control measures must be identified and implemented by the operator so that discharges are consistent with the assumptions and requirements of the WLA.
- 4.4.5 The SWPPP must address the following requirements (if not addressed in the ESC Plan):
- Control stormwater volume and velocity within the site to minimize soil erosion;
 - Control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion;
 - Minimize the amount of soil exposed during construction activity;
 - Minimize the disturbance of steep slopes;
 - Minimize sediment discharges from the site;
 - Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration, unless infeasible;

- Minimize soil compaction and, unless infeasible, preserve topsoil;
 - Stabilization of disturbed areas must, at a minimum, be initiated immediately whenever any clearing, grading, excavating, or other earth disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days.
- 4.4.6 The SWPPP shall be amended whenever there is a change in design, construction, operation, or maintenance that has a significant effect on the discharge of pollutants to state waters and that has not been previously addressed in the SWPPP.
- 4.4.7 The SWPPP must be maintained at a central location onsite. If an onsite location is unavailable, notice of the SWPPP's location must be posted near the main entrance at the construction site.

5.0 NASA Administration and Implementation: Project Approval Process

The following section outlines the process for a compliant project at LaRC and the administrative process used by NASA. This section details how LaRC manages a project from cradle to grave in regards to ESC and SWM.

5.1 Langley Form (LF) 416 – Environmental Review

5.1.1 Any land disturbing work, regardless of size, must be coordinated through SPEEB and approved by the ESC and SWM Combined Administrator. To initiate this process a Langley Form (LF) 461 shall be submitted to SPEEB at the earliest planning stages by the project requestor. LF461s are submitted online at:

<https://gis-dwweb.larc.nasa.gov/gisproc/htmldb/?p=122:1:2858958604240::NO>

The LF 461 submittal shall provide a basic scope of work, an estimate of the amount of land disturbance, information on potential changes to drainage, and a preliminary site work location map. NASA SPEEB will provide feedback and guidance on the applicability of the *NASA LaRC Annual Standards and Specifications for SWM and ESC* and other regulations. Guidance will be given on the applicability of Plans, CGP coverage, and project expectations.

5.2 Project Planning and Design

5.2.1 It is the responsibility of NASA SPEEB to ensure that appropriate requirements including, but not limited to, the *NASA LaRC Annual Standards and Specifications for SWM and ESC*, Environmental Specification Section 01 35 40.00 41, Virginia Regulations, and NASA Environmental Design Standards are implemented into project requirements and ultimately into contract award packages.

5.2.2 To ensure projects are designed in accordance with the aforementioned requirements, SPEEB shall participate in the NASA Design Review Process as described in Langley Procedural Document (LAPD) 7000.2. This LAPD specifically outlines NASA's various preconstruction design reviews and the entire design process. SPEEB shall participate and provide ESC and SWM guidance during the following design reviews:

- Functional Requirements Document Development
- Project Requirements Review (PRR)
- Conceptual Design Reviews (CoDR)
- Preliminary Design Reviews (PDR)
- Critical Design Reviews (DCR)
- Design Charrettes
- 35%, 90%, and 100% Design Table Tops
- Integrated Systems Review (ISR)
- Operational Readiness Review (ORR)

5.3 Preconstruction Project Submittals

5.3.1 All required submittals shall be submitted to the Contracting Officer for NASA SPEEB review and approval prior to any LDAs. Submittals timeframes are project specific. Below are the typical required submittals expected to be completed for each project; however, exact composition of

submittals is project specific and guidance will be given during the LF 461 process and built into the project bid package.

- LF 461 Submittal
- ESC Plan
- SWM Plan
- P2 Plan
- SWPPP
- Stamped/Signed (by a licensed Professional Engineer) Civil Plans and Profiles
- Copy of Completed VSMP Permit Application and check
- Vicinity Map
- Construction Schematics
- Dig Permit
- Virginia Runoff Reduction Method (VRRM) Analysis
- CGP Registration Statement

Prior to commencement of a LDA, the project must have received approval for all applicable Plan(s) from NASA SPEEB's Plan Reviewer.

5.4 Plan Reviews

5.4.1 Plan reviews shall be conducted by qualified personnel as detailed in Section 2.1. Plan reviews shall ensure compliance with the *NASA LaRC Annual Specifications for ESC and SWM* and all applicable regulations. Plan reviewers shall use the *ESC and SWM Plan Review Checklists* provided in the Appendix A and B respectively. The Plan Reviewer shall have 15 days to review a submittal and provide written comments.

5.4.2 Accepted Plans: Should a Plan be accepted and approved by NASA SPEEB, then the contractor may proceed with obtaining CGP coverage from DEQ (for projects 1 acre or greater) or begin implementing Plans (for projects 2,500 square feet to .99 acres).

Upon approval, the contractor shall submit at least (2) unmarked Plan sets. These plan sets are allocated as follows: (1) for NASA SPEEB records and (2) for the Project Inspector. Additional copies may be requested as needed. The Operator's copy (contractor) is considered the primary and active living document (especially for ESC and SWPPPs) that should be updated throughout the project as needed.

5.4.3 Rejected Plans: Should a Plan be rejected for rework, the Plan Reviewer shall state in writing the reason(s) for disapproval of a Plan and specify the modifications, terms, and conditions necessary for Plan approval. The re-submission should address all of the Plan Reviewer's comments. Once resubmitted to NASA SPEEB, the Plan Reviewer has an additional 15 days to provide approval or additional comments. LDAs may not occur during this time. This process continues until all Plans obtain the necessary approvals.

5.5 CGP Coverage and Termination

5.5.1 LDAs between 2,500 square feet to 0.99 acres do not require DEQ CGP coverage. However, these LDAs still require SWM and ESC Plan approval prior to land disturbance work commencing.

- 5.5.2 LDAs over one (1.0) acre require DEQ CGP coverage. More information, including access to the DEQ Registration Statement Form, the CGP (VAR10), and the CGP fee schedule, can be found here:

<http://www.deq.virginia.gov/Programs/Water/StormwaterManagement/VSMPPermits/ConstructionGeneralPermit.aspx>

The contractor is responsible for submitting a correct Registration Statement and fee to DEQ for CGP coverage. NASA SPEEB must review the form(s) prior to submittal to the DEQ.

- 5.5.3 The Contractor is responsible for terminating coverage once NASA SPEEB verifies that the site is considered stabilized and the permanent SWM controls are functioning. Contractors should request a SPEEB site inspection once the site is considered complete. SPEEB will visit the site and either grant permission for CGP termination to DEQ or specify what work or conditions are needed prior to termination. The notice of termination should be submitted no later than 30 days from NASA SPEEB approval. Completion of the project is defined as the achievement of final stabilization, not completion of construction.

5.6 Post-construction Submittals

- 5.6.1 A copy of the Operator's DEQ CGP termination letter shall be submitted to NASA SPEEB once received. SPEEB will file the termination letter appropriately into the project file.
- 5.6.2 A construction record drawing for permanent stormwater management facilities shall be submitted to the NASA Contracting Officer. The construction record drawing shall be appropriately sealed and signed by a professional registered in the Commonwealth of Virginia, certifying that the stormwater management facilities have been constructed in accordance with the approved SWM Plan.

6.0 NASA Administration and Implementation: Inspections

6.1 NASA (“VSMP Authority”) and MS4 Oversight Inspections

6.1.1 NASA SPEEB, acting as the VSMP authority by means of these Standards and Specifications and as the MS4 Operator, inspects LDAs during construction and post-construction. NASA Inspectors ensure:

- Adequate installation of ESC measures and ground stabilization;
- Compliance with the 19 Minimum Standards (9 VAC 25-840-40);
- Implementation and compliance with any approved ESC Plan and SWPPP;
- Implementation and compliance with any approved SWM plan;
- Implementation and compliance with any approved P2 Plan;
- Development and implementation of any additional control measures necessary to address a TMDL; and
- Installation and construction of SWM facilities.

6.1.2 NASA SPEEB shall inspect LDAs for compliance with any approved Plan and with these Annual Standards and Specifications. NASA SPEEB shall inspect as follows:

- Upon initial installation of erosion and sediment controls;
- At least once during every two-week period;
- Within 48 hours of any runoff-producing storm event; and
- Upon completion of the project.

6.1.3 NASA Inspectors shall be qualified and certified personnel. Please refer to Section 2.3 for more information. The Certified Inspector(s) are responsible for ensuring that the construction and installation of all structural and non-structural controls are in accordance with the project’s ESC and SWM plans and intention. All erosion and sediment control structures and systems are to be inspected. Maintenance and repairs shall be documented and delivered to the appropriate parties to ensure continued performance of their intended function.

6.1.4 For NASA ESC and SWM Inspections, the *Stormwater Construction Inspection Report form*, provided in Appendix C, shall be used on each site inspection visit. All measures shown or discussed in the ESC and SWPPP shall be inspected. A copy of the Inspection Report will be provided to the NASA Project Manager and the Prime Contractor and archived by NASA SPEEB.

6.2 Contractor (“Operator”) CGP Required Inspections

6.2.1 The CGP requires inspections for compliance with the Permit and approved SWPPP to ensure that ESC controls are in place and functioning. Inspections mandated by the CGP are to be performed and recorded by the Permit Operator (“the contractor”).

6.2.2 Permit Operator inspections shall be done in accordance with the CGP and the CGP inspection schedule.

6.2.3 Each inspection report shall include the following items:

- The date and time of the inspection and when applicable, the date and rainfall amount of the last measurable storm event;

- Summarized findings of the inspection;
 - The location(s) of prohibited discharges;
 - The location(s) of control measures that require maintenance;
 - The location(s) of control measures that failed to operate as designed or proved inadequate or inappropriate for a particular location;
 - The location(s) where any evidence identified under CGP Part II F 3 a (7) exists;
 - The location(s) where any additional control measure is needed that did not exist at the time of inspection;
 - A list of corrective actions required (including any changes to the SWPPP that are necessary) as a result of the inspection or to maintain permit compliance;
 - Documentation of any corrective actions required from a previous inspection that have not been implemented; and
 - The date and signature of the qualified personnel and the operator or its duly authorized representative.
- 6.2.4 The CGP details the inspection requirements in Part II F (3). These inspection requirements should be met by the Operator.
- 6.2.5 For sites with CGP coverage, specific Contractor inspections requirements can be found in the CGP (VAR 10) Part II F.
- 6.2.6 During SWPPP review and approval, NASA will verify that a quality inspection form and tracking system is in place for each LDA.

7.0 NASA Administration and Implementation: Violations, Corrective Actions, and Enforcement

- 7.1 Inspections are done in accordance with Section 6.0 of this document. Should an inspector find a violation, the Project Manager, Contracting Officer, and contractor are notified immediately via email and/or phone. Violations will be documented and delivered to the Project Manager and Permit Operator with a copy of the corresponding *Stormwater Construction Inspection Report form* and *Corrective Action Notice* (provided in Appendix). Any violation reported will include photographs, descriptions, and necessary corrective actions (including timelines for correction).

The Operator shall implement any corrective action(s) identified as a result of an inspection as soon as practicable but no later than seven days after discovery. A longer corrective action timeframe must be approved by NASA SPEEB. If approval of a corrective action by NASA SPEEB is necessary, additional control measures shall be implemented to minimize pollutants in stormwater discharges until such approvals can be obtained.

- 7.2 Potential ESC and SWM violations include, but are not limited to:

- No CGP coverage for sites over 1 acre;
- No SWPPP; Incomplete SWPPP; and/or SWPPP not available for review;
- No approved ESC plan;
- Failure to install stormwater BMPs or erosion and sediment controls;
- Stormwater BMPs or erosion and sediment controls improperly installed or maintained;
- Slow contractor response to NASA ESC and SWM findings;
- Operational deficiencies;
- Failure to conduct required inspections;
- Incomplete, improper, or missed inspections.

- 7.3 For minor deficiencies with no environmental impacts the contractor may remedy the violation immediately and avoid a formal *Corrective Action Notice* being issued. However, an inspection report with photos documenting the deficiency and repairs made will still be placed in the project folder.

Examples of minor deficiencies include, but are not limited to:

- Inlet protection needing maintenance/cleanout, but the BMP is still functioning;
- Silt fence sagging, but BMP is still functioning;
- CGP Coverage letter not posted at project site.

If the minor deficiency is not remedied immediately, a formal *Corrective Action Notice* will be issued to the Contractor. In no circumstance should a corrective action take more than 7 days. If rain is expected and a potential discharge may occur, corrective action needs to be taken immediately.

- 7.4 For deficiencies that have the potential for environmental harm a formal *Corrective Action Notice* will be issued with the corresponding inspection report. Examples of these deficiencies include, but are not limited to:

- Silt fence not installed in accordance with an approved Plan;
- Improper dewatering devices;

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- Unprotected inlets or inadequate controls;
- SWPPP paperwork deficiencies;
- Lack of inspection records.

- 7.5 If a deficiency damaging the environment occurs (ex. illicit discharge of sediment laden water) or minor deficiencies continue to reoccur, then a formal contractual action will be taken through the Contracting Officer. Formal contractual actions (as provided in the FAR) can include, but are not limited to, cure notices, formal contract non-conformance notices, stop work orders, withholding of payment, negative evaluation reports in formal systems such as Federal Government's Contractor Performance Assessment Reporting System (CPAR) and/or contract termination.
- 7.6 At the discretion of NASA and in coordination with DEQ, the CGP may be suspended and/or revoked; at which time all LDAs must cease until the violation(s) of the plan or permit has ceased, corrective action completed, and any related environmental or property damages abated. Alternatively, NASA also has the option to contract with a 3rd party to install and maintain the ESC and SWM measures in accordance with the approved plan(s), complete any necessary corrective actions, and abate any related damages. Once the site is stabilized to the satisfaction of the NASA SPEEB, site work may resume.

8.0 NASA Administration and Implementation: Changes to Approved Plans

- 8.1 NASA SPEEB may require that an approved plan be changed in the following cases:
- Where inspection has revealed the plan is inadequate to satisfy applicable regulations; or
 - Where the person responsible for carrying out the approved Plan(s) finds that such Plan(s) is no longer effective due to field conditions and/or changes to the overall project scope. In such case, an amended plan must be promptly proposed.
- 8.2 Revisions to an approved ESC and/or SWM plan must be submitted in writing to NASA SPEEB. Revisions shall not be considered approved until written notice is provided. All revisions must be clearly marked in red. Revisions must comply with the *NASA LaRC Annual Standards and Specifications for ESC and SWM*. Exceptions may be allowed in the event of an emergency. All changes to the Plans shall be documented on the Plans and recorded in the SWPPP.
- 8.3 The Contractor is responsible for the performance of the ESC measures. If the designated ESC measures prove to be inadequate, the Contractor is responsible to reassess, design, and submit a plan amendment at no cost to the NASA LaRC.

9.0 NASA Administration and Implementation: Variances

9.1 DEQ Tidewater Regional Office (TRO) may waive or modify any of the requirements that are deemed inappropriate or too restrictive for site conditions, by granting a variance. A variance may be granted under these conditions:

- At the time of plan submission, an operator may request a variance. The operator shall explain the reasons for requesting variances to NASA. This request must include a detailed description of the alternative SWM/ESC practice and justification that the practice meets the intent of the state's 19 Minimum Standard for which the variance is sought. NASA will coordinate the request with DEQ TRO. Only DEQ TRO may approve a variance. Specific variances which are approved by DEQ TRO shall be documented in the Plan(s).
- During construction, the person responsible for implementing the approved plan may request a variance in writing from NASA SPEEB. NASA will coordinate the request with DEQ TRO and respond in writing either approving or disapproving such a request. If NASA SPEEB/DEQ TRO does not approve a variance within 10 days of receipt of the request, the request shall be considered disapproved. Following disapproval, the operator may resubmit a variance request with additional documentation.

NASA and DEQ TRO shall consider variance requests judiciously, keeping in mind both the need of the applicant to maximize cost effectiveness and the need to protect off-site properties and resources from damage.

- 9.2 Variances to regulations must ensure off-site properties and resources are protected from damage. Economic hardship is not sufficient reason to request a variance.
- 9.3 All approved variances shall be listed in the General Notes section of the SWM and ESC plans for land disturbing activities and included in the narrative.

10.0 Long-term Management of Stormwater Management Control Devices

This section discusses NASA's provisions for the long-term responsibility and maintenance of SWM control devices and other facilities specified to manage the quantity and quality of runoff, including an inspection and maintenance schedule ensure the long-term success of SWM facilities.

- 10.1 Post-construction inspections shall be made in accordance with the manufacturer's and/or engineer's recommendation, the provisions of these Standards and Specifications, in accordance with the approved SWM Plan, and in accordance with NASA's MS4 Program Plan.

At a minimum, NASA SPEEB shall inspect all SWM facilities at least annually. This is in accordance with requirements of NASA LaRC's MS4 permit.

- 10.2 Inspections shall include a Plan review prior to site visit, a field visit with photographs, and a completed SWM Facility inspection report form. Inspectors will look for proper drainage and erosion issues (such as scouring, rill erosion, etc.).

A copy of the SWM Facility inspection report form can be found in Appendix D.

- 10.3 Once the inspection has been completed, NASA SPEEB will compile the report and any issues that need attention. The field inspection report and a summary of the issues will be forwarded to the appropriate entity (such as COD, Grounds Maintenance, Facility Coordinator, etc.) for corrective action(s). For significant corrections (non-routine), NASA SPEEB may have to advocate for funding to address the issue properly. Documentation on all corrective actions will be kept on file with NASA SPEEB.

11.0 Land Disturbing Activities and Project Tracking

- 11.1 NASA SPEEB tracks all regulated (and non-regulated) LDAs. A copy of the historical and active site tracking log can be found in Appendix F. A “live” version of this log is kept with NASA SPEEB and updated as needed. This tracking log will be submitted annually to DEQ along with this document. As discussed before, projects are also tracked in the LF 461 environmental tracking system. Each project has an associated unique LF 461 number and file that is updated and maintained throughout the project.
- 11.2 A list of regulated land-disturbing activities expected to be under contract at NASA has been submitted in Appendix G. The list includes project description, estimated coverage date, estimated disturbed acreage by watershed, and status/notes. Information on specific land-disturbing activities not included on the list will be provided to DEQ no less than two weeks prior to the start of the activity.

12.0 Annual Standards and Specifications Review and Evaluation

- 12.1 NASA shall submit an updated version of the *Standards and Specifications for ESC and SWM* to DEQ annually. The timeframe for this submittal is contingent upon this first version being approved by DEQ.
- 12.2 DEQ shall have sixty days in which to review/comment/disapprove/approve *NASA's Annual Standards and Specifications for ESC and SWM*. DEQ's comments shall be binding to NASA and any contractor working at NASA.

13.0 Definitions

"Best management practice" or "BMP" means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices, including both structural and nonstructural practices, to prevent or reduce the pollution of surface waters and groundwater systems.

"Board" means the State Water Control Board.

"Certified combined administrator for ESC" means a LaRC employee who holds a certificate of competence from the Board in the combined ESC classifications of program administrator, plan reviewer, and project inspector in the area of ESC.

"Certified combined administrator for SWM" means a LaRC employee who holds a certificate of competence from the board in the combined classifications of program administrator, plan reviewer, and project inspector in the area of SWM.

"Classification" means the four specific certificate of competence classifications within the areas of ESC or SWM that make up activities being performed (program administrator, plan reviewer, project inspector, and combined administrator).

"Clean Water Act" or "CWA" means the federal Clean Water Act (33 USC § 1251 et seq.), formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972, Public Law 92-500, as amended by Public Law 95-217, Public Law 95-576, Public Law 96-483, and Public Law 97-117, or any subsequent revisions thereto.

"Combined administrator for ESC" means anyone who is responsible for performing the combined duties of a program administrator, plan reviewer and project inspector of a VESCP authority.

"Combined administrator for SWM" means anyone who is responsible for performing the combined duties of a program administrator, plan reviewer and project inspector of a VSMP authority.

"Construction activity" means any clearing, grading or excavation associated with large construction activity or associated with small construction activity.

"Discharge," when used without qualification, means the discharge of a pollutant.

"Discharge of a pollutant" means:

1. Any addition of any pollutant or combination of pollutants to state waters from any point source; or
2. Any addition of any pollutant or combination of pollutants to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation.

This definition includes additions of pollutants into surface waters from: surface runoff that is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a state, municipality, or other person that do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances, leading into privately owned treatment works. This term does not include an addition of pollutants by any indirect discharger.

"Erosion and Sediment Control Plan" or "plan" means a document containing material for the conservation of soil and water resources of a unit or group of units of land. It may include appropriate maps, an

appropriate soil and water plan inventory and management information with needed interpretations, and a record of decisions contributing to conservation treatment. The plan shall contain all major conservation decisions and all information deemed necessary by the plan-approving authority to assure that the entire unit or units of land will be so treated to achieve the conservation objectives.

"Land disturbance" or "land-disturbing activity" means a manmade change to the land surface that potentially changes its runoff characteristics including clearing, grading, or excavation, except that the term shall not include those exemptions specified in § 62.1-44.15:34 of the Code of Virginia.

"Linear development project" means a land-disturbing activity that is linear in nature such as, but not limited to, (i) the construction of electric and telephone utility lines, and natural gas pipelines; (ii) construction of tracks, rights-of-way, bridges, communication facilities and other related structures of a railroad company; (iii) highway construction projects; (iv) construction of stormwater channels and stream restoration activities; and (v) water and sewer lines. Private subdivision roads or streets shall not be considered linear development projects.

"Maximum extent practicable" or "MEP" means the technology-based discharge standard for municipal separate storm sewer systems established by CWA § 402(p). MEP is achieved, in part, by selecting and implementing effective structural and nonstructural best management practices (BMPs) and rejecting ineffective BMPs and replacing them with effective best management practices (BMPs). MEP is an iterative standard, which evolves over time as urban runoff management knowledge increases. As such, the operator's MS4 program must continually be assessed and modified to incorporate improved programs, control measures, BMPs, etc., to attain compliance with water quality standards.

"Municipal separate storm sewer system" or "MS4" means all separate storm sewers that are defined as "large" or "medium" or "small" municipal separate storm sewer systems or designated under 9VAC25-870-380 A 1.

"Municipal Separate Storm Sewer System Management Program" or "MS4 Program" means a management program covering the duration of a state permit for a municipal separate storm sewer system that includes a comprehensive planning process that involves public participation and intergovernmental coordination, to reduce the discharge of pollutants to the maximum extent practicable, to protect water quality, and to satisfy the appropriate water quality requirements of the CWA and regulations and the Act and attendant regulations, using management practices, control techniques, and system, design and engineering methods, and such other provisions that are appropriate.

"Operator" means the owner or operator of any facility or activity subject to the Act and this chapter. In the context of stormwater associated with a large or small construction activity, operator means any person associated with a construction project that meets either of the following two criteria: (i) the person has direct operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications or (ii) the person has day-to-day operational control of those activities at a project that are necessary to ensure compliance with a stormwater pollution prevention plan for the site or other state permit or VSMP authority permit conditions (i.e., they are authorized to direct workers at a site to carry out activities required by the stormwater pollution prevention plan or comply with other permit conditions).

"Outfall" means, when used in reference to municipal separate storm sewers, a point source at the point where a municipal separate storm sewer discharges to surface waters and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other surface waters and are used to convey surface waters.

"Postdevelopment" refers to conditions that reasonably may be expected or anticipated to exist after completion of the land development activity on a specific site.

"Predevelopment" refers to the conditions that exist at the time that plans for the land development of a tract of land are submitted to the VSMP authority. Where phased development or plan approval occurs (preliminary grading, demolition of existing structures, roads and utilities, etc.), the existing conditions at the time prior to the first item being submitted shall establish predevelopment conditions.

"Prior developed lands" means land that has been previously utilized for residential, commercial, industrial, institutional, recreation, transportation or utility facilities or structures, and that will have the impervious areas associated with those uses altered during a land-disturbing activity.

"Runoff coefficient" means the fraction of total rainfall that will appear at a conveyance as runoff.

"Runoff" or "stormwater runoff" means that portion of precipitation that is discharged across the land surface or through conveyances to one or more waterways.

"Runoff characteristics" includes maximum velocity, peak flow rate, volume, and flow duration.

"Runoff volume" means the volume of water that runs off the site from a prescribed design storm.

"Site" means the land or water area where any facility or land-disturbing activity is physically located or conducted, including adjacent land used or preserved in connection with the facility or land-disturbing activity. Areas channelward of mean low water in tidal Virginia shall not be considered part of a site.

"Site hydrology" means the movement of water on, across, through and off the site as determined by parameters including, but not limited to, soil types, soil permeability, vegetative cover, seasonal water tables, slopes, land cover, and impervious cover.

"Stormwater management facility" means a control measure that controls stormwater runoff and changes the characteristics of that runoff including, but not limited to, the quantity and quality, the period of release or the velocity of flow.

"Stormwater management plan" means a document(s) containing material for describing methods for complying with the requirements of the VSMP or this chapter.

"Stormwater Pollution Prevention Plan" or "SWPPP" means a document that is prepared in accordance with good engineering practices and that identifies potential sources of pollutants that may reasonably be expected to affect the quality of stormwater discharges. A SWPPP required under a VSMP for construction activities shall identify and require the implementation of control measures, and shall include, but not be limited to the inclusion of, or the incorporation by reference of an approved erosion and sediment control plan, an approved stormwater management plan, and a pollution prevention plan.

"Surface waters" means:

1. All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide;
2. All interstate waters, including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters: (a) That are or could be used by interstate or foreign travelers for recreational or other

purposes; (b) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (c) That are used or could be used for industrial purposes by industries in interstate commerce.

4. All impoundments of waters otherwise defined as surface waters under this definition;
5. Tributaries of waters identified in subdivisions 1 through 4 of this definition;
6. The territorial sea; and
7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in subdivisions 1 through 6 of this definition.

"Total maximum daily load" or "TMDL" means the sum of the individual wasteload allocations for point sources, load allocations (LAs) for nonpoint sources, natural background loading and a margin of safety. TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure. The TMDL process provides for point versus nonpoint source trade-offs.

"Virginia Pollutant Discharge Elimination System (VPDES) permit" or "VPDES permit" means a document issued by the State Water Control Board pursuant to the State Water Control Law authorizing, under prescribed conditions, the potential or actual discharge of pollutants from a point source to surface waters.

"Virginia Stormwater Management Act" means Article 2.3 (§ ~~52.1-44.15:24~~ et seq.) of Chapter 3.1 of Title 62.1 of the Code of Virginia.

"Virginia Stormwater BMP Clearinghouse Website" means a website that contains detailed design standards and specifications for control measures that may be used in Virginia to comply with the requirements of the Virginia Stormwater Management Act and associated regulations.

"Virginia Stormwater Management Handbook" means a collection of pertinent information that provides general guidance for compliance with the Act and associated regulations and is developed by the department with advice from a stakeholder advisory committee.

"Virginia Stormwater Management Program" or "VSMP" means a program approved by the board after September 13, 2011, that has been established by a VSMP authority to manage the quality and quantity of runoff resulting from land-disturbing activities and shall include such items as local ordinances, rules, permit requirements, annual standards and specifications, policies and guidelines, technical materials, and requirements for plan review, inspection, enforcement, where authorized in the Act and associated regulations, and evaluation consistent with the requirements of the SWM Act and associated regulations.

APPENDIX A: ESC Plan Review Checklist

REVIEW CHECKLIST

EROSION AND SEDIMENT CONTROL PLAN

ESC General:

	YES	NO
Title Page including Project, Contract Number, and Date.	<input type="checkbox"/>	<input type="checkbox"/>
Certification Statement Signed by an Officer of the Company?	<input type="checkbox"/>	<input type="checkbox"/>
Plan signed off by all subcontractors?	<input type="checkbox"/>	<input type="checkbox"/>
Responsible Land-Disturber Certificate Included?	<input type="checkbox"/>	<input type="checkbox"/>

ESC Narrative:

Detailed description of construction activities?	<input type="checkbox"/>	<input type="checkbox"/>
Site description (i.e. location, type of ground cover, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>
Site location map?	<input type="checkbox"/>	<input type="checkbox"/>
Estimated area to be disturbed?	<input type="checkbox"/>	<input type="checkbox"/>
Construction sequence/ schedule of land-disturbing activities?	<input type="checkbox"/>	<input type="checkbox"/>
Pre and post stormwater runoff coefficients?	<input type="checkbox"/>	<input type="checkbox"/>
Name and location of receiving waters and tributaries?	<input type="checkbox"/>	<input type="checkbox"/>
Location of wetlands or other sensitive habitat within the project?	<input type="checkbox"/>	<input type="checkbox"/>

ESC Potential Pollution Sources:

Aboveground storage tanks addressed?	<input type="checkbox"/>	<input type="checkbox"/>
List of chemicals, petroleum products provided?	<input type="checkbox"/>	<input type="checkbox"/>
Sanitary waste facilities addressed?	<input type="checkbox"/>	<input type="checkbox"/>
Vehicle maintenance addressed?	<input type="checkbox"/>	<input type="checkbox"/>

ESC Best Management Practices (BMPs):

Description, type, and schedule of stabilization practices?	<input type="checkbox"/>	<input type="checkbox"/>
Description and type of structural BMPs (i.e. silt fence, check dams, inlet protection, sediment traps/basins, construction entrances, gabions, etc.) provided?		

Soil stockpile stabilization addressed?

ESC Operational Practices (Good Housekeeping):

Solid waste management addresses?

Dust suppression addressed?

Sediment tracking on roads addressed?

Inspection and Maintenance of BMPs:

Provided a plan for inspecting and maintaining the BMPs?

Designated a qualified individual to inspect all BMPs?

Included name and telephone number for the qualified person?

Example of BMP inspection checklist included?

Detailed Maps:

Soil disturbance areas shown?

APPENDIX B: SWM Plan Review Checklist

REVIEW CHECKLIST

STORMWATER MANAGEMENT PLAN

SWM General:

	YES	NO
Title Page including Project, Contract Number, and Date?	<input type="checkbox"/>	<input type="checkbox"/>
Virginia Professional Engineer Seal?	<input type="checkbox"/>	<input type="checkbox"/>
Appropriate technical criteria to the entire LDA?	<input type="checkbox"/>	<input type="checkbox"/>
Location of all SW discharges?	<input type="checkbox"/>	<input type="checkbox"/>
Narrative of final site conditions and VSMP authority?	<input type="checkbox"/>	<input type="checkbox"/>
Detailed site description (i.e. location, type of ground cover)?	<input type="checkbox"/>	<input type="checkbox"/>
Site location map, acres treated, SWM facility descriptions?	<input type="checkbox"/>	<input type="checkbox"/>
Hydrologic and hydraulic calculations (VRRM)?	<input type="checkbox"/>	<input type="checkbox"/>
Compliance calculations for water quality and quantity (IIb)?	<input type="checkbox"/>	<input type="checkbox"/>
Limits of clearing and grading?	<input type="checkbox"/>	<input type="checkbox"/>
Information on adjoining parcels?	<input type="checkbox"/>	<input type="checkbox"/>
Location of wetlands or other sensitive habitat within the project?	<input type="checkbox"/>	<input type="checkbox"/>
Post construction maintenance requirements?	<input type="checkbox"/>	<input type="checkbox"/>
Designated a qualified individual to inspect all BMPs?	<input type="checkbox"/>	<input type="checkbox"/>
Included name and telephone number for the qualified person?	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX C: NASA ESC Inspection Report Form

APPENDIX D: NASA SWM Inspection Report Form

NASA Langley Annual Standards and Specifications Covering June 30, 2016 – July 1, 2017

SOIL OR FILTER MEDIA		
TYPE OF FILTER/INFILTRATION MEDIA: (check all that apply) <input type="checkbox"/> Soil mix _____ (in) <input type="checkbox"/> Sand _____ (in) <input type="checkbox"/> Gravel _____ (in) <input type="checkbox"/> Large Stone _____ (in) <input type="checkbox"/> Organic material _____ (in) <input type="checkbox"/> Other _____ <input type="checkbox"/> N/A <input type="checkbox"/> Unknown Avg. depth of sediment build-up on surface? _____ (in)		
SOIL MEDIA SAMPLE: Dominant Soil Type <input type="checkbox"/> Clay <input type="checkbox"/> Loam <input type="checkbox"/> Sand <input type="checkbox"/> Sand/Loam Is the soil homogenous? <input type="checkbox"/> Yes <input type="checkbox"/> No	Comments:	
VEGETATION		
GENERAL OBSERVATIONS: <input type="checkbox"/> Landscaped <input type="checkbox"/> Aquatic Bench <input type="checkbox"/> Invasive Species <input type="checkbox"/> Plant Diversity	TYPE OF GROUND COVER (% of Surface Area in Plan View up to low Outlet): _____ Trees _____ Grasses/Perennials _____ Pondered water _____ Other: _____ Managed Turf _____ Bare Soil _____ Shrubs _____ N/A _____ Gravel/stone _____ Mulch _____ Emergent wetland	
Depth of mulch, if present: <input type="checkbox"/> Hardwood _____ (in) <input type="checkbox"/> Pine Straw _____ (in) <input type="checkbox"/> Other _____ (in) Rate degree of shading of BMP Surface Area by trees: <input type="checkbox"/> Well Shaded <input type="checkbox"/> Some Shading <input type="checkbox"/> No Shading <input type="checkbox"/> N/A		
INLET CHARACTERISTICS		
INLET #1: Diameter/Width: _____ (in)	TYPE OF INLET: <input type="checkbox"/> Open Channel <input type="checkbox"/> Closed Pipe <input type="checkbox"/> Sheet Flow <input type="checkbox"/> Curb Cut <input type="checkbox"/> Other:	Elevation difference between bottom of inlet and BMP surface: _____ (in)
INLET SUBMERSION: <input type="checkbox"/> Complete <input type="checkbox"/> Partial <input type="checkbox"/> None	INLET CONDITIONS: Inlet Erosion: None Slight Moderate Severe Inlet Clogging: None Slight Moderate Severe Structural Problems: None Slight Moderate Severe	Comments:
INLET #2: Diameter/Width: _____ (in)	TYPE OF INLET: <input type="checkbox"/> Open Channel <input type="checkbox"/> Closed Pipe <input type="checkbox"/> Sheet Flow <input type="checkbox"/> Curb Cut <input type="checkbox"/> Other:	Elevation difference between bottom of inlet and BMP surface: _____ (in)
INLET SUBMERSION: <input type="checkbox"/> Complete <input type="checkbox"/> Partial <input type="checkbox"/> None	INLET CONDITIONS: Inlet Erosion: None Slight Moderate Severe Inlet Clogging: None Slight Moderate Severe Structural Problems: None Slight Moderate Severe	Comments:
PRETREATMENT		
TYPE OF PRETREATMENT (check all that apply) <input type="checkbox"/> None <input type="checkbox"/> Sediment Forebay (ft) <input type="checkbox"/> Grass Channel <input type="checkbox"/> Riprap Channel or Apron <input type="checkbox"/> Grass Filter Strip <input type="checkbox"/> Plunge Pool? <input type="checkbox"/> Stone Diaphragm <input type="checkbox"/> Other:	PRETREATMENT FUNCTION <input type="checkbox"/> By design <input type="checkbox"/> Incidental Is pretreatment functioning? <input type="checkbox"/> Yes <input type="checkbox"/> No Is sediment removal necessary? <input type="checkbox"/> Yes <input type="checkbox"/> No Signs of pretreatment bypass? <input type="checkbox"/> Yes <input type="checkbox"/> No Signs of flow of sediment from pretreatment to BMP? <input type="checkbox"/> Yes <input type="checkbox"/> No Severity: <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Severe	
GENERAL DESIGN		
BMP FEATURES (check all that apply) <input type="checkbox"/> Maintenance Access <input type="checkbox"/> Underdrain <input type="checkbox"/> Fence <input type="checkbox"/> Clean Out <input type="checkbox"/> Multi-cell <input type="checkbox"/> Observation Well <input type="checkbox"/> Micropool <input type="checkbox"/> Is water present in observation well? Yes/No Depth: _____ ft <input type="checkbox"/> Impermeable Liner <input type="checkbox"/> Pond Drain <input type="checkbox"/> Other:		
CONVEYANCE THROUGH BMP <input type="checkbox"/> No Defined Channel <input type="checkbox"/> Low Flow Channel <input type="checkbox"/> Concrete <input type="checkbox"/> Eroded <input type="checkbox"/> Earthen <input type="checkbox"/> Other _____ Length of Shortest Flow Path: _____ (ft)	Is BMP designed with a Permanent Pool? <input type="checkbox"/> Yes <input type="checkbox"/> No	

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PERFORMANCE				
GENERAL PROBLEMS: (check all that apply)				
<input type="checkbox"/> Maintenance Needed	<input type="checkbox"/> Erosion at Embankments	<input type="checkbox"/> Permanent Pools not stable		
<input type="checkbox"/> Water Bypass of Inlet	<input type="checkbox"/> Erosion within Facility	<input type="checkbox"/> Inadequate vegetation		
<input type="checkbox"/> Water Bypass of Outlet	<input type="checkbox"/> Deposition within Facility	<input type="checkbox"/> Dead or Diseased Vegetation		
<input type="checkbox"/> Incorrect Flow Paths	<input type="checkbox"/> Inappropriate Ponding of Water	<input type="checkbox"/> Too many invasive plants		
<input type="checkbox"/> Short-circuiting of treatment mechanism	<input type="checkbox"/> Clogged Pond Drain/Underdrain	<input type="checkbox"/> Trees on Embankment		
<input type="checkbox"/> No or ineffective treatment	<input type="checkbox"/> Clogged Media	<input type="checkbox"/> Failing structural components		
<input type="checkbox"/> Ineffective pretreatment	<input type="checkbox"/> Inappropriate media material	<input type="checkbox"/> Safety issue (Note: _____)		
<input type="checkbox"/> Others	<input type="checkbox"/> Inappropriate underlying soil (infiltration)			
WATER QUALITY IN FACILITY:		EVIDENCE OF:		
Algae	<input type="checkbox"/> None <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Severe	<input type="checkbox"/> Geese		
Odor	<input type="checkbox"/> None <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Severe	<input type="checkbox"/> Animal Burrows		
Turbidity	<input type="checkbox"/> None <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Severe	<input type="checkbox"/> Mosquitoes		
Color	<input type="checkbox"/> Normal <input type="checkbox"/> Abnormal	<input type="checkbox"/> BMP Alteration		
PROBLEM	1=NONE	2 - FEW	3 – SEVERAL	4-SEVERE
TRASH	No evidence of trash	A few pieces of trash throughout BMP	Trash accumulation near inlet/outlet	Lots of trash in BMP or BMP used for storage
BMP BANK EROSION	No noticeable erosion	Slight erosion < 5% of bank affected	Moderate erosion ~1.5% of bank affected	Banks severely eroded, >25% of bank affected
SEDIMENT DEPOSITION	No sediment deposition	Areas of minor sediment deposition	Areas of some deposition, may be severe near inlet/outlets	Lots of deposition resulting in pond bottom clogging
SURFACE SLOPE	0-1% BMP surface slope	1-3% BMP surface slope or steeper slopes with check dams,	3-5% BMP surface slope with no check dams,	>5% surface slope;
SIDE SLOPES	BMP side slopes 3:1 or flatter	BMP side slopes 2:1	Steep BMP side slopes	Risk of side slope failure
STRUCTURAL	No evidence of structural damage	Minor problems (e.g., bank slump, eroded channels)	Moderate structural problems –failure pending	Structural failures (e.g., bank failure, blowout)
VISIBILITY	High visibility, near high-traffic areas	Some visibility, near traffic areas	Limited visibility, near low traffic areas	No visibility, behind buildings or fences
ACCESSIBILITY	Maintained access area for vehicles	Access area designated, but not maintained	Access for vehicles not designated	Access for vehicles not possible
VEG COVER	No mowing in/around BMP	Mowing along BMP edges but areas of no mow in BMP bottom	Mowed turf vegetation	BMP bottom has large areas of bare soil
	Dense plant cover (>75%)	Plant cover, 50-75%	Some plant cover, 25-50%	Sparse Plant Cover
TREES	Healthy and established	Slightly Stressed	Stressed	Dead
GROUND COVER	Healthy and established	Slightly Stressed	Stressed	Dead
SHRUBS	Healthy and established	Slightly Stressed	Stressed	Dead
EMERGENT WETLAND	Healthy and established	Slightly Stressed	Stressed	Dead

APPENDIX E: Corrective Action Notice

NASA Langley Corrective Action Notice

Project Name: _____ Permit Number: _____
 Inspector: _____ Date: _____ Time: _____

- Stage of Construction**
- Pre-Construction Building Construction Construction of SWM Facilities
 Clearing/Grubbing Finish Grading Maintenance of SWM Facilities
 Rough Grading Final Stabilization Other

Item#	Law or Regulation	Description/Location of Deficiency, Recommended Actions, Comments

The corrective action deadline date must be adhered to. If the site stays in non-compliance and/or corrective actions are not completed by the deadline, other enforcement actions will be pursued. If rain is expected and a potential discharge may occur, corrective action needs to be taken immediately. Please notify SPEEB via email (photos, etc.) at peter.van.cyke@nasa.gov once corrective actions have been taken.

Deadline Date:	NASA Re-Inspection Date:
Inspector Signature:	Date:

APPENDIX F: Historical and Current LDAs Tracking Sheet

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Project Description	Permit Operator	Coverage Date	Tracking Number	Status
1189/1190/1200	MK Taylor	4/28/2009	DCR-01-09-101658	Closed
Road Repave	Asphalt Roads & Materials Co.	6/12/2009	DCR01-09-101919 to VAR10-10-102326	Closed
2101	Whiting Turner	8/5/2009	VAR10-10-103092	Closed
1262 Pad	Riesbeck Contracting	8/15/2009	VAR10-10-103279	Closed
B1236 Parking Lot	Hudgins	9/17/2009	VAR10-10-103433	Closed
Big DEMO Project	Bhate Environmental	10/14/2009	VAR10-10-103599	Closed
B1250 Parking Lot	MK Taylor	12/9/2009	VAR10-140-103943	Closed
Tunnel Demo	Charter Environmental	5/5/2010	VAR10-10-104736	Closed
Hydro Impact	J.B. Denny	6/3/2010	VAR10-10-104921	Closed
Repaving	ARM	5/24/2010	VAR10-10-104890	Closed
009 OWS Work	Northwind	1/6/2011	VAR10-11-100937	Closed
003 OWS Work	Northwind	1/6/2011	VAR10-11-100937	Closed
1212C - Road	Pembroke	6/10/2011	VAR10-11-101745	Closed
Temp Gravel Lot	MK Taylor	6/28/2011	VAR10-11-101822	Closed
Phase II Demo	All Phases	10/7/2011	VAR10-12-100545	Closed
1229 Parking Lot	Northwind	6/21/2011	VAR10-12-100034	Closed
1212 C	Riesbeck Contracting	Summer	VAR10-12-103769	Closed
IESB Site	Whiting Turner	6/4/2012	VAR10-12-103624	Closed
TRIAD DEMO	Triad	6/18/2012	VAR10-12-103734	Closed
Stratton Road	ROME	8/1/2012	VAR10-13-100158	Closed
1195 Steam Line	MK Taylor	5/29/2013	VAR10-13-101677	Closed
Fire Station Upgrade	Heard	8/1/2013	VAR10-14-100253	Permit Expiring June 30 (Under 1 acre)
1229/LTPT	All Phase	12/9/2013	VAR10C696	Active Site (Reapplied)
1212 Steam Line	MK Taylor	11/8/2013	VAR10C315	Closed
Sanitary Upgrades	Aspen	1/15/2014	VAR10C750	Permit Expiring June 30 (Under 1 acre)
Potable Water Upgrades	BCI Construction	2/14/2014	VAR10D018	Permit Expiring June 30 (Under 1 acre)

APPENDIX G: Proposed LDAs Tracking

NASA Langley Annual Standards and Specifications Covering June 30, 2016 – July 1, 2017

*² Some of these projects are contingent upon budget. These projects may or may not occur.



Appendix D: DEQ TMDL Action Plan Approval Letter



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P.O. Box 1105, Richmond, Virginia 23218
www.deq.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4000
1-800-592-5482

December 11, 2015

David E. Bowles
Center Director
NASA – Langley Research Center
5 Langley Boulevard, M/S 010
Hampton, VA 23681

Transmitted electronically: david.e.bowles@nasa.gov

RE: Virginia Pollutant Discharge Elimination System (VPDES) MS4 Permit
VAR040092, NASA – Langley Research Center, Chesapeake Bay TMDL Action Plan
Approval

Dear Mr. Bowles:

The Department of Environmental Quality (DEQ) has reviewed the Chesapeake Bay TMDL Action Plan received on September 28, 2015 in accordance with Section I.C of the General VPDES Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4). Additional information was received November 16, 2015.

As submitted, the action plan will result in the following annual reduction of pollutants of concern:

Pollutant of Concern	Annual Load Reduction (lb/yr)	Percentage of L2 Reduction Achieved After Implementation
Total Nitrogen	268.89	104%
Total Phosphorus	83.65	135%
Total Suspended Solids	25639.51	119%

The Chesapeake Bay TMDL Action Plan is hereby approved and is an enforceable part of the MS4 Program Plan. The approved action plan is based on the 2010

Urbanized Area as designated by the U.S. Census Bureau; and reductions were calculated based on land use data from 2009.

Please note any modifications to the Chesapeake Bay TMDL Action Plan shall be made in accordance with the Program Plan Modification Section of the MS4 General Permit (Section II.F).

As provided by Rule 2A:2 of the Supreme Court of Virginia, you have thirty (30) days from the date you received this decision within which to appeal this decision by filing a notice of appeal in accordance with the Rules of the Supreme Court of Virginia with the Director, Virginia Department of Environmental Quality.

Please contact Derick Winn at (804) 698-4114 or at Derick.Winn@deg.virginia.gov if you have any questions.

Sincerely,



Allan Brockenbrough II, P.E.
Manager, Office of VPDES Permits

Copies: File

Peter Van Dyke (peter.vandyke@nasa.gov)

Andrea Remington (andrea.m.ehien@nasa.gov)

