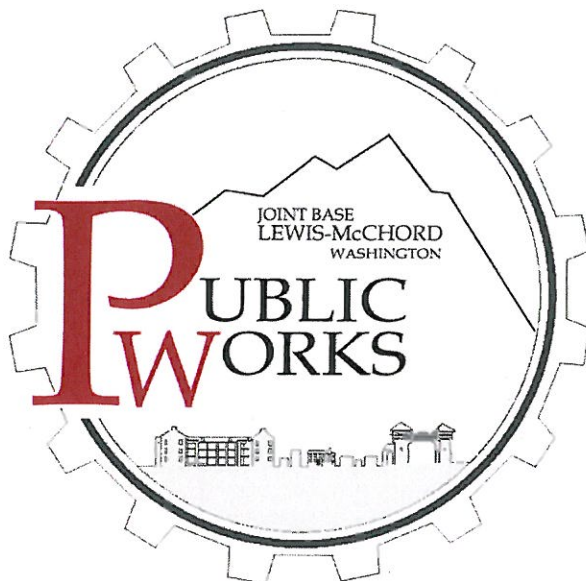




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Joint Base Lewis-McChord
 Municipal Separate Storm Sewer System (MS4)
 Stormwater Management Plan

Prepared for:
 Environmental Division
 Directorate of Public Works
 Joint Base Lewis-McChord, WA

Public Works, Joint Base Lewis-McChord Environmental Division		
Procedure: MS4 Stormwater Management Plan		
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Joint Base Lewis-McChord
Municipal Separate Storm
Sewer System (MS4):
Stormwater Management Plan
NPDES Permit WAS-026638

Prepared for

Directorate of Public Works
Joint Base Lewis-McChord, WA 98433

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13 July 2016

Revised: 30 June 2017

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PHASE II STORMWATER MANAGEMENT PLAN CERTIFICATION

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.



Paul Steucke
Chief, Environmental Division

5 JUL 2017
Date

LIST OF ACRONYMS

CWA	Clean Water Act
EAB	Environmental Appeals Board
Ecology	Washington State Department of Ecology
EMS	Environmental Management System
EOP	Environmental Operation Permit
EPA	United States Environmental Protection Agency
GFEBBS	General Fund Enterprise Business System
I-5	Interstate 5
JBLM	Joint Base Lewis-McChord
MSGP	Multi-Sector General Permit
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
Permit	NPDES Permit number WAS-026638
SWMM	Stormwater Management Manual for Western Washington, (2014 ed).
SWMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Protection Plan
WWHM	Western Washington Hydrology Model (2012 ed)

1 INTRODUCTION

This Stormwater Management Plan (SWMP) describes the procedures that Joint Base Lewis-McChord (JBLM) will implement to comply with the requirements with United States Environmental Protection Agency (EPA) National Pollutant Discharge and Elimination System (NPDES) permit number WAS-026638 (Appendix A). This permit provides authorization to discharge stormwater from JBLM's Municipal Separate Storm Sewer System (MS4). In addition, pursuant to Ecology's certification and Clean Water Act (CWA) Section 401(d), 33 U.S.C. 1341 (d), the MS4 Permit also authorizes discharges from the MS4 to groundwater of the State of Washington.

As the permit requires in Section II.A.3, this SWMP includes the following information:

- a) A summary of the legal authorities which enable JBLM to control discharges to and from JBLM's MS4,
- b) A description of each minimum control measure used to satisfy the requirements of Parts II.B and II.C of the Permit,
- c) Any additional actions implemented by JBLM in meeting Permit requirements of Parts II.B and II.C, and
- d) A description of the monitoring activities required by Part IV of the Permit.

Format of this SWMP is:

Section 1.0 - Introduction, regulatory and site information
Section 2.0 - Six minimum control measures
Section 3.0 - Stormwater retrofit
Section 4.0 - Monitoring, Recordkeeping and Reports
Section 5.0 - Stormwater coordination, implementation team and schedule.

1.1 REGULATORY INFORMATION

NPDES MS4 WAS-026638 was issued to the JBLM on 22 August 2013, with a scheduled effective date of 1 October 2013. On 19 September 2013, and 22 October 2013, the Army filed two Motions for Extension of Time to File Petition for Review. The Environmental Appeals Board ("EAB") granted both extension requests. On 5 November 2013, the Army filed a Petition for Review of the Permit by the EAB. The Army sought review of the stormwater management program requirements in Parts II.B.5 and II.C of the Permit, as well as various compliance deadlines elsewhere in Permit Parts II and IV. On 22 November 2013, EPA notified JBLM that the contested conditions in Parts II.B.5, II.C and specified deadlines were stayed until final agency action under 40 CFR § 124.19(f); the remaining conditions of the Permit are severable from the contested provisions and therefore became fully effective and enforceable on 25 December 2013. The stayed conditions became effective on 1 February 2015.

1.2 OTHER PERMITS

JBLM is authorized to discharge stormwater associated with industrial and construction activities through the MS4, only when such discharges are otherwise authorized under an appropriate NPDES permit. These other permits are described below.

1.2.1 Multi-Sector General Permit (MSGP)

JBLM is currently authorized to discharge stormwater under the Multi-Sector General Permit #WAR05000F. As this permit requires, a Stormwater Pollution Prevention Plan (SWPPP) for the covered facilities has been developed and is managed by the Stormwater Program. Facilities covered under the permit and the MS4 outfalls they discharge to are contained in the SWPPP.

1.2.2 Construction General Permit (CGP)

JBLM currently implements a base-wide construction stormwater management program. Additionally, all projects that have a land disturbance of an acre or more and a potential to discharge stormwater to waters of the United States will obtain site specific permit coverage by submitting a separate Notice of Intent (NOI) to the EPA. Coverage for these specific projects is obtained by the operator/contractor with day-to-day operational control of the construction project.

1.3 SITE INFORMATION

1.3.1 Background

JBLM was established in 2010, and is cooperatively operated by the Army and the Air Force. The joint base is located in Pierce and Thurston Counties and comprises approximately 86,176 acres of the former Fort Lewis Army Base, and 4,639 acres of the former McChord Air Force Base (Figure 1). Total land area of JBLM is approximately 90,815 acres or 142 square miles.

The Joint Base operates JBLM on behalf of warfighting units, families, and extended military community who rely on JBLM for support. With an Army joint base commander and Air Force deputy joint base commander, the installation is supported through directorates and agencies that provide a full range of city services and quality-of-life functions, including facility maintenance, recreation, family programs, training support and emergency services.

The population of JBLM in Pierce and Thurston Counties in 2017 was estimated to be 95,000, which includes military personnel, military dependents residing on base, civilian employees, contractors, and visitors. Most development is located in what is referred to as the "cantonment" areas. Those portions of the installation designated as training areas have limited development, and are reserved exclusively for military training operations. See Figure 1 for a map of JBLM with areas delineated.

Yakima Training Center, and several other geographically separate facilities are under the jurisdiction of JBLM. However, the MS4 permit addresses only the discharges from the MS4 owned or operated by JBLM in Pierce and Thurston Counties as shown in Figure 1 and Appendices B and C. It does not include Yakima Training Center or other geographically remote sites operated by JBLM.

1.3.2 Climate

The climate of the JBLM region is characterized by mild, wet winters and warm, dry summers. The average annual precipitation at JBLM is 40.2 inches, with about 70 percent of the annual rainfall occurring between mid-October and February. The driest months are July and August, with an average of only 1 inch of precipitation per month. Average snowfall at the installation rarely exceeds a few inches. Temperatures range from a monthly mean of 36.5 °F in winter to 65 °F in summer. The frost-free season averages 176 days (U.S. Army Corps of Engineers 1994).

Climatic conditions at JBLM are determined, in large part, by three factors: the Pacific Ocean, the Olympic Mountains, and semi-permanent high- and low-pressure weather cells which hover over the North Pacific Ocean (Kruckeberg 1991). JBLM lies in the rain shadow of the Olympic Mountains, and annual precipitation is quite low compared to many forested areas in western Washington. Average precipitation in the Puget Sound basin ranges from 33 inches in Bellingham to 52 inches in Olympia (Franklin and Dyrness 1988).

1.3.3 Geology

The geology of JBLM is dominated by continental glacier deposits from the Fraser Glaciation (Walters and Kimmel 1968, Thorson 1980). The geologic units underlying the base were deposited by the Vashon Stade of the Fraser glaciation about 14,000 years ago. The Puget Lobe of the glacier reached its terminus just a few miles south of the southern boundary near the current site of Tenino, WA (Kruckeberg 1991). During subsequent deglaciation, glacial sediments were deposited to form a variety of distinct glacial landforms. The low hills in the western half of the Pierce County portion of the base are made of lodgement till (deposited underneath the glacier) mantled with ablation till (surface debris let down onto the landscape as the ice melted away). On some of the hills, the Vashon till may overlie drumlins formed during pre-Vashon glaciation.

The majority of the Pierce County portion of the base consists of outwash deposited by meltwater from the receding terminus of the glacier (Walters and Kimmel 1968, Thorson 1980). The resulting topographic surface is called the Steilacoom Plains, underlain by Steilacoom Gravel. This recent glacial landscape has been modified by post-glacial geomorphic processes of erosion and alluvial deposition, most notably

near the Nisqually River and Muck Creek. Lake deposits also formed during and after glaciation in upland depressions in the till and moraine.

1.3.4 Topography

Topographic characteristics are largely determined by the recent glaciation described above. Due to the predominance of outwash deposits, the topography at JBLM is generally quite gentle, characterized by flat plains and gently rolling terrain with occasional hilly areas of moderate slope. Elevation ranges from 0 to 600 feet, with most of the area between 200 and 400 feet. Short (< 200 feet), steep slopes occur between different levels of outwash terraces and on the banks of old outwash channels. Relatively gentle hills in and around the developed area of JBLM derive from till deposits. Topographic features due to surface drainage and erosion are poorly defined because of the highly permeable nature of the coarse-textured soils and glacial parent materials. Exceptions are the steep slopes occurring along escarpments bordering the Nisqually River and the shoreline of Puget Sound. The Nisqually River valley was carved by large volumes of water from the Nisqually Basin, draining around the southern end of the receding Vashon glacier.

1.3.5 Soils

The soils of JBLM are placed into two major groups for general characterization based on maps and descriptions of soil series prepared by the Soil Conservation Service (Anderson et al. 1955, Pringle 1990). Groups I and II comprise 90 percent of the total area and are similar in many physical characteristics (derived from loose glacial sands and gravels, somewhat excessively drained, low water-holding-capacity, coarse textured, and shallow). However, Group I soils developed on outwash plains under prairie vegetation while Group II is strongly associated with the hills or breaks in topography historically occupied by forest.

Group I soils are somewhat excessively drained soils derived from loose glacial outwash. They are mostly gravelly sandy loam, with some sandy loam, or sand and are shallow to moderately shallow. Soil series include: Spanaway, Fitch, and Nisqually.

Group II soils are also somewhat excessively drained soils derived from loose, gravelly or sandy glacial drift, often overlying till or moraine. They are mostly gravelly sandy loam, some very gravelly or stony and are very shallow to moderately shallow. Soil series include: Everett, Indianola, Lynden, and Skykomish (U.S. Soil Conservation Service, 1990).

1.3.6 MS4 Description

The MS4 throughout the installation is comprised of curbs and gutters, ditches and storm drains, lift stations, treatment systems, and associated outfalls. It is located in the cantonment areas of Lewis-Main, Lewis-North, and McChord Field. Operational

ranges including training and impact areas are outside of the cantonment areas and are not served by the cantonment area MS4 infrastructure, but are included in the permit.

- **Lewis-Main and Lewis-North.** The cantonment areas of Lewis-Main and Lewis-North are comprised of approximately 10,603 acres, almost half of which (4,972 acres) drain to the MS4 infrastructure. Appendix B describes the outfalls of Lewis-Main and Lewis North. The MS4 in Lewis-Main and Lewis-North discharges to both surface water and groundwater as shown in Figures 2 and 3 and Exhibit 1.

Lewis-Main. The MS4 within the northern portion of Lewis-Main, which includes Madigan Army Medical Center and the Logistics Center east of Exit 122 on Interstate 5 (I-5), drains to Murray Creek. MS4 in the southern portion of Lewis-Main (area includes the Main Gate and Gray Army Airfield east of the Main Gate at I-5 Exit 120) drains to two stormwater treatment and infiltration facilities, both of which overflow to marshes west of I-5. Overflows from two of these marshes, Bell Marsh and Hamer Marsh, are conveyed to the JBLM Stormwater Canal. The Stormwater Canal flows west along the south side of Lewis-North, then northwest to discharge to Puget Sound just north of the JBLM Solo Point Wastewater Treatment Plant.

Lewis-North is located northwest of the JBLM Main Gate at I-5 Exit 120. The MS4 system in Lewis-North predominately drains to two treatment facilities, one of which has significant infiltration capacity. Overflows from these outfalls are conveyed to the JBLM Stormwater Canal. Residential housing areas in Lewis-North include MS4 infrastructure which drains to American Lake, American Lake Marsh, and Elliot Marsh.

- **McChord Field.** Two areas, the airfield and the west housing area, comprise the MS4 on McChord Field. Appendix C describes the outfalls on McChord Field. Stormwater discharges to both surface water and groundwater as shown on Figure 3 and Exhibit 1. The airfield area drains approximately 415 acres through a central MS4 discharging to Clover Creek. Clover Creek enters McChord Field at its eastern boundary, flows west under the runway, continuing west and north through the remainder of McChord, off base, and discharges to Lake Steilacoom. The airfield area includes the airfield, supporting infrastructure, and barracks areas. The MS4 serving the western residential area drains approximately 320 acres, and discharges to Carter Lake, Emerson and other unnamed wetlands.
- **Operational Ranges.** Operational ranges consist of training areas, firing ranges and impact areas. Operational ranges on JBLM, are located outside of the cantonment areas. Operational ranges include approximately 75,573 total acres (Figure 1).

Drainage areas and MS4 infrastructure in the operational ranges will be fully delineated prior to the end of the permit. In general, however, most stormwater in the ranges on Lewis-Main infiltrates directly into the ground. Stormwater that does drain from the ranges south of the Lewis-Main cantonment area typically flows to Muck Creek or the Nisqually River. Flows from the ranges east of the cantonment area drain to the ground or wetlands upstream of Spanaway Lake. A small MS4 system services the Leschi Town training facility southeast of the cantonment area but it also discharges to groundwater. Flows from the ranges on Lewis-North drain to wetlands, the ground or to Puget Sound. New development in the training areas is both limited and very restricted.

Two operational ranges used as training areas are located on McChord Field. One is the small 20 acre Fire Training Area on the eastern boundary of the base, and the other is a 685 acre area about ½ mile south of the main McChord Field runway. Stormwater from both drainages infiltrates into the ground.

1.3.7 Co-Permittees, if applicable.

This section is not applicable at this time.

2 MINIMUM CONTROL MEASURES (MCMS) AND BEST MANGEMENT PRACTICES (SEC II.B)

The following six minimum control measures will be implemented under this plan and are described in the following sections:

1. Public Outreach and Education on Stormwater Impacts
2. Public Involvement/Participation
3. Illicit Discharge Detection and Elimination (IDDE)
4. Construction Site Stormwater Runoff Control
5. Stormwater Management for Areas of New Development and Redevelopment
6. Pollution Prevention and Good Housekeeper for Municipal Operations and Maintenance.

A list of BMPs, goals of the BMPs, and metrics to measure the progress on each goal are included in Tables 1-6.

2.1 PUBLIC OUTREACH AND EDUCATION ON STORMWATER IMPACTS (SEC II.B.1)

The primary goal of the education and outreach program is to reduce or eliminate behaviors and practices that cause or contribute to adverse stormwater impacts. Under this program and other Division programs, public outreach and education is conducted through various training classes, briefings, special events, and newsletters/newspaper articles. These on-going efforts will be summarized and evaluated in each Annual Report.

JBLM targets the following audiences as appropriate:

- project managers;
- contractors;
- tenants;
- environmental staff;
- Public Works Operations and Maintenance shops, and
- business owners and operators.

For this permit iteration, JBLM plans to target Public Works Operations and Maintenance shops. BMPs to be implemented for public outreach are described in Table 1.

2.2 PUBLIC PARTICIPATION AND INVOLVEMENT (SEC II.B.2)

JBLM has implemented a public involvement/participation program which includes the programs listed in Table 2. In addition, this Management Plan is available to the public via the JBLM website. Each year public participation and involvement efforts will be summarized in the corresponding Annual Report.

2.3 ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE) (SEC II.B.3)

JBLM includes an ongoing program to detect and remove illicit connections and discharges into the MS4. The JBLM IDDE program currently addresses each of the components in the Permit. BMPs used to implement the IDDE program are shown in Table 3.

2.3.1 JBLM Regulation

JBLM is implementing a JBLM Stormwater Regulation which, among other things, prohibits all illicit discharges into the MS4 to the maximum extent practicable. The draft regulation was sent for publication on 15 April 2016 and was signed by the installation commander on 20 July 2016. Elements of the Regulation include descriptions of allowable and conditionally allowable discharges as required by the Permit.

2.3.2 Detection and Elimination

This program will be developed in the coming years in accordance with permit requirements. The Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments, (Center for Watershed Protection, 2004) will be used to ensure the program is compliant and meets the necessary measures of the program.

The BMPs address the following topics or activities.

- *Update cantonment and operational area maps*
- *Procedures for locating priority areas likely to have illicit discharges*
- *Field Assessments*
- *Characterizing the nature of, and potential threat posed by any illicit discharges found or reported*
- *Tracing the source of the illicit discharge*
- *Eliminating the discharge.*

2.3.3 Tracking

JBLM will track the number and type of illicit discharges identified, dry weather screening efforts, and the location and any remediation efforts to address identified illicit discharges. The effectiveness of the program will be measured by the reduction of illicit discharges discovered or reported to the Stormwater Program beginning in 2015. This information will be summarized in the corresponding Annual Reports.

2.3.4 Education

During training courses, JBLM personnel are briefed that all spills are required to be reported. The Environmental Operations Section of Public Works responds to spills and ensures they are properly cleaned-up and reported. Additionally, JBLM employs a full-time illegal dump investigator. Both spills and illegal dumping are required to be reported by dialing 911.

Currently illicit discharges are reported through the 911 emergency system. Calls from the 911 system are reported to the System Manager and the Environmental Division. Records of calls to the System Manager and/or the Environmental Division will be maintained and identified in the Annual Report.

As part of its the Education and Outreach Program in section 2.1 above, JBLM entities, employees, businesses, and the general public within the permit area are informed about the hazards associated with illegal discharges and improper disposal of waste and the means to report them.

2.3.5 Training

All staff responsible for the identification, investigation, termination, clean up and reporting of illicit discharges, including spills and illicit connections, will be trained to conduct these activities. Orientation and training concerning the JBLM stormwater management program will be accomplished within the first six months of employment for new staff who work directly on stormwater management issues. Follow-up training will be provided as necessary to address changes in procedures, techniques or requirements. Records of relevant training provided or obtained, and the staff members trained will be maintained. A summary of each year's training will tracked and included in the corresponding Annual Report.

2.4 CONSTRUCTION SITE STORMWATER RUNOFF CONTROL (SEC II.B.4)

JBLM's MS4 permit requires that pollutants be controlled in stormwater runoff from all construction sites that disturb 5,000 square feet of land surface or more. JBLM has a Construction Site Stormwater Runoff Control Program outlined in PWE-633, and BMPs to implement the Construction Stormwater Program are listed in Table 4.

Generally, projects are required to comply with one of two conditions to address stormwater runoff from construction activities:

1. For projects that disturb areas between 5,000 square feet and one acre, a Stormwater Water Pollution Protection Plan (SWPPP) that addresses applicable stormwater pollution prevention concerns is prepared and submitted to stormwater program staff for review.
2. For projects disturbing one acre or greater a SWPPP shall be prepared in compliance with the EPA NPDES Construction General Permit (CGP). Coverage under the CGP is obtained the contractor by submitting a Notice of Intent to EPA prior to conducting land disturbing activities.

BMPs utilized in construction shall comply with Volume II of the SWMM.

Construction projects have contract language that includes applicable compliance requirements depending on project land disturbance size. Example contract language is in Appendix D.

Stormwater control on construction projects on JBLM are monitored and inspected by Certified Erosion and Sedimentation Control Lead (CESCL) trained Stormwater Program staff and Engineering Services Division Construction Inspector Program staff. SWPPPs for projects described above are submitted and reviewed by the Stormwater Program prior to construction.

2.5 STORMWATER MANAGEMENT FOR AREAS OF NEW DEVELOPMENT AND REDEVELOPMENT (SEC II.B.5)

For all new development and redevelopment project sites disturbing 5,000 square feet or more, JBLM has implemented a project planning program that addresses runoff from developed properties and includes design criteria. Administrative BMPs to implement the development and redevelopment program are in Table 5.

A procedures pamphlet ([Stormwater Management for New Development and Redevelopment](#), 2017) has been developed to assist designers in meeting the requirements of the Permit. The pamphlet and its associated check list may be acquired by contacting the JBLM Stormwater Program Office. This procedures pamphlet addresses the below program components:

- Site Planning and preparation of a Stormwater Site Drainage Plan;
- Source control of pollution;
- Site design to minimize impervious areas, preserve vegetation and natural drainage systems;
- Hydrologic performance for on-site stormwater management;
- Hydrologic performance requirement for flow control;
- Runoff treatment; and
- Wetlands protection

The Regulation and the JBLM Design Standards require compliance with the MS4 Permit and all development/redevelopment requirements. One task is to review proposed development/redevelop projects to ensure they meet the MS4 requirements. A summary of these projects for the corresponding year will be included in the Annual Report.

2.6 POLLUTION PREVENTION, GOOD HOUSEKEEPING AND MAINTENANCE (SEC II.B.6)

JBLM has an active and extensive pollution prevention program. JBLM has an active Environmental Management System (EMS) that assists in reducing environmental risks and impacts while increasing program efficiency.. Table 6 lists BMPs that are or will be implemented to meet the permit requirements.

2.6.1 Maintenance Standards for Permanent Stormwater Facilities

Maintenance standards for JBLM facilities will follow the guidance provided by Volume 5, Section 4.6 of the SWMM. The details of the implementation of the pollution prevention and O&M plan are described in JBLM's Operation, Maintenance and Inspection Plan. This plan can be acquired by contacting the JBLM Stormwater Program office.

2.6.2 Stormwater Pollution Prevention Plans for Equipment Maintenance/Material Storage Yards.

The JBLM environmental program requires maintenance and storage yards to prepare and maintain an Environmental Operating Permit (EOP) that contains, among other things, the comparable requirements of a SWPPP. JBLM intends to utilize the EOPs as an equivalent document to the SWPPP. SWPPPs will be developed for maintenance and material storage yards not covered by the MSGP. Facilities requiring this action are included in Table 7. An EOP example is included in Appendix G.

2.6.3 Documentation

Records of all permanent stormwater facility inspections, catch basin inspections, maintenance, or repair activities conducted will be maintained in accordance with the permit Part IV.C. A summary of these items will be included in each corresponding Annual Report.

3 STORMWATER RETROFIT (SEC II.C.2, C.3)

JBLM will implement a stormwater retrofit program. In support of the program, the Stormwater Program will conduct stormwater discharge, water quality, and biological assessment monitoring. Using this data and in coordination with Pierce County, a retrofit report identifying potential retrofit projects will be prepared. At least one retrofit project will be initiated prior to the expiration of the permit.

A McChord Field Stormwater Management Study was conducted on JBLM in April 2016 to study the drainage sub-basins that discharge into Clover Creek with the intent of providing DPW with identification for potential stormwater management retrofit projects. Prior to the expiration of the Permit, JBLM will schedule a meeting with EPA to discuss the results of the retrofit report and determine whether any specific permit terms should be included in the permit reissuance.

4 MONITORING, RECORDKEEPING AND REPORTING

4.1 MONITORING

JBLM will monitor stormwater discharges, surface water quality and stream biology to assess the effectiveness of the SWMP in minimizing the impacts from MS4 discharges. Per the requirements of the permit, JBLM will conduct the following monitoring tasks:

1. Measure phosphorus loading from its MS4 discharges into American Lake;
2. Characterize water quality discharging through the JBLM Canal;
3. Characterize water quality in Clover Creek and Murray Creek;
4. Assess baseline biological conditions in Clover Creek and Murray Creek; and
5. Conduct monitoring to determine pollutant loading into Clover Creek from the MS4.

JBLM will update the monitoring plan to address the objectives of Part IV.A.5 and IV.A.8 of the Permit and submit the updated plan with the corresponding Annual Reports.

Detailed monitoring tasks are described in the Monitoring and Quality Assurance Plan (QAP). This plan presents the management, organization, objectives, monitoring requirements, protocols and schedule for stormwater sampling. The QAP also documents the type, quantity, and quality of data needed for developing pollutant load estimates and making decisions regarding the effectiveness and adequacy of control measures implemented under the Permit.

The QAP follows USEPA guidelines contained in USEPA Guidance for Quality Assurance Project Plans (USEPA, 2002), and USEPA Requirements for Quality Assurance Project Plans (USEPA, 2001). The development, review, approval, and implementation of the Plan is part of USEPA's mandatory Quality System, which requires all organizations to develop and operate management structures and

processes to ensure that data used in decisions are of the type and quality needed for their intended use.

4.2 RECORDKEEPING

Records (such as proof of training, inspections, and maintenance) required by the Permit will be retained for at least five years and will be accessible to the public when specifically requested. Records will be kept electronically and/or in paper copy by the Stormwater Program. Results of the records will be summarized in the Annual Report, but will not be submitted unless requested by EPA.

4.3 SCHEDULE

The schedule for implementing the stormwater program is mandated by the Permit (Appendix A). Timeframe for implementing BMPs meeting the Permit requirements are shown in Tables 1-6 and Table 8.

4.4 PROGRAM UPDATES

The SWMP will be updated at least annually. Changes to delete or replace an action or activity identified in the permit will include:

- An analysis of why the original actions or activity is ineffective, infeasible, or cost prohibitive;
- Expectations on the effective of the replacement action or activity; and
- An analysis of why the replacement action or activity is expected to better achieve the permit requirements.

Change requests will be made in writing and submitted to EPA as described below.

4.5 REPORTING

An Annual Report will be prepared that will include the following information collected during the previous reporting period:

JBLM will submit one hard and one electronic copy (CD ROM or transmission by E-Mail) of the Annual Report to EPA at the following address:

United States Environmental Protection Agency
Region 10
Attention: Municipal Stormwater Program Contact
NPDES Compliance Unit
1200 6th Avenue, Suite 900 (OCE-133)
Seattle, WA 98101
Vakoc.Misha@epa.gov

Point of contact for the installation for regulatory agencies is:

Joint Base Lewis-McChord
Environmental Division - Public Works
Box 339500 MS 17
Joint Base Lewis-McChord, Washington 98433-9500
usarmy.jblm.imcom.list.dpw-stormwater@mail.mil

The reporting period is 1 October through 30 September of the previous year. The first Annual Report was submitted to EPA on January 30, 2015. Future Annual Reports will be submitted by January 30 following each year.

5 STORMWATER COORDINATION AND IMPLEMENTATION TEAM

Coordination between the Stormwater Program Manager and Directorate of Public Works (DPW) support is essential to ensure program goals are met. Table 9 lists the members of the stormwater coordination and implementation team and their respective responsibilities.

6 REFERENCES

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Figures

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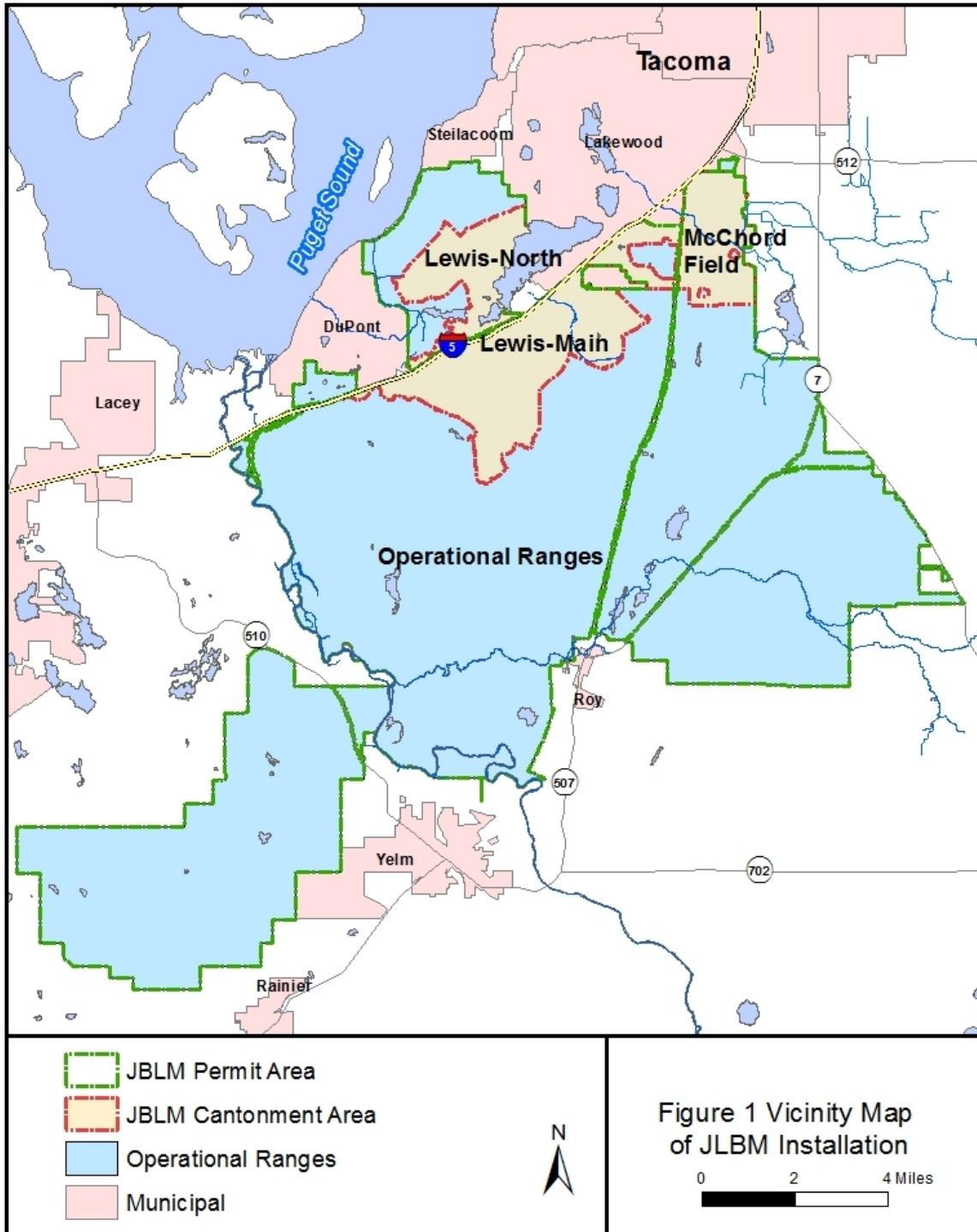
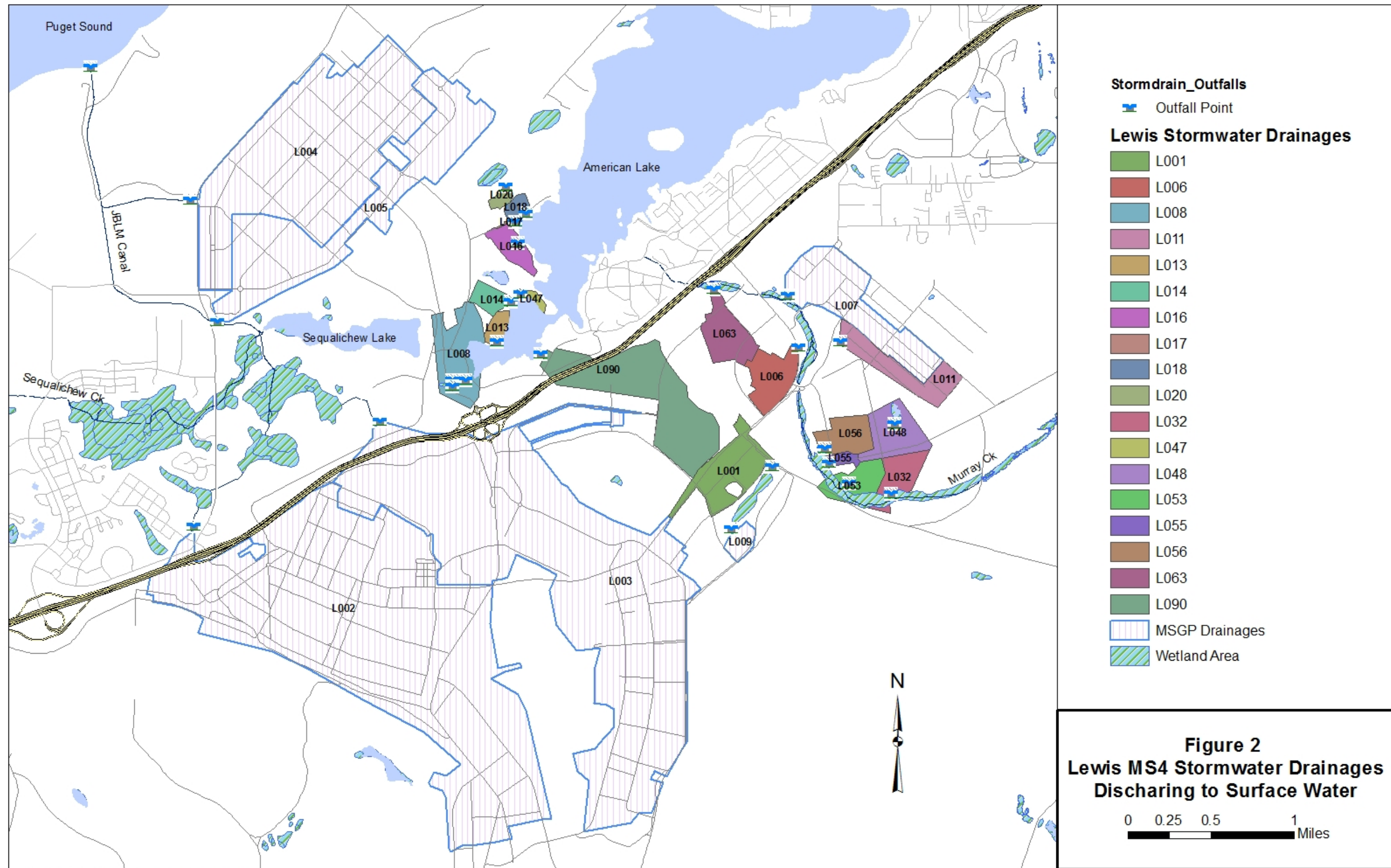


Figure 1 Vicinity Map of JBLM Installation

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Fig_2_SWMP_Lewis_SW_Drainages.mxd

Figure 2 Lewis MS4 Drainages Discharging to Surface Water

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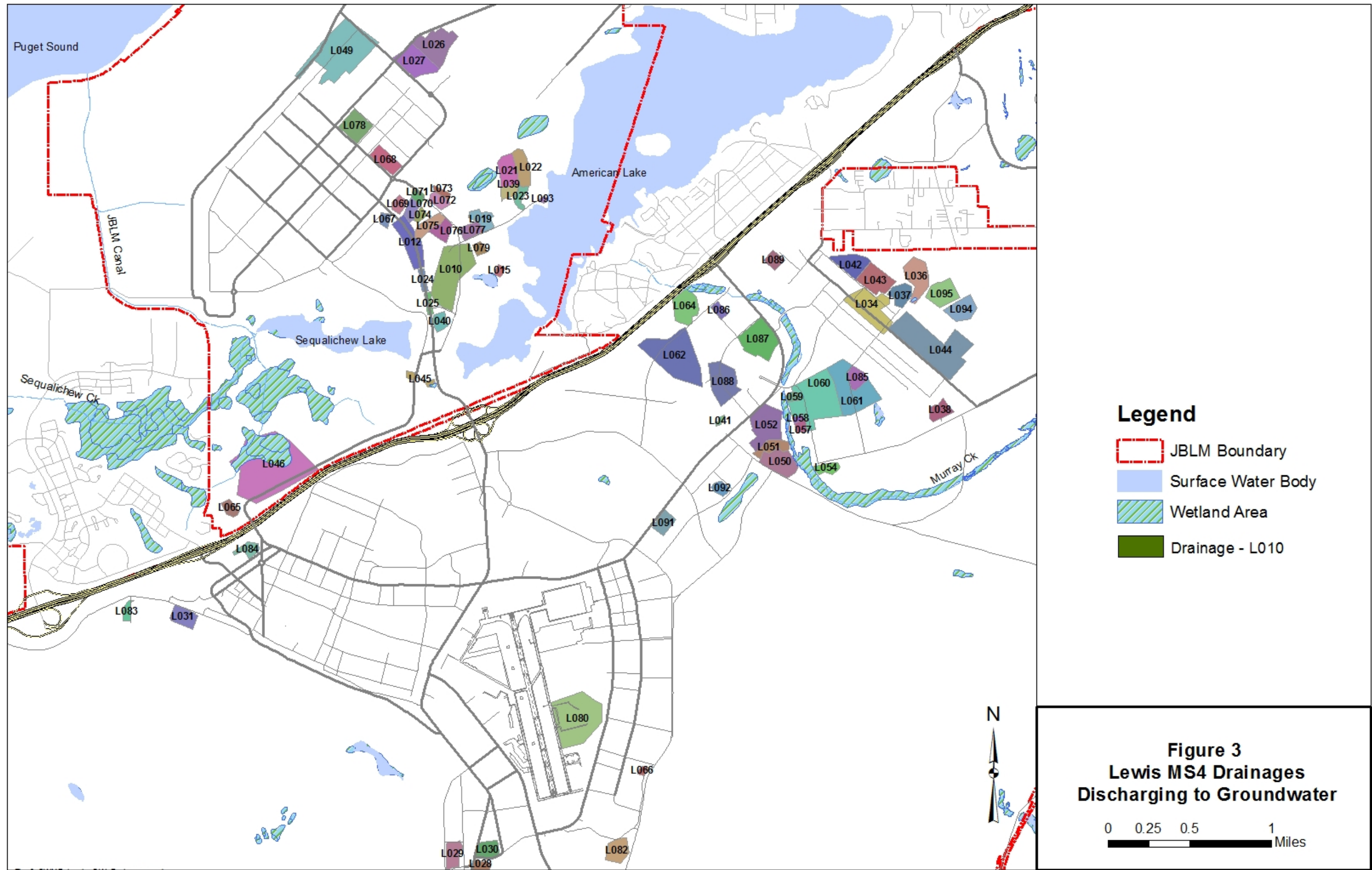
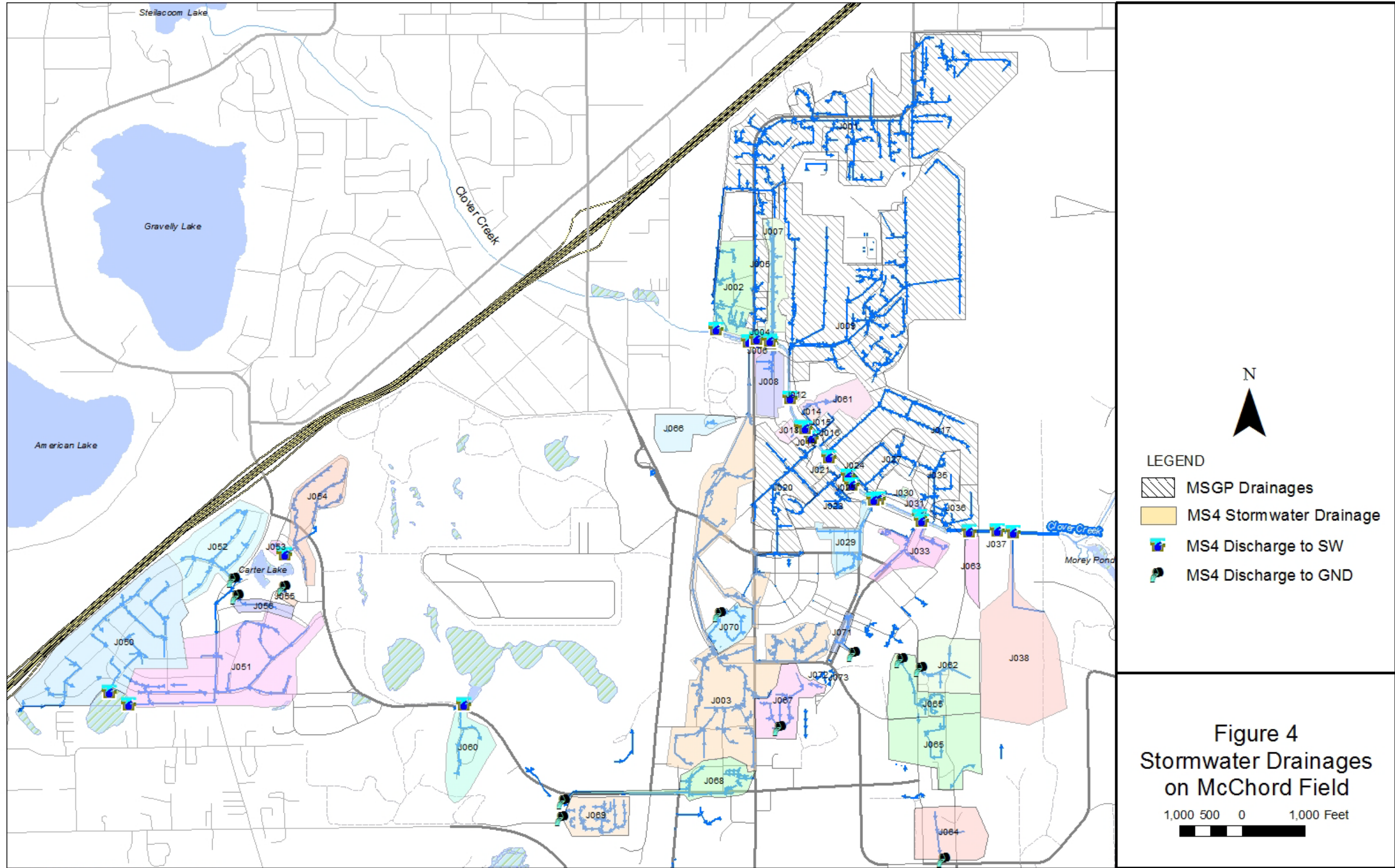


Figure 3 Lewis MS4 Outfalls Discharging to Groundwater

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Fig_4_SWMP_McChord_Drainages.mxd

Figure 4 McChord Field MS4 Drainages

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TABLES

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Table 1 Public Outreach and Education on Stormwater Impacts

BMPs	Measurable Goal	Metric	Permit Section Reference*	When	Status/Notes	Responsible Party
Provide training for individuals/activities that are likely to have an impact on stormwater quality.	Provide Environmental Operations training to contractors, tenants, business operators and service members that work with hazardous materials and waste, i.e. hazardous material and waste technicians and environmental compliance officers.	Total number of trainings held and individual attendance	Sec II.B.1.a.b.c	Year 3-5	Weekly EOM courses provided by ED	ED
	Educate PW O&M personnel on stormwater program requirements. Target proper management of street, parking lot, sidewalk, and building wash water; proper methods for using water for dust control; and impacts of illicit discharges and how to report them.	Conduct assessments before and after training to evaluate actual practices and focus training in areas where behavior change is needed	Sec II.B.1.d	Year 3-5	Initial training event held for DPW O&M personnel on 13APR16. Additional training will take place once MS4 O&M Contract underway in Fall 2017.	ED/OMD
	Provide site visits to all units and contractors when requested.	Total number of sites visits and type of activity	Sec II.B.1.a.b.c	Year 3-5	Ongoing as visits are requested.	ED

* Some Permit subsections not addressed by BMPs. See text for description of these areas

Table 2 Public Participation and Involvement

BMPs	Measurable Goal	Metric	Permit Section Citation *	When	Status/Notes	Responsible Party
Provide an avenue to discuss and coordinate SWMP implementation with all JBLM organizations	Convene Water Council Meetings at least annually	Track number of issues and decisions made by the group	Sec II.B.2b	Year 3-5	Refocus Water Council scope to serve as a base wide decision making body. In the past the Water Council was an informative body with no decision making authority. The vision is to develop a program in which water issues including stormwater can be brought before the council which will make binding decisions. It will be chaired/attended by the PW director.	ED
Provide Public availability of the SWMP	Annually post the current SWMP to the JBLM Website	SWMP is posted annually	Sec II.B.2c	Year 3-5	The most current SWMP document is posted to the JBLM public website located at: http://www.lewis-mcchord.army.mil/publicworks/	ED
Provide opportunities for residents and personnel at JBLM to Volunteer in activities that provide understanding of water resources and how their activities can affect water quality	Participate in the Army's Volunteer Program, which allows continued volunteer activities	Advertise the availability of this program and strive to have at least one volunteer a year.	Sec II.B.2d	Year 1-5	Volunteer activities are ongoing and sign up details are posted on the Sustainability website. Two student volunteers joined the Stormwater Program from JAN-JUN17 to work on cistern mapping and benthic macroinvertebrate sampling protocol development.	ED

* Some Permit subsections not addressed by BMPs. See text for description in these subsections

Table 3 Illicit Discharge Detection and Elimination (IDDE –Sec II.B5)

BMPs	Measurable Goal	Metric	Permit Section Reference	When	Status/Notes/Updates	Responsible Party
Update Map of Cantonment Areas	Complete annual GIS updates	Updated maps	Sec II.B.3a	Year 1-5	Stormwater maps identifying stormwater features are updated routinely. However, an inventory of all stormwater features needs to be completed.	ED/GIS
	Develop field verification plan	Completed plan		Year 3	USACE contract awarded 31 May 2017 to verify and inventory stormwater facilities and update GIS maps	ED/GIS
	Field verify features section	Number of completed sections		Year 3-4		ED
	Update Cantonment Maps	Completed inventory		Year 4-5		GIS
Develop Map of Operational Ranges Areas	Develop field verification plan	Completed plan	Sec II.B.3b	Year 5	In development	ED/GIS
	Field verify features by training area	Number of completed training areas		Year 5	In development	ED
	Update Range Maps	Completed Range Maps		Year 5	In development	GIS
Develop and implement regulation covering IDDE	Prepare coordinate, and publish regulation	Published Document	Sec II.B.3c	Year 3	JBLM Stormwater Regulation signed and published 20JUL16.	ED
	Implement regulation	Number of enforcement actions		Year 3-5	In development	ED/SJA/JBD
Detection and Elimination Program	Develop D&E Plan	Coordinate among PW directorates	Sec II.B.3d	Year 4	Meetings scheduled for O&M will start to incorporate IDDE program development.	ED/ESD/BOI D/OMD
		Complete Plan		Year 4-5	In development	ED
	Implement Plan	Number of inspections conducted & number of repairs/reconstruction projects planned/completed		Year 4-5	In development	ED/ESD/OMD
Track Illicit Discharges	Track illicit discharges	Document number of illicit discharges discovered/repared/new construction	Sec II.B.3e	Year 3-5	Provide information in annual report	ED

BMPs	Measurable Goal	Metric	Permit Section Reference	When	Status/Notes/Updates	Responsible Party
Illicit Discharge Education	Developed & implemented Programs	Successful establishment of program	Sec II.B.3f	Year 1-5	Programs currently include household hazardous waste collection, trash investigator, environmental training for new employees, troops, and contractors	ED
	New employee environmental class	Reported incidents of employee / troop/ contractor compliance with stated goals		Year 1-5	EOM classes held multiple times each month.	ED
	IDDE training videos	Upload training videos on public website and track usage/visits		Year 4-5	Videos acquired; working on licensing and posting on site	ED/IT/PAO
Responsible staff training	Develop training plan for new hires	Completed training plan	Sec II.B.3g	Year 4	In development	ED
	Training identified in plan	Received within 6 months of hire date		Year 4-5	In development	ED
	Annual IDDE refresher training	After initial training all staff to attend at least two stormwater related education events		Year 4-5	In development	ED

Table 4 Construction Site Stormwater Control

BMPs	Measurable Goal	Metric	Permit Section Reference	When	Status/Notes/Updates	Responsible Party
Develop and implement regulation covering ordinance and enforcement of construction site stormwater runoff control	Coordinate and publish regulation	Published Document	Sec II.B.4b	Year 3	JBLM Stormwater Regulation signed and published 20JUL16.	ED/SJA/JBC
	Implement regulation	Number of enforcement actions	Sec II.B.4c	Year 3-5	Ongoing as of Apr 2015	ED/SJA/JBD
Construction Site BMP's	Adherence to SWMM	Number of findings of non-standard site BMP's.	Sec II.B.4d	Year 3	Ongoing inspections of construction sites	ED
Appropriate stormwater language in all contracts and requests for proposals	Applicable language in contracts, proposals	Agreement from USACE, PW Planning, JBLM Directorate of Contracting	Sec II.B.4e	Year 3	Language included in design standards, working with parties to establish specific language for proposals, contracts, etc.	ED/ESD/ Planning
Pre-construction plan reviews	Plan reviews conducted	Number of completed plan reviews	Sec II.B.4f	Year 3-5	Ongoing as of Feb 2015	ED
Construction inspections	Prepare Construction Site Inspection Plan	Completed plan	Sec II.B.4g	Year 3	Completed Feb 2015. Revised Jun 2017	ED
	Inspections conducted at least quarterly	Number of completed inspections annually		Year 3-5	Ongoing as of Apr 2015	ED
	Construction inspection progress	Reduced number of findings from inspections		Year 3-5	Ongoing as of Apr 2015	ED
Train responsible staff to conduct construction inspections and plan reviews	New staff Certified Erosion and Sediment Control Lead (CESCL) training, On the job training	Completed training within 6 months of hire	Sec II.B.4h	Year 3-5	CESCL training obtained by inspection staff – 2016 and 2017	ED

Table 5. Stormwater Management for Areas of Development and Redevelopment

BMPs	Measurable Goal	Metric	Permit Section Reference	When	Status/Notes/Updates	Responsible Party
Implement site planning process	Development/Redevelopment Plan	Completed Plan	Sec II.B.5a - 5h	Year 3	Plan completed Dec 2015 and updated May 2017	ED
	Plan reviews	Number of plan reviews annually		Year 3-5	Ongoing reviews as of Sep 2014	ED
Site inspection program	Develop Facilities Inspection Plan	Completed Plan	Sect II.B.5i	Year 3-5	See Table 6 Site Inspection Plan	ED
	Develop PWS to complete a field inventory of permanent SW facilities	Contract award of PWS/Completed inventory		Year 4	USACE contract awarded 31 May 2017 to inventory permanent SW facilities	ED/BOID/ESD/OMD/
	Conduct field inspections of SW facilities	Number of inspections completed annually		Year 4-5	USACE contract awarded 31 May 2017 to conduct conditions assessments of SW facilities.	ED/BOID/ESD/OMD
Ensure long-term operation and maintenance of SW facilities	Implement SWMM O&M standards for all new facilities, SW features checklist	Completed standards	Sec II.B.5j	Year 4-5	Standards identified in SWMM. Complete list of standards will be established with USACE MS4 O&M contract.	ED/BOID/OMD
	Maintain facilities	Reduced number of inspection findings and/ or IJO's issued for repair of SW facilities		Year 5	USACE contract awarded 31 May 2017 to maintain facilities	OMD
Train responsible staff to conduct SW facility inspections and plan reviews	New staff training, on the job training. Follow up training annually	Completed training within 6 months of hire. Up to date training records.	Sec II.B.5k	Year 4-5	ED staff trained and continually seek professional development courses.	ED

Table 6 Pollution Prevention and Good Housekeeping for Operations and Maintenance

BMPs	Measurable Goal	Metric	Permit Section Reference	When	Status/Notes/Updates	Responsible Party
Written O&M Program	Develop an O&M Plan for SW facilities	Completed Plan	Sec II.B.6a	Year 4	USACE contract awarded 31 May 2017 to develop O&M Plan	ED/BOID/OMD/ESD
Maintenance standards	Develop maintenance standards for stormwater facilities	Established maintenance standards	Sec II.B.6a	Year 4	Adopted maintenance standards from SWMM	ED/BOID/OMD/ESD
Site inspection program	Develop a Site Inspection Plan for SW features including forms and criteria for inspection frequency	Completed Plan	Sec II.B.6a	Year 4-5	USACE contract awarded 31 May 2017 to develop plan	ED
	Develop PWS to complete a field inventory of permanent SW facilities	Contract award of PWS/Completed inventory	Sec II.B.6b	Year 4	USACE contract awarded 31 May 2017 to inventory stormwater facilities	ED/BOID/OMD/ESD
	Inspect flow control/treatment facilities annually	Completed Inspections	Sec II.B.6b	Year 3-5	Bi-monthly MS4 O&M meetings held to develop contract for inspections	OMD
	Conduct spot checks at permanent SW facilities after major storm events	Number of inspections completed annually	Sec II.B.6c	Year 3-5	ED tracking major storm events; none to date	ED/OMD
	Conduct field inspections for 95% of SW facilities and catch basins.	Number of inspections completed annually	Sec II.B.6d-e	Year 3-5	Bi-monthly MS4 O&M meetings held to develop contract for inspections.	ED/OMD
Ensure long-term operation and maintenance of SW facilities	Assemble existing and develop O&M standards for all facilities, make a SW features checklist	Completed standards, and checklist	Sec II.B.5j	Year 4-5	USACE contract awarded 31 May 2017 to develop checklists and establish standards for all inventoried SW facilities.	ED/OMD
	Maintain facilities	Number of facilities maintained annually compared to total requiring maintenance	Sec II.B.6a	Year 4-5	Bi-monthly MS4 O&M meetings held to develop contract for stormwater facility maintenance	OMD/ESD Contracting
	Develop SWPPPs for equipment and facilities not in MSGP (See Site Inspection Program above)	Number of SWPPPs prepared annually	Sec II.B.6h	Year 4-5	Some information in EOPs, developing additional SWPPPs to cover all facilities	ED
Train responsible staff to conduct SW facility inspections and plan reviews	New staff training, on the job training. Follow up training annually	Completed training within 6 months of hire. Up to date training records.	Sect II.B.5k	Year 3-5	In progress	ED

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Table 7 Non-MSGP Sites Covered by the MS4

Building	Maintenance Area
02060	27
03273	None
03331	2B
03400	12A
03465	13
03901	16A
03916	21
03943	17B
03960	23
03985	22
06156	29
09145	26
09511	None
09517	None
09540	9540
09608	9608
09678	NA
09683	NA(2)
09705	None
09721	None
09940	40
11329	E6
11413	E7
11621	A1
11980	C8
12124	D3
12981	C6
13911	C5
13921	C4
16187	B2
C0112	C1
D0211	D2
D0211	D4
E1301	E5
R0231	D1
R0235	D5
R1332	D4
R9655	None
Scrapyard	None

Table 8. Stormwater Coordination and Implementation Team

MEMBER	TASK
DPW – Environmental Division - Chief	<ul style="list-style-type: none"> • Provides oversight and senior management for the MS4 Program. • Ensures that Program Manager has adequate government staff, support personnel, and equipment • Coordinates with DPW and Installation leadership on status of program
DPW – Environmental Division - MS4 Program Manager	<ul style="list-style-type: none"> • Implements BMPs and the Phase II MS4 stormwater program • Administers and oversees team member activities • Coordinates inspections • Maintains all records • Submits annual reports to EPA Region 10
DPW – Systems Manager	<ul style="list-style-type: none"> • Coordinates all stages of BMP implementation relating to installation infrastructure • Conducts maintenance of stormwater lines, inlets and structural BMPs • Informs MS4 Program Manager of noncompliance
DPW –Operations and Maintenance Manager	<ul style="list-style-type: none"> • Procures necessary equipment/supplies to implement/maintain BMPs • Provides training to shop level workers • Coordinates DPW training
DPW – Engineering Services Division	<ul style="list-style-type: none"> • Ensures contractors comply with requirements and properly implement BMPs as necessary. • Ensures contractors follow installation policies.
DPW – Information Technology	<ul style="list-style-type: none"> • Maintains up to date GIS layers • Provides technical support for GFEBS O&M data and record management
DPW – Master Planning	<ul style="list-style-type: none"> • Coordinates with MS4 Program Manager and new project proponents
DPW Environmental Division - Environmental Specialists	<ul style="list-style-type: none"> • Maintain records and submits copies to the MS4 Program Manger • Notify MS4 Program Manager of non-compliance • Ensure BMPs are implemented and maintained • Conduct inspections • Provide training and guidance to personnel • Review MS4 Stormwater Plans and Construction SWPPPs
DPW On-site Inspectors	<ul style="list-style-type: none"> • Conduct inspections of construction and post-construction sites • Review construction sediment and erosion control plans • Report on status of BMPs and suggest necessary improvements
Public Affairs Office	<ul style="list-style-type: none"> • Develops/reviews any material that is posted in public view, on the internet or is disseminated outside installation

This is an UNCONTROLLED DOCUMENT printed for reference only.
The controlled document is maintained by the Stormwater Program Manager in BLDG 2012 Rm 309.

APPENDIX A

Municipal Separate Storm Sewer System Permit No. WAS-026638

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APPENDIX B

Description of Lewis Outfalls

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APPENDIX C

Description of McChord Outfalls

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APPENDIX D

Sample JBLM MS4 Contract Language

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APPENDIX E

Example JBLM Environmental Operating Permit (EOP)

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