STORM WATER MANAGEMENT PROGRAM PLAN (SWMPP)
FOR
THE UNIVERSITY OF MICHIGAN
ANN ARBOR CAMPUS

PREPARED FOR NPDES PERMIT MI0053902

PREPARED BY:

The Department of Occupational Safety and Environmental Health
The University of Michigan
OSEH/CSSB
1239 Kipke Drive
Ann Arbor, Michigan 48109-1010

March 2003
Revised June 2005

TABLE OF CONTENTS

Appendices

STORM WATER MANAGEMENT PROGRAM PLAN (SWMPP) FOR THE UNIVERSITY OF MICHIGAN ANN ARBOR CAMPUS

1.0 INTRODUCTION AND GENERAL REQUIREMENTS

This Storm Water Management Program Plan (SWMPP) is prepared to meet requirements of the Michigan National Pollutant Discharge Elimination System Storm Water Permit Number MI0053902, issued by the Michigan Department of Environmental Quality (MDEQ) to the University of Michigan (U-M), effective October 1, 2001 (see Appendix 1 for a copy of the Permit). In accordance with conditions in Part I.B of the Permit, U-M is required to submit an SWMPP and implementation schedule to the MDEQ Jackson District Supervisor within one year after the effective date of the Permit. The SWMPP will address the following:

- A public education and outreach program on storm water impacts
- Public involvement and participation
- An illicit discharge elimination program
- A post construction storm water management program for new development and redevelopment projects
- Construction storm water runoff control
- Pollution prevention and good housekeeping practices for University Operations

1.0.1 Contact Person

As previously designated by the U-M, the following individual is the contact person for the regarding this Permit:

Ms. D. Malama Chock, PE, QEP
Coordinator, Environmental Management
Occupational Safety & Environmental Health
The University of Michigan
1239 Kipke Drive
Ann Arbor, MI 48109-1010
phone: (734) 936-1920
fax: (734) 763-1185
e-mail: chock@umich.edu

For clarification purposes, the following acronyms/definitions are used throughout this document:

BMPs	Best Management Practices
City	The City of Ann Arbor
CPP	U-M Central Power Plant
DPS	U-M Department of Public Safety
ERCP	Emergency Response Contingency Plan maintained by OSEH
G&WM	Plant Operations Grounds and Waste Management Department
HRPAP	Huron River Pollution Abatement Program
Illicit Connection	A physical connection to the drainage system that 1) primarily conveys illicit discharges into the drainage system or 2) is not authorized or permitted by the local authority (where a local authority requires such authorization or permit).
Illicit Discharge	Any discharge or seepage that is not composed entirely of storm water into the drainage system, except for discharges specified in Parts I.A.1.b. and c. of the permit. Illicit discharges include dumping of motor vehicle fluids, hazardous wastes, grass clippings, leaf litter, domestic animal wastes, litter or unauthorized discharges of sewage, industrial waste, food services wastes, or any other non-storm water waste into the drainage system.
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MDOT	Michigan Department of Transportation
MEP	Maximum Extent Practicable - met by adherence to the requirements of the MDEQ approved Parts 3 and 4 of this SWMPP.
NPDES	National Pollutant Discharge Elimination System
NREPA	State of Michigan Natural Resources Environmental Protection Act, Act 451
OSEH	U-M Department of Occupational Safety and Environmental Health
Permit	The NPDES Storm Water Permit Number MI0053902 issued by MDEQ to the U-M, effective October 1, 2001
PIPP	Pollution Incident Prevention Plan prepared for the CPP
Plant Extension	This division includes architects, engineers, construction managers, and the planner involved in facilities design activities

Plant Operations	This division includes G&WM, Utilities, Parking Services, Maintenance Services and other activities associated with maintenance of the facilities
PPP	Pollution Prevention Plan
SWMPP	Storm Water Management Program Plan prepared for the Permit and approved by MDEQ
U-M	The University of Michigan, Ann Arbor Campus
UMHHC	The University of Michigan Hospitals and Health Centers
UPO	The University of Michigan, Planner's Office

1.1 Background Information

Storm water runoff from urban areas has been identified in both federal and state studies as a leading cause of pollution in our nation's waters. Pollutants of concern in storm water from a general standpoint include organic materials which have a high biochemical oxygen demand, suspended solids, metals, nutrients, bacteria, and traces of toxic materials. These pollutants have the potential to adversely affect the health of natural water systems. Reducing pollutant loads on water bodies is not, however, the only reason for storm water management programs. In a general sense, effective storm water management programs and properly operating storm water conveyance systems are necessary to prevent flooding in urban areas and to maintain groundwater quality and recharge rates.

Recognizing the impact storm water discharges have on the environment, and with authorization from the 1987 amendments to the Clean Water Act, the United States Environmental Protection Agency initiated Phase I of the National Pollutant Discharge Elimination System in 1990. The Phase I NPDES storm water program requires permit coverage of storm water discharges from municipal separate storm sewer systems serving areas with populations of 100,000 people or more. The University's system alone does not serve such a population. It is, however, connected to the City of Ann Arbor's storm water system and together the two systems do serve more than 100,000 people. As a result, in 1995 the University voluntarily entered into the NPDES permit program to support the goals of the Clean Water Act amendments, in lieu of falling under the City of Ann Arbor permit. As of March 2003, the University's participation became mandatory under the NPDES permit Phase II program which regulates small municipal separate storm sewer systems (MS4s) located within an "urbanized area."

1.2 Discharge Points/Receiving Waters

The Permit issued to the U-M authorizes the discharge of storm water and non-storm water listed in *Part I, Section A.1.c* of the permit to waters of the State from all existing outfalls of the University of Michigan's storm water drainage system. Any new outfalls will be installed and operated in accordance with the requirements of *Part I, Section B.*

The U-M has identified outfalls from its storm water drainage system in Appendix B. Approximately one third of the outfalls discharge directly into surface waters of the state, and the balance discharge into drainage systems operated by the City or MDOT. The U-M storm water drainage system discharges, either directly or indirectly into the following surface water bodies:

- Huron River
- Allen Creek
- Millers Creek (also known as the North Campus Drain)
- Traver Creek
- Malletts Creek

Appendix B identifies the outfall identification number, location of discharge, name of receiving water and ultimate receiving water. If any changes should be identified for this list, the changes will be provided to MDEQ in the appropriate mid-year or annual report.

Like all surface waters of the State, these water bodies are protected by water quality standards for specific designated uses. The designated uses are for aquatic life (either coldwater or warmwater) and wildlife support; agricultural, industrial, and municipal water supply; navigation; and total body contact recreation. The Permit authorizes, among other things, the discharge of rainwater and snow-melt runoff, as well as discharges of certain non-storm waters that are common and widespread but are not expected to pose a threat to water quality. Examples of authorized non-storm water discharges include runoff from lawn watering and irrigation, individual car washing, and foundation drain systems. A more complete listing of authorized discharges is presented in *Part I, Section A.1 of the Permit.*

1.3 Administrative Requirements of Permit

1.3.1 Legal Authority

Part I, Section B.3.c of the Permit:"…The permittee shall have the legal authority, which may be a combination of state statute, municipal statute, ordinance, permit,

> order, rules, regulations, or other means available to the permittee, for the purpose of…regulating the contribution of pollutants to the drainage system… [and]… requiring compliance with ordinances, permits issued by the permittee, contracts, or orders…"

Unlike a municipality, the U-M does not maintain the equivalent of a city code to regulate storm water discharges. In this regard, the U-M bears a close resemblance to a private industry. However, the U-M does operate and maintain a separate storm water system which collects runoff from areas involved in a wide variety of uses including: student housing; institutional, and research activities; science laboratories; and recreational facilities. In this regard, the U-M storm water system is representative of similar systems owned by municipalities.

1.3.1.1 Authority Under State Constitution

The U-M has the authority to implement storm water management programs and to control, regulate, and enforce discharges to the storm water system through Article VIII-5 of the Constitution of the State of Michigan of 1963.

> *Sec 5.* "The regents of the University of Michigan and their successors in office shall constitute a body corporate known as the Regents of the University of Michigan. Each board shall have general supervision of its institution and the control and direction of all expenditures from the institution's funds."

Article VIII-5 of the State Constitution allows the Board of Regents of the U-M to have general supervision of its institution and the control and direction of all expenditures. The U-M, through the Board of Regents, therefore has the power to promulgate regulations for the operation, management, and maintenance of the storm water system, as well as the power to control illicit discharges, spills, and dumping. The U-M has the legal authority to operate its storm water system in a manner necessary to comply with the applicable regulations.

1.3.1.2 Application of Authority Under State Constitution

The U-M has adopted policies, procedures, and practices for the operation and maintenance of its storm water system, and to control the contribution of pollutants to the system, in order to meet the requirements of the Permit. Best Management Practices (BMPs) have been developed to support the adopted policies, procedures, and practices. Information on these BMPs is provided in subsequent sections of this document.

The NPDES regulations establish a definition of storm water associated with industrial activity in 40 CFR 122.26(b)(14) as the discharge from any conveyance which is used for collecting and conveying storm water and is directly related to manufacturing, processing of raw materials, or storage areas. Industries required to obtain storm water NPDES discharge permits are specifically defined in the regulations by industrial category or through the identification of Standard Industrial Classification (SIC) codes.

The U-M CPP is the only site at the Ann Arbor Campus presently having industrial activity. This facility operates under a separate storm water permit as required by EPA regulations. If future activities are determined to meet applicable requirements for a separate NPDES permit, the appropriate permit will be applied for.

The CPP has filed a PIPP with the appropriate authorities as required by the Part 5 Spillage of Oil and Polluting Materials administrative rules promulgated pursuant to Part 31, Water Resources Protection regulations. This PIPP identifies hazardous materials on the premises, identifies specific programs for their safe handling, and outlines spill response procedures. The CPP has developed and implemented a Storm Water Pollution Prevention Plan (SWPPP) for the facility and is also subject to the Spill Prevention Countermeasure and Control (SPCC) plan for the campus.

1.3.1.3 Control of Discharges Through Interagency Agreements

> *Part I, Section C.1.d of the Permit:* "Drainage systems can have multiple operators (co-operators). Often, no single drainage system operator has the power or authority to comply will all the terms and conditions of this permit for its drainage system(s). If the permittee is not the sole permitted operator of the drainage system, then the permittee shall report under this part of or before April 1, 2003 to assure that all permitted co-operators are identified and that the terms and conditions of this permit can be met…."

The U-M storm water system does interconnect with portions of the City and MDOT storm water systems. By April 1, 2003, U-M will notify the Jackson District Supervisor of all drainage system co-operators what will be relied upon to satisfy terms and conditions of this permit for drainage system(s) co-operated with the permittee. At the same time, a copy of the notice will be sent to each drainage system co-operator (i.e., City of Ann Arbor, MDOT) named in the notice submitted to the Jackson District Supervisor.

1.3.1.4 Control Through Ordinance

The Regents of the U-M adopted *An Ordinance to Regulate Parking and Traffic, and to Regulate the Use and Protection of the Buildings and Property of the Regents of the University of Michigan* in January 1995. This ordinance is enforceable by law enforcement officers of the City, Washtenaw County, Michigan State Police, as well as the U-M DPS. The ordinance does specify penalties for violation. Among the provisions of this ordinance is the following:

"No person shall place, deposit, throw, scatter, or leave any refuse, waste, garbage, or litter on the streets or grounds, or within any building or structure of the University of Michigan, except that which is generated because of activities or business related to the University, which properly belongs on University property, and which is deposited in receptacles provided for such purposes."

The ordinance is enforceable by law enforcement officers of the U-M Department of Public Safety, the City of Ann Arbor, Washtenaw County, and the Michigan State Police. Violation of this Article of the ordinance is considered a civil infraction punishable by a fine of not more than $50.00.

1.3.1.5 Compliance and Surveillance

> *Part II, Sections D.1 of the Permit:* "All discharges authorized herein shall be consistent with the terms and conditions of this permit…. It is the duty of the permittee to comply with all terms and conditions of this permit…."

The U-M has formalized or enhanced several existing programs and policies to meet the requirements and intent of the applicable regulations. The U-M authorized representatives have the authority to inspect, monitor, and conduct all surveillance necessary of activities on the U-M property in order to ensure compliance with Permit conditions.

1.3.2 Storm Water Management Program Resources

Management, maintenance and operation of the storm water Permit and system is performed by several U-M departments. The primary responsibilities are within the Business and Finance department under the direct control of the Executive Vice President and Chief Financial Officer. Within Business and Finance, OSEH is the unit with primary responsibility for day-to-day management of environmental issues, compliance with environmental regulations, and interaction with regulatory agencies on behalf of the

U-M. OSEH is accordingly responsible for the development and oversight of the SWMPP and interacts with all other U-M departments to ensure that the requirements of the permit are met. OSEH additionally maintains trained personnel to address and handle hazardous material responses and clean-ups as well as routine management of hazardous materials and their disposal.

The U-M has developed draft BMPs to outline the roles and responsibilities for its departments related to storm water management. The BMPs are periodically updated to reflect current conditions at the U-M. The most up-to-date version of the BMPs can be obtained through the OSEH Department. For purposes of example, a copy of the current draft version of the document to describe how Plant BMPs are created is attached as Appendix C.

Funding resources for each of the U-M divisions/departments with storm water management responsibilities come through slightly differing channels. Funding for OSEH is through the University General Fund. A separate fund for environmental projects, controlled by OSEH, is generated through a unit tax system and storm water projects may be funded from this. Plant Operations budget is the primary source of funding for storm water operation and maintenance of the system. Costs for the department are passed directly to other U-M units; therefore increases in storm water system management will result in increased costs for all U-M units, many of which are also funded through the General Fund. Funding for Plant Extension activities for new projects can come from three main areas: 1) state bonds, 2) internal capital funds, and 3) donor funds.

Actual expenditures and proposed upcoming annual budgets for the various areas are provided in the Annual Report submitted to MDEQ, and are not shown in this SWMPP.

1.3.3 Contact Person

> *Part I, Section C.1.a of the Permit:* "The permittee shall designate a storm water program manager to serve as the contact person for the Department regarding activities carried out to comply with this permit. The permittee may replace the program manager at any time and shall notify the Jackson District Supervisor within ten days after the replacement."

Contact information is provided in section 1.0.1 on page 1-1.

1.3.4 Storm Water Management Program Modification

Any modifications required for this Management Program, once approved by the Jackson District Supervisor, will be made following requirements of *Part I, Section C.5 of the Permit*.

Once the storm water management program plan is approved, it may be modified in the following ways, per the requirements of *Part I, Section C.5.a*:

1. The addition of (but not subtracting or replacing) components, controls, or requirements to the approved storm water management program may be made at any time upon written notification to the Jackson District Supervisor. Such notification will contain a description of the modification.

2. The replacement of ineffective or unfeasible BMPs specifically identified in the Storm Water Management Program with an alternative BMP may be requested at any time by written notification to the Jackson District Supervisor. Unless denied by the Jackson District Supervisor, the modification shall be deemed approved and may be implemented by the permittee 60 days from submittal of the request. Such requests will include the following:
    a. an analysis of why the BMPs are ineffective or unfeasible (including cost prohibitive);
    b. expectations on the effectiveness of the replacement BMPs; and
    c. an analysis of why the replacement BMPs are expected to achieve the goals of the BMPs to be replaced.

In addition, per the requirements of *Part I, Section C.5.b*, the MDEQ may require U-M to modify the Storm Water Management Program to:

1. Address contributions by the drainage system discharges which impair receiving water quality;
2. Include more stringent requirements necessary to comply with new state or federal statutory or regulatory requirements; or
3. Include such other conditions deemed necessary by the Jackson District Supervisor to comply with the goals and requirements of the Federal Act or the Michigan Act.

1.3.4.1 Waste Load Allocation Reopener

As stated in *Part I, Section C.7*, the permit may be modified by the Department in accordance with applicable laws and rules if storm water controls are needed for the discharge based on waste load allocations that are part of “total maximum daily loads” that address specific pollutants of concern.

1.4 Assessment of Storm Water Management Program Effectiveness

> *Part I, Section C.1.b.3 of the Permit:* "The permittee shall describe the status of compliance with the storm water management program plan approved on December 15, 1999. Compliance status shall include reporting of program effectiveness as established under 'Assessment of Storm Water Management Program Effectiveness' in Part III A. of the previous NPDES storm water permit."

The compliance status information will be compiled and presented in the First Year Report, as required by *Part I, Section C.1.b* of the Permit. It will include the following components to assess effectiveness of the program:

- Illicit Discharges: The U-M will maintain information on the number of potential illicit connections investigated and removed. The data will identify results of the investigation, the source of the connection, time table for removal, and results of the removal.
- Dry Weather Screening: The U-M will maintain information on any dry weather screening that may be done to look for and investigate potential illicit connections.
- Waste Oil Recycling: The U-M will provide information on the quantity of waste oil being generated and recycled by the U-M operations. It will not be possible to track disposal of used oil by housing residents if they use an out-side disposal point.
- Spill Clean-ups: OSEH routinely responds to minor spills of chemicals that do not result in releases to the environment. If releases to the environment occur, the appropriate reporting is performed. Where the spill results in an actual or potential release to the storm water system, the data will be examined for improvements to the response system or educational efforts.
- Education Efforts: Results of educational activities performed including number of participants, topics covered, and any other pertinent data.
- System Maintenance: Results of catch basin cleaning performed by Utilities or Maintenance Services including length of system cleaned and quantity of material removed. This information could correlate to reductions in loading entering the receiving waters.
- Erosion Control: Number of Part 91 of NREPA erosion control plans implemented at construction sites during the reporting period, including type of control measures used.

- Any other pertinent data that may arise during the reporting period.

1.5 Reporting Requirements

The reporting requirements under this Permit are presented in *Part I, Section C,* and are divided into three distinct types of reports:

- First Year Report
- Mid Year Report
- Subsequent Year Reports

The subsections below describe the reporting details for each.

1.5.1 First Year Report

The first year report must be submitted to the Jackson District Supervisor for approval on or before October 1, 2002. The report is required to describe the progress toward compliance with requirements of the permit and must include this storm water management program plan along with descriptions and schedules for BMPs and their measurable goals. The first year report is required to include the following elements.

- Best Management Practices: BMPs that will be or have been implemented for each of the minimum measures identified in *Part I, Section B. of the Permit* is included as part of this report. The list includes BMPs already implemented or proposed under the previous storm water management program and any additional BMPs or efforts needed to comply with the MEP requirements of the permit.
- Measurable Goals: U-M must submit descriptions of the measurable goals for each of the BMPs identified in *Part I, Section B of the Permit*. The measurable goals should demonstrate results that relate to an environmental benefit. This submittal should also identify the years (or months as appropriate) that the BMPs will be implemented, interim milestones for all BMPs, and the frequency of actions. Interim milestones may include descriptions of BMP implementation or the results of BMP implementation. If possible descriptions of BMP implementation will be quantified.
- Compliance Assessment: An assessment to describe the compliance with the approved December 15, 1999 SWMPP is a required component of the first year report. A description of this requirement is presented in Section 1.4 of this document.

- Receiving Water Quality Status: A description of the status of the water quality in the waters of the State around the U-M must be provided in the first year report.
- Receiving Water Quality Stresses: This section of the report identifies and prioritizes the stresses on the waters of the State around the U-M.
- Revised Fiscal Analysis: Pursuant to the permit application requirements specified in 40 CFR 122.26(d)(2)(vi), the first year report must include a summary of the revisions to the fiscal analysis reported during the previous permitted period.
- Upcoming Activities: The first year report must include a summary of the storm water activities to be implemented during the next annual reporting cycle.
- Annual Budget: The first year report must include a detail of the previous fiscal year's annual expenditures and the proposed budget for the fiscal year following the report.

1.5.2 Mid-Year Report

By April 1, 2003 and annually thereafter, a mid-year progress report will be submitted to the Jackson District Supervisor. Per the requirements of *Part I, Section C.1.c,* the mid-year reports will include a brief summary of information for the period of time following the last annual report and will include the following information:

- Compliance Assessment including a report of Illicit Discharges, Illicit Connections Removed and an assessment of the progress toward achieving Best Management Practice goals identified in the SWMPP.

1.5.3 Subsequent Annual Reports

With the support of other U-M departments, OSEH will prepare an annual report for submittal to the MDEQ based on its budget cycle. The U-M budget cycle runs from July 1 to June 30. Therefore, to provide the most current information, subsequent Annual Reports will be prepared and submitted by October 1 of each year. The annual reports will detail the information as presented in *Part I, Section C.1.e* and as follows:

- Compliance Assessment
- Environmental Impacts
- Water Quality Assessment
- Data and Results
- Upcoming Activities

- BMP Changes
- Notice of Changes in Reliance on Permitted Drainage System Operators
- Drainage System Changes
- Revised Fiscal Analysis
- Annual Budget

1.5.4 Submittals

According to *Part I, Sections C.1.b, c, and e* of the Permit, copies of the annual and mid year reports, SWMPP or Permit modifications, and modification requests will be submitted to the Jackson District Supervisor at:

Jackson District Office, SWQD, MDEQ
301 East Louis Glick Highway
Jackson, MI 49201
phone: (517) 780-7690
fax: (517) 780-7855

1.5.5 Retention of Records

Part I, Section C.4 of the Permit: " The latest approved version of the Storm Water Management Program Plan developed in accordance with this general permit shall be retained by the permittee and available for inspection in accordance with Part II.D.7. of this general permit. All records and information resulting from the preparation of the annual progress reports, including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation, shall be retained by the permittee for a minimum of three years, or longer if requested by the Jackson District Supervisor or the Regional Administrator."

The records will be retained in files maintained by OSEH.

1.6 Notification Requirements

In accordance with *Part I, Section C.2 of the Permit*, the U-M will make notification to the MDEQ Jackson District Supervisor under the following circumstances:

1.6.1 Regulated Discharges Into the Municipal Separate Storm Water Drainage System

Within 24 hours of their discovery, the Jackson District Supervisor will be notified of any discharges to the drainage system that may endanger health or the environment. Such notification will be made if the discharges are from facilities or sites that are not complying with the following:

- Requirements of an NPDES permit, including an individual permit, a general permit, or the Permit-by-Rule for storm water discharges from construction sites.
- Requirements of a State of Michigan permit for soil erosion and sedimentation control pursuant to Part 91 of NREPA.
- Requirements of a State of Michigan permit for discharge of liquid wastes to groundwater pursuant to the Michigan Act. Requirements of Part 5 (Polluting Materials) of the administrative rules promulgated under the Michigan Act; or
- Water Quality Standards.

Any instances of noncompliance as described above that do not pose imminent danger to health or the environment will be reported either verbally or in writing within five (5) days of the time they are discovered.

1.6.2 Non-Compliance Notification

If it is discovered that U-M is not complying with or will be unable to comply with any condition specified in the permit, the Jackson District Supervisor will be notified in writing within 14 days of such a discovery. The written documentation will include the following information:

- A description of the circumstances, including the type of noncompliance;
- The period of noncompliance (if known), including dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance; and
- For illegal discharges to the system, the estimated volume of the discharge, a description of the type of pollutants in the discharge, the location of the discharge into the system, the location of the outfall from which the discharge enters the waters of the State;
- Identification of the parties responsible for the discharge, if known, and the facility or the construction site from which the discharge originated, if known.

1.6.3 Additional Notification and Authorization Requirements

In addition to the *Part I, Section C* notification requirements, the Permit requires the following notifications and authorizations:

- Tracer Dye Discharges: Per the requirements of *Part I, Section A.2.a*, U-M must receive authorization from MDEQ for the discharge of tracer dyes. Requests to discharge tracer dyes must be in accordance with Rule 323.1097 of the Michigan Administrative Code. A copy of the U-M *Storm Water System Dye Testing Guidelines* are provided for reference in Appendix D.
- Water Treatment Additives: Per the requirements of *Part I, Section A.2.b*, U-M must receive authorization from MDEQ for the discharge of any water additives.
- Identification of Additional Point Source Discharges of Storm Water: Per the requirements of *Part I, Section C.3* if any additional points are identified in the system that are not listed in Table 1-1, U-M will notify the Jackson District Supervisor of the discovery within 30 days
- Expiration and Reissuance: Per the requirements of *Part I, Section C.6*, if U-M wishes to continue a discharge authorized under the permit beyond the permit's expiration date, U-M will submit a written request to the Jackson District Supervisor on or before April 1, 2006.

1.7 Management Requirements

The U-M recognizes the general management requirements specified in *Part II, Section D of the Permit* and has incorporated such requirements into appropriate parts of this SWMPP. The management requirements include a duty to comply, proper operation and maintenance of the system, provide containment facilities, recording of results, reporting of additional results, minimizing adverse impacts, and proper handling and disposal of removed substances.

In addition, per the requirements of *Part I, Section C.4*, the current version of the SWMPP must be retained by U-M and available for inspection. All records and information gathered to prepare and support the annual and mid year reports must be retained for at least 3 years at U-M OSEH.

2.0 PUBLIC EDUCATION PROGRAM

> *Part I, Section B.1 of the Permit:* "The permittee shall have a public education program to promote, publicize, and facilitate watershed education for the purpose of encouraging the public to reduce the discharge of pollutants in storm water…."

The Ann Arbor campus of the University of Michigan is comprised of 538 buildings and housing units, and spans 3,177 acres. The precipitation runoff generated each year from these buildings, their parking lots, and other impervious surfaces is quite substantial, and as such, it plays a vital role in the health of the water bodies that receive storm water discharges. The quality of the water going into the storm system, and ultimately the receiving bodies, is in large part determined by those that it serves. Therefore, any program to reduce the discharge of pollutants in storm water must involve public participation. What makes public participation so important for the U-M system is the large population that it serves. In 2000, the U-M enrolled 38,103 students and employed 24,647 faculty and staff. The U-M and its facilities serve a total population of over 62,000 people.

Recognizing the need for public involvement in the effort to reduce storm water pollutants, the U-M has developed a broad and aggressive storm water education and outreach program. This multi-faceted program is closely connected to the U-M's pollution prevention (P2) program and its many initiatives. Specifically, the storm water education curriculum is designed to promote, publicize, and facilitate watershed education while encouraging the P2 practices developed under the U-M's environmental stewardship agenda. The intended audience for the program is all persons associated with the University who could potentially affect the quality of storm water discharges, including, but not limited to, campus residents; University faculty, staff, and students; visitors to the campus; contractors and vendors working on the campus; and commercial and industrial operations on campus. Below is a description of each of the program's components. The overall program accomplishes the following:

- Educate the public of hazards associated with illicit discharges and improper discharges. Part of this education is to encourage public reporting of the presence of illicit discharges or improper disposal of materials into the U-M drainage system.
- Educate the public regarding acceptable application and disposal of pesticides, herbicides, and fertilizers.
- Educate the public concerning the ultimate discharge point and potential impacts of pollutants from the drainage system serving their places of residence.

- Educate the public about their responsibilities and stewardship of their watershed.
- Educate commercial and institutional entities likely to have significant storm water impacts.

2.1 Storm Water Education Brochures

In cooperation with the U-M School of Natural Resources and Environment (SNRE), the U-M Department of Occupational Safety and Environmental Health (OSEH) developed a series of brochures to assist various members of the University community in preventing storm water pollution on campus. The brochures have been designed to meet the overall program objectives for specific audiences.

> **Measurable Goal:** A minimum of 1,800 brochures will be distributed annually during presentations, training courses and new employee orientation sessions. The quantity of brochures distributed throughout the year will be tracked for subsequent reporting. Additional brochures will be created/revised as new needs are identified. The number of new brochures, flyers or other educational media created will be tracked on an annual basis for subsequent reporting.

2.2 OSEH/SNRE Storm Water Education Web Site

Developed in cooperation with the U-M SNRE and maintained by OSEH, the Storm Water Education Web site builds upon the information contained in the brochures and disseminates it to the general University community and the public at large. This web site is intended to help students, employees, and visitors in the U-M community understand how the University's storm water system operates, various legal requirements, and what individuals can do to reduce contamination in the storm water system from surface runoff. As viewers move through the site they learn about storm water, what they can do to help protect it, how regulations impact the University's operation, and various safe practices.

It is updated on a regular basis to include pertinent information related to storm water management and pollution prevention. Current material on the web site can be viewed by visiting www.oseh.umich.edu/stormwater/.

> **Measurable Goal:** The number of visitors to the website will be tracked semi-annually for subsequent reporting. The goal is to have at least 2,000 website hits annually. This website is intended to help students, employees, and visitors in the U-M community understand how the University's storm water system operates,

various legal requirements, and what individuals can do to reduce contamination in the storm water system from surface runoff. This website tally may also serve as an indication of the community seeking additional storm water information from the link provided in the brochures, as detailed above.

2.3 Storm Water Management at the University of Michigan - Video & Public Service Announcements

The video *Storm Water Management at the University of Michigan* provides viewers with an overview of storm water issues as they pertain to University operations and activities. The video begins with an overview of the University's storm water drainage system and it's receiving bodies followed by a synopsis of the legal requirements that mandate the NPDES permit and the development of a storm water management program. The remainder of the video focuses on how storm water can become polluted because of human activities. It proceeds to inform viewers of the University's actions to protect storm water quality in the following areas: salt use and deicing activities, waste management and spill response, campus planning and expansion, cleaning outdoor equipment and vehicles, chemical disposal practices, and food vendor training.

This video is shown every semester on the cable system. In addition, separately offered video viewings, on an as needed basis, are provided in faculty and staff presentations.

Measurable Goal: The video will be aired a minimum of 50 times annually for viewing on the U-M local cable TV station. The number of offerings of the video will be tracked semi-annually for subsequent reporting. Additional viewing of the video during presentations, classes, workshops, etc. will also be tracked.

Measurable Goal: Storm water, waste disposal, and recycling related Public Service Announcements will be distributed annually for use during the six or seven Football season home games. These short educational messages will provide storm water information to visitors, students, staff and contractors attending the U-M football games. The total anticipated audience for these messages is over 107,000 per game.

2.4 Storm Water Education Presentations

OSEH provides storm water education presentations to key staff having greater potential to impact storm water quality during their day-to-day work. The remainder of the University community is targeted through other means. The presentations discuss the storm water drainage system; the need for protecting the quality of storm water

discharges; the NPDES permit, its legal requirements, and the storm water management program; and the most common storm water pollutants and ways to limit their effects on storm water. The presentations can also feature the storm water video.

Storm water education is provided during new employee orientation sessions (all employees at the U-M), new laboratory employee training classes and new Plant employee training classes. In addition, presentations including storm water topics are provided on an annual basis to Plant staff which includes the following sub-groups:

- Building Services,
- Construction Services (including the Cabinet, Sign, Glass, and Upholstery shop departments),
- Facilities Maintenance (including HVAC, Plumbing, Pumps, Steam Distribution & Insulation, Electrical, Fire Systems, Elevators, Roofing, Metal Crafts & Machine Repair shop departments),
- Grounds & Waste Management Services,
- Utilities & Plant Engineering (includes purchasing, generation, distribution, conservation, and accounting of utilities for the University), and the
- Work Control group (responsible for single point of contact for services, all estimates and preventive maintenance planning).

Measurable Goal: Storm water topics will be included in a minimum of 50 classes, workshops or presentations sponsored annually by OSEH. The number of sessions including training on storm water issues will be tracked for subsequent reporting.

Measurable Goal: A minimum of 500 laboratories will be inspected annually. The inspections will include a review of issues impacting storm water quality, chemical storage, waste management and disposal. These inspections may also serve as an indicator of the effectiveness of storm water education received, or the need for additional education. The number of inspections performed annually will be tracked for subsequent reporting.

Measurable Goal: All outdoor food vendors will receive training/education including related storm water issues annually. Food establishment inspections will include items to ensure storm water BMPs are being followed. These inspections may also serve as an indicator of the effectiveness of storm water education received, or the need for additional education. The number of inspections performed will be tracked for subsequent reporting.

3.0 PUBLIC INVOLVEMENT AND PARTICIPATION

> *Part I, Sections B.2 of the Permit:* "Public input shall be encouraged in all aspects of the storm water management program…"

The University encourages public input in all aspects of its storm water management program. In order to facilitate public participation, this plan and information related to the storm water management program are made available on the storm water web site. By viewing the Annual Reports that are placed on the web site, the general public and members of local stream and watershed protection organizations can make themselves aware of activities the University carries out under its storm water management program. In addition, when new storm water management program plans are developed and finalized, the City, County, Ann Arbor Public Schools and interested local stream and watershed protection organizations are allowed to review and comment on them. A website feedback link will be provided to facilitate feedback on the SWMPP from the community.

One public awareness group that U-M works with on a regular basis is the Huron River Watershed Council (HRWC). Many of the HRWC's goals are consistent with the University's ideals for the preservation and protection of the surrounding natural water bodies. As a result, the University has established an informal partnership with the HRWC and has provided input to the HRWC on issues concerning the Total Maximum Daily Load program for water bodies that lie within the Huron River Watershed.

Measurable Goal: The SWMPP and NPDES annual and semi-annual reports will be made available on the U-M storm water web site. The date of addition to the website will be tracked for subsequent reporting.

Measurable Goal: The U-M will attend a minimum of ten (10) meetings annually with the Huron River Watershed Council (HRWC), Washtenaw County Drain Commission, City of Ann Arbor (A2), the Millers Creek Action Team (MCAT) or other local stream protection organizations for collaboration on storm water issues in the community. U-M's participation in meetings, community events, etc. with these groups will be tracked for subsequent reporting.

Measurable Goal: The U-M SWMPP (and subsequent revisions) will be provided to the City, County, Ann Arbor Public Schools and other interested parties for review and comment on the same frequency the information is provided to the MDEQ. The SWMPP will be accessible on the U-M website for

review and suggestions. Any comments received will be reviewed and evaluated for inclusion in the SWMPP by U-M OSEH. A reply to the comments submitted will be provided documenting the outcome.

Measurable Goal: The U-M will participate in semi-annual meetings of the Middle Huron Initiative to address the Ford & Belleville Lake TMDL on phosphorus reduction throughout the permit cycle. Attendance at these meetings will be tracked for subsequent reporting.

Measurable Goal: The U-M will participate in the Geddes Pond – E. coli TMDL efforts throughout the permit cycle. Management activities addressing E. coli include dry weather screening and illicit discharge elimination, semi-annual catch basin cleaning, pollution prevention, and public education. These efforts as well as attendance at meetings/events on this issue will be documented for subsequent reporting.

Measurable Goal: The U-M will sponsor/offer a semi-annual volunteer opportunity for participants to get involved with storm water improvement and education programs. Examples of opportunities include storm drain stenciling/marking and invasive species removal projects. The number of volunteer events offered will be tracked annually for subsequent reporting. The number of participants in volunteer stewardship events will be tracked for subsequent reporting.

4.0 ILLICIT DISCHARGE ELIMINATION PROGRAM

> *Part I, Section B.3 of the Permit:* "The permittee shall develop, implement and enforce a program to prohibit and effectively eliminate illicit discharges, including discharges of sanitary wastewater, to the permittee's drainage system…"

The removal of illicit discharges is an ongoing program being conducted by the U-M. As illicit discharges are identified, they are discontinued or otherwise corrected. The program described in this section will be used to determine the existence, location, and extent of possible illicit connections and discharges to the storm water drainage system. At a minimum, It will address the elements presented in *Part I, Section B.3 of the Permit.*

The U-M, through the HRPAP, has previously made major efforts to identify and quantify possible illicit connections and discharges from U-M facilities. An extensive dye-testing program performed by the U-M in 1990 was used to identify the field screening locations that will be used in the current program.

4.1 Description of Program

The U-M has been involved in an ongoing program for identifying and controlling non-point source pollution to the Huron River. The HRPAP was developed from a grant from the federal Clean Water Act and used by the U-M to identify illicit connections to the storm water system. The project was completed in 1990.

The U-M will continue to encourage reporting of water quality problems and possible illicit connections and discharges to the storm water system. OSEH and /or Plant Operations will receive reports of water quality problems and possible illicit connections and perform follow-up investigations, leading to elimination where appropriate.

The key elements of this plan are described in the following subsections of this document.

4.2 Survey of Facility Discharge Points Into the System

OSEH has implemented a program to identify discharge points from facilities into either the sanitary sewer or storm water systems. The first phase of this program began several years ago and resulted in the identification of facility discharge points on the Ann Arbor

Campus. Information collected included water usage rates, category of activity, and categorization of water flows as domestic or non-domestic based on the activity occurring at the facility. The performance of building by building surveys will continue and will be used to identify types of discharges and discharge points.

The second phase of the identification of facility discharge points will be implemented as part of this SWMPP. The second phase will consist of a continual observation process performed by OSEH personnel as they perform other activities across campus facilities. The activities associated with this program are conducted as illicit discharges are identified. They are prioritized and discontinued or otherwise corrected.

4.3 Dry Weather Screening

The purpose of dry weather field screening is to determine the existence, location, and extent of possible illicit discharges into the U-M storm water drainage system. The screening program has been designed to target points within the storm water system that will help identify non-storm water flow. The current procedure used for dry weather screening is attached as Appendix E. This procedure will be updated periodically, and the most current copy of the procedure will be available for review in the OSEH office.

For the purposes of dry weather screening, the U-M Ann Arbor campus has been divided into four geographical regions. Two rounds of dry weather screening have already been completed, as identified below. The regions are as follows:

- Central Campus (1998, 2001)
- Medical Campus (2000, 2003)
- North & East Campuses (1999, 2004)
- South Campus (2002, scheduled 2005)

Measurable Goal: The U-M will perform dry weather screening on the entire campus over the 5-year permit cycle to determine the existence, location, and extent of possible illicit discharges into the U-M storm water drainage system. This is typically done during four to five rounds of screening. Any issues identified for further investigation or correction will be tracked for subsequent reporting. The number of illicit discharges and connections identified and subsequently corrected or removed will be tracked annually for subsequent reporting.

4.4 Minimizing Seepage to the Storm Water Drainage System

Where practical, the U-M attempts to design sanitary sewer or storm water drainage systems so that the sanitary sewers are always at a lower invert elevation. Good engineering practice, proper installation, and final inspection will be exercised by Plant Extension and Plant Operations to limit seepage from sanitary sewers to the storm water drainage system on campus.

Infiltration of seepage from sanitary sewers to the storm water drainage system will be monitored during normal scheduled and non-scheduled maintenance activities. If possible, seepage identified during maintenance activities will be corrected as it is identified. If immediate correction is not feasible, a plan for corrective action and a time schedule will be prepared to track progress on the correction.

4.5 Public Reporting of Illicit Discharges

Public involvement in the reporting of illicit discharges to the storm water system is a voluntary program. G&WM currently coordinates extensive recycling promotions with student housing and individual colleges on campus. These promotions include information regarding reporting of illicit discharges to OSEH for follow-up. By means of its public education program, OSEH also advises the University community to report discharges for appropriate investigative and follow-up action.

The University maintains a 24-hour 911 emergency response system (also 734-763-1131) which is coordinated and manned by the Department of Public Safety. Any calls reporting dumping, accidental spills, etc. are dispatched from DPS to OSEH for emergency response, containment and control. In addition, calls can be made to OSEH directly reporting such incidents for emergency response.

> **Measurable Goal:** The emergency response system on campus will be maintained by DPS (24/7) for use by the public to report illegal dumping, spills or suspicious discharges at the University throughout the permit term. The number of calls received by the DPS/OSEH emergency response call system on potential discharges to the storm water system will be tracked for subsequent reporting. The number of incidents remedied as a result of these calls will also be tracked and reported annually.

4.6 Follow-up Corrective Action

Identification of illicit discharges and connections is the first stage of the illicit discharge elimination program. Once the discharges are identified, they must be effectively eliminated to prevent future impacts on the receiving waters of the State. The following program for corrective action has been proven effective in removing identified illicit connections and discharges.

4.6.1 Correction of Illicit Connections

Illicit connections are physical connections to the storm water drainage system that can convey a discharge that should not be entering it. These connections typically require the involvement of Plant Operations or Plant Extension personnel for correction. Activities involved in the corrective action include:

- Identify the source of the discharges to the illicit connection and stop the discharges.
- Notify the owner of the discharge point and ask them to contact Plant Operations through the work order system to initiate the removal of the connection.
- Plant Operations will prioritize the problem with other maintenance activities underway on campus. A higher priority will be assigned if the connection presents an immediate concern. A lower priority will be assigned if the owner can operate without discharging to the connection until repairs are implemented.
- A schedule for corrective action will be included with the Mid-Year or Annual report if the illicit connection cannot be removed within a reasonable time. It will be listed as identified and corrected if the connection can be removed prior to the reports.

4.6.2 Correction of Illicit Discharges

Identification of potential illicit discharges will come from either public involvement in reporting or from OSEH staff members identifying problems during routine activities at University facilities. Every individual in the University community has a responsibility for reporting illicit discharges to OSEH if they are observed. The education program is designed to enhance this effort. Once identified, OSEH will perform follow-up actions to remove the discharge and prevent future occurrences.

The correction of an illicit discharge typically involves modifying an unwanted behavior. The following actions will be taken by OSEH once the responsible individual or unit is identified:

- The activities of the individual or unit will be reviewed to determine the appropriate disposal method to use. The discharge will be reviewed for appropriate reporting requirements under environmental regulations.
- The individual or unit will be directed to stop discharging and change operations to the appropriate disposal method.
- OSEH will respond to the area for cleanup if the discharge can be removed from the system. An outside contractor with vacuum truck capabilities may be required to remove the material.
- OSEH will perform appropriate follow-up with the supervisor of the individual or unit to ensure future discharges do not occur.
- A review will be performed of similar operations that could have similar concerns. Education efforts will be made with individuals or units associated with the similar activities, if appropriate.

4.7 Other Measures to Prohibit Illicit Discharges

Under the legal authority described in Section 1.2.1, U-M has adopted policies in the following areas to prohibit illicit connections and illicit discharges including the direct dumping or disposal of materials other than storm water into the drainage system:

- Erosion Control – Part 91 of the NREPA provides for a statewide soil erosion and sedimentation control program. This program outlines the proper provisions for water disposal and the protection of soil surfaces during and after construction and is adhered to by the U-M.
- Employee Training and Education – U-M personnel involved in the application of herbicides, pesticides, and fertilizers have been trained and are licensed applicators. All applicators in the following departments are trained and licensed: G&WM, Matthaei Botanical Gardens, Nichols Arboretum, Radrick Farms, and Athletics. In addition to the courses taken through the Michigan Department of Agriculture, G&WM also employs a foreman to train all of its employees. Training programs will also be conducted to address the purpose and operation of BMP activities under this SWMPP. In addition, staff in various departments have received, or are in training to receive certification from MDEQ in Storm Water Management –

Construction Site, Storm Water Management – Industrial Site or Soil Erosion & Sedimentation Control.

- Recycling Efforts – The U-M promotes environmental awareness by sponsoring recycling programs on campus. Educational materials have been developed by G&WM which address student contributions to the U-M recycling effort, educate students on the types of recyclables and where they may be taken for recycling, and educate students on the impact that recycling has on the environment.
- Hazardous Materials Response – OSEH is in charge of maintaining a safe and healthy environment for faculty, staff, students, and visitors. OSEH provides routine training to new faculty, staff, and students regarding hazardous materials and conditions at U-M facilities. OSEH also maintains a spill response team that can quickly and efficiently respond to and mitigate releases of hazardous materials.
- Hazardous Waste Disposal – OSEH is responsible for the appropriate collection and disposal of hazardous waste and hazardous materials used and generated by the U-M units. The program ensures tracking of the materials from point of generation through collection and ultimate disposal. Personnel are properly trained and appropriately licensed to handle the material and transport the waste on campus. Qualified contractors are used for ultimate transport and disposal off site.
- Plan Review – OSEH reviews all plans for the renovation of existing structures and the construction of new facilities. The plans are reviewed by all OSEH divisions to identify potential concerns appropriate for that division. Environmental Management reviews plans specifically for environmental concerns including the protection of storm water quality and the storm water drainage system.
- Storm Water Basins – Storm water management basins are used to reduce the impact of storm water discharges from campus locations. Although the primary function of these basins is to provide first-flush holding capacity for storm water, the design also provides for sediment deposition within the basin structure which can significantly reduce pollutant loads in receiving waters.

4.8 Recordkeeping

Once an illicit discharge or connection is identified and appropriate follow-up actions are initiated, the following items will be investigated and recorded. The records will be maintained by OSEH.

- The estimated volume of material discharged will be identified. This may be done through interviews, inventory records, or other sources of information.
- The estimated rate of flow for an on-going discharge will be determined. This information may require an actual flow measurement or observation of the discharge.
- The material or pollutant discharged will be identified. This can typically be obtained through interviews, reviews of inventory data, and Material Safety Data Sheets.
- The location of the discharge to the U-M storm water drainage system will be identified. This information will be tracked through discussions with the Plant Operations personnel, review of drawings, or dye testing if needed.
- The location of the storm water system outfall to waters of the State will be identified. This information will be obtained through review of the storm water drainage plans for the U-M property.
- If the illicit discharge cannot be eliminated immediately, actions underway to eliminate the discharge and effect cleanup will be noted. These records may involve memoranda prepared by OSEH regarding actions taken and cleanup efforts. They may also involve discussions with Plant Operations or Plant Extension regarding correction of illicit connections.

5.0 POST CONSTRUCTION STORM WATER MANAGEMENT PROGRAM FOR NEW DEVELOPMENT AND REDEVELOPMENT PROJECTS

> *Part I, Section B.4 of the Permit:* "The permittee shall revise, as necessary, implement and enforce a program to address storm water runoff from new development and redevelopment projects that discharge into the drainage system and 1) disturb areas greater than or equal to one acre, or 2) disturb areas less than one acre but are part of a larger common plan of development or sale…"

The U-M has a program to address storm water runoff from new development and redevelopment projects. As part of this program, the U-M manages, reviews, and continually updates campus-wide planning to address storm water runoff from each new development and redevelopment project. This program helps to ensure that controls are in place that will minimize and in some cases prevent impacts on water quality from new development and redevelopment projects that disturb areas greater than one acre or disturb areas less than one acre but which are part of a larger common plan of development.

5.1 Controls for Limiting the Effects of Urbanization

Stream hydrology and morphology change rapidly as land is developed and the terrain changes. Common effects of urbanization include stream flashiness, increased stream bank erosion, increased stream temperature, increased stream pollutant load, reduced stream-bank vegetation, and degraded fish habitat. Under its plan for new development and redevelopment projects, U-M encourages the development and implementation of measures to control such effects. Example controls that are used campus wide may include but are not limited to the following:

- Standards for directing growth to specifically identified areas
- Protecting sensitive areas such as wetlands and riparian areas
- Maintaining or increasing open space
- Encouraging in-fill development in higher density urban areas and areas with existing infrastructure
- Coordinating release rates for detention basins to minimize flow conditions that may cause stream bank erosion

5.2 Post Construction Storm Water Runoff

The University continues to review options for regional storm water management systems at locations where current or future construction is anticipated. This regional detention would include storage for construction or renovation projects that have limited space for on-site systems. The goal of the University is to protect receiving water quality and limit the rate at which surface water runoff discharges from any specific site during and following development or redevelopment to not exceed the pre-development hydrologic regime.

On previous projects where detention on site is not feasible the University has required a minimum of structural BMPs to improve the water quality leaving the site (sedimentation traps, etc.) and proposed regional containment within the runoff basin as the quantity control.

Regional detention systems constructed on campus include: a 1,000,000 gallon (approximately 3 acre feet) detention basin under the parking structure for the Life Sciences Institute/Palmer Drive complex which manages runoff from over 60 acres of Central Campus, and a detention system (approximately 11 acre feet) to manage storm water runoff from over 90 acres of North Campus.

Storm water management practices and facilities for new development and redevelopment projects may be designed with any or all of the following objectives:

- Incorporate design standards that control water quantity and quality;
- Encourage innovative storm water management practices that meet the criteria contained within Washtenaw County's and the City's regulatory mechanisms;
- Ensure future maintenance of facilities by planning for it as part of system design;
- Make the safety of the facility a priority;
- Strengthen the protection of natural features; and
- Encourage more effective soil erosion and sedimentation control measures.

5.2.1 Non-structural and Structural BMPs

To meet the objectives, U-M may implement various non-structural and structural BMPs where appropriate. Non-structural BMPs are preventative actions that involve

management and source controls. Examples of issues that are covered in non-structural BMPs used on campus include but are not limited to the following:

- Buffers along sensitive water bodies
- Education programs for developers and the public about project designs that minimize water quality and quantity impacts
- Minimum disturbance of soils and vegetation;
- Restrictions on directly connected impervious areas;
- Preservation of the natural environment;
- Minimization of impervious surfaces; and
- Use of vegetated swales and natural storage.

Structural BMPs are physical controls, including storage practices, which improve water quality. Examples of issues covered in structural BMPs used on campus include but are not limited to the following:

- Wet ponds and extended detention outlet structures;
- Filtration practices such as grassed swales, sand filters, and filter strips; and
- Infiltration practices such as infiltration basins and infiltration trenches.

Measurable Goal: OSEH and the University Planner's Office department will review all construction and renovation plans for use of structural and non-structural BMPs to prevent receiving water quality from the impacts of development and limit the rate at which surface water runoff discharges from any specific site to not exceed the pre-development hydrologic regime. The number of sites implementing various non-structural and structural BMPs will be tracked annually for subsequent reporting. Examples of BMPs to be tracked for reporting may include but are not limited to those identified above.

5.2.2 Operation and Maintenance of BMPs

Any non-structural BMPs that are implemented at a facility are incorporated into day to day activities for the operation of the facility or into maintenance schedules. Structural BMPs related to storm water detention and retention basins are subject to scheduled maintenance inspections. Non-scheduled activities are completed as they arise.

Measurable Goal: Storm water management basins on campus will be inspected annually, at a minimum. The number and frequency of inspection of storm water

basins will be tracked for subsequent reporting. Maintenance issues identified during these inspections will be tracked until corrected.

5.2.3 Site Plan Review

The U-M has established programs to control the quality of storm water runoff from development or redevelopment activities through the review of site plans. This program is the same as that used for controlling storm water runoff on construction sites. Please see Section 6.1.1 of this plan for a complete description of the site plan review program.

Measurable Goal: OSEH and the University Planner's Office review all plans to ensure projects have adequate post construction storm water management controls. The number of plan reviews will be tracked for subsequent reporting.

5.3 Commercial Operations

The site plans for any commercial operations that conduct business on U-M property are reviewed to ensure that storm drain inlets are adequately isolated from pollutant sources. Equipment washing and waste material handling operations at these institutions does not result in discharges of waste to the storm water drainage system and all regulated polluting materials are handled in areas with secondary containment systems in accordance with state and federal regulations.

6.0 CONSTRUCTION STORM WATER RUNOFF CONTROL

> *Part I, Section B.5 of the Permit:* "The permittee shall revise, as necessary, implement and enforce a program to address storm water runoff from areas of construction activity that discharge into the permittee's drainage system…"

In 1982, the U-M received approval from the Michigan Department of Natural Resources to operate as an Authorized Public Agency (APA) under the authority of Part 91, Soil Erosion and Sedimentation Control (SESC) of the Natural Resource & Environmental Protection Act, 1994 PA 451, as amended (Part 91). Reauthorization of U-M's APA status was received in 2004 from the Michigan Department of Environmental Quality. APA status allows the U-M to establish and manage the Soil Erosion and Sedimentation Control procedures on its properties. Construction activity at U-M may involve contractor or in-house construction activities performed by Plant Operations.

6.1 Sedimentation and Erosion Control Program

The SESC procedures apply in varying degrees to construction and maintenance activities at the U-M conducted by contractors and in-house personnel. The need for and extent of a formal written soil erosion control plan will vary, depending on the project.

The campus follows the MDEQ-approved U-M Soil Erosion and Sedimentation Control Procedures (August 2004) to control storm water runoff from construction areas on U-M property. New development projects are subjected to the U-M internal review process to ensure adequate storm water control is provided during construction activities.

Earth disturbances not stabilized within 24 hours of the initial earth disturbance and which are not exempted under MI Part 17 SESC Rule 323.1705, meeting either of the following criteria require a fully developed, written, erosion and sediment control plan that complies with Part 91:

- Earth disturbances of 1 acre or more.
- Earth disturbances within 500 feet of "Waters of the State"

All other projects must maintain methods to control runoff that enters the existing storm water system and protects it from sedimentation.

Maintenance activities, disturbing less than one acre and greater than 500 feet from "Waters of the State" as defined in the Glossary, do not typically have a design or specification prepared. These activities are performed on a work order or emergency basis by Plant Operations or other U-M departments such as U-M Hospitals & Health Centers (UMHHC) or Athletics. The supervisor of the maintenance activity, shall notify the OSEH SESC inspector of the proposed activity and shall arrange for OSEH inspections to ensure appropriate erosion control and sediment control measures are implemented during fieldwork.

6.1.1 Site Plan Reviews

The U-M has established programs to control the quality of storm water runoff from development or redevelopment activities. Plans for new development are subjected to a U-M internal review process to ensure that storm water quality is adequately controlled during construction and after completion of the new development. Efforts are underway to insert storm water management controls into the front end of all projects. Examples of efforts on projects include control of sedimentation using silt screens or other measures, controlling sediment tracking from construction areas through increased street sweeping, and using hydroseeding to control runoff once construction efforts are completed. Reviews of all projects are performed by the Plant Extension or The University of Michigan Hospitals and Health Centers (UMHHC) architect or engineering staff. The U-M Planner and Civil Engineer are liaisons with the City staff to ensure that U-M projects comply with City ordinances on development control.

> **Measurable Goal:** Formal SESC plans are required for sites with earth disturbance (greater than 24 hours) of 1 acre or greater and projects (of any size) within 500 feet of "Waters of the State." The number of SESC site plan reviews will be tracked annually for subsequent reporting. This review process allows OSEH to require projects to insert storm water management controls into the front end of all projects.

6.1.2 Best Management Practices

Best Management Practices are used for construction projects to prevent soil erosion and sedimentation from leaving the property. As specified above, U-M utilizes practices specified in the Manual. The following list represents examples of erosion and sedimentation controls for which specific BMPs have been developed. Copies of the BMPs can be found in the Manual and are used, as appropriate, based on the specific needs for a construction site. Note that not all sites will need to use all of these practices.

- Access Roads

- Construction Barriers
- Tree Protection
- Buffer and Filter Strips
- Filter Fencing
- Storm Drain Inlet Filter Fabric
- Street Sweeping

Measurable Goal: The use of BMPs is required on all projects under the approved SESC Procedures for the University. The number of projects using the Best Management Practices identified above for SESC will be tracked annually for subsequent reporting. BMPs will be selected as appropriate for site conditions.

6.2 Site Inspections

Inspections of work sites are essential to controlling erosion and sedimentation concerns. Personnel from several departments have received SESC training from the MDEQ. This provides a strong base of personnel to draw upon to regularly review maintenance, renovation, and construction sites. The inspections focus on requirements of site-specific erosion and sedimentation control plans for the project. Conditions can change at maintenance, renovation, and construction sites and the inspectors should make adjustments to the erosion and sedimentation control measures, as needed.

OSEH or their designee, who have received a MDEQ SESC certificate of training, will inspect sites weekly during maintenance, renovation, and construction activities and following significant rain events to ensure compliance with the U-M SESC procedures and Part 91. Sites 1 acre and above will be inspected within 24 hours of the rain event to comply with National Pollution Discharge Elimination System (NPDES) inspection requirements.

Issues and concerns will be referred to the project/construction manager or designee for correction. The contractor will make any necessary repairs or corrections to the control measures within 24 hours, if waters of the state are being impacted. Other corrections, not impacting waters of the state will be made within 5 days. The project/construction manager will report any issues that cannot be corrected within 5 days to OSEH. Additional detail as to why the correction cannot be made in that time frame will be required.

Measurable Goal: Sites will be inspected weekly and after rain events until final stabilization of the project site. The number of SESC inspections performed annually on U-M sites will be tracked for subsequent reporting.

Measurable Goal: Select staff from OSEH and the University Planner's Office will be SESC trained by MDEQ. The number of U-M staff who have received MDEQ SESC training will be tracked annually for subsequent reporting.

Measurable Goal: Select U-M staff from OSEH University Planner's Office and Construction Management will be certified in Storm Water Management for Construction Sites. The number of U-M staff who have received MDEQ certification will be tracked annually for subsequent reporting.

6.3 Sedimentation Control During Maintenance Activities

Some maintenance activities do not typically have a formal design or specification prepared. They are performed on a work order or emergency basis by Plant Operations or other U-M departments such as UMHHC or Athletics. The supervisor overseeing the maintenance activity will be responsible for ensuring appropriate sedimentation control measures are implemented during field work. These procedures will be used for routine operations; however, in emergency situations human life and the safety and operation of the facilities and infrastructure are of overall importance. In those cases, work will be performed to minimize any immediate danger and stabilize the situation, and sedimentation control actions will follow. This chain of actions may require the use of an outside contractor to clean the storm water drainage system following the maintenance activities to prevent or minimize sediment transport to the Huron River. In addition to the BMPs listed above, the following BMPs will be used by the maintenance supervisor during activities that disturb soil to the degree where sediment transport could occur.

- Evaluate the site to determine the location of the nearest inlet to the storm water drainage system.
- Determine if soil will be excavated or disturbed during the maintenance activity.
- Remove any unused soil from the site as soon as maintenance activities are completed.
- Contact G&WM to grade and re-vegetate the work area if necessary.
- Remove all erosion and sedimentation control devices from the site once final site stabilization has been completed.

- Evaluate the need to have nearby catch basins cleaned and initiate appropriate actions.
- Evaluate the need to have the street or surface parking area cleaned following completion of the work and initiate the appropriate actions.
- Report any sediment releases into the storm water drainage system to OSEH during all stages of the project.

Measurable Goal: The use of SESC controls is required for all maintenance projects involving earthwork. The number of SESC inspections performed annually on U-M sites will be tracked for subsequent reporting.

6.4 Notifications

6.4.1 Outside Agencies

As an authorized public agency, the U-M has the authority to implement its own soil erosion and sedimentation control procedures with regard to earth changes undertaken on its property. In the event construction activities result in soil erosion and sedimentation that deposits or threatens to deposit solids into the drainage system, OSEH will be notified. OSEH will investigate the incident and will take the necessary steps to prevent further deposit of solids into the drainage system. In addition, OSEH will make any necessary notifications to the Jackson District Supervisor in accordance with Part I.C.2.a of the permit.

6.4.2 Internal Operations

Public comments, complaints, or other information regarding construction activities or construction site storm water runoff leading into the storm water drainage system are welcomed by the U-M Department of Public Safety and OSEH. All calls are subsequently investigated and handled by OSEH and any corrective actions or notifications are made.

7.0 POLLUTION PREVENTION/GOOD HOUSEKEEPING FOR UNIVERSITY OPERATIONS

> *Part I, Section B.6 of the Permit*: "The permittee shall develop and implement a program of operation and maintenance BMPs with the ultimate goal of preventing or reducing pollutant runoff from university operations to the maximum extent practicable. The permittee shall ensure that employees properly handle wastes, recyclables, chemicals, and equipment used on the job; maintain a clean work area; regularly maintain storm water controls, and identify and report various storm water pollution sources including illicit discharges, malfunctioning post-construction controls, and poor soil erosion and sedimentation controls at construction sites. The program shall include employee training to prevent and reduce storm water pollution through proper implementation of BMPs in accordance with this minimum measure..."

The University's storm water pollution prevention and good housekeeping initiatives are divided into the following six areas:

- Structural Controls
- Roadways
- Fleet Maintenance
- Storm Sewer Labeling
- Flood Control Projects
- Pesticides and Fertilizers

Each area has operation and maintenance BMPs with the ultimate goal of reducing and in some cases preventing pollutant runoff from University operations to the maximum extent practicable. The University's storm water pollution prevention and good housekeeping initiatives are described in the following sections.

7.1 Structural Controls

Structural controls are permanent physical features that control and prevent storm water pollution. Each structural control has routine scheduled maintenance and long-term inspection procedures to ensure that they remove storm water pollutants to the maximum extent practicable.

Several retention basins and retention ponds have been identified as part of the U-M storm water system. These structures receive direct run-off from the U-M storm water system and are defined in Appendix F.

G&WM is responsible for administration of the inspection program for storm water retention facilities. Maintenance activities for the retention facilities are scheduled by G&WM based on results of the inspections.

All inlets to the storm water drainage system have catch basins in them to collect sediments and other debris so it does not enter the system. Plant Operations is responsible for maintenance of the catch basin system. Basins are cleaned on a semi-annual basis. Any debris that is collected from the catch basins is temporarily stored at a collection site before disposal at a solid waste landfill. Liquid that is collected with the debris is decanted into a sanitary sewer prior to offloading at the temporary storage location.

Liquid waste from storm water maintenance activities will be drained to an approved sanitary sewer location. If vacuum services are performed at an off-site location, the vacuum truck operator shall decant the liquids back to a sanitary drain prior to leaving the site. Solid waste generated from these activities is taken off-site for disposal.

> **Measurable Goal:** Storm water management basins will be inspected annually during the permit term. The number and frequency of inspections on the U-M retention basins and detention basins will be tracked for subsequent reporting.
>
> **Measurable Goal:** Maintenance cleaning of the catch basins and storm sewer system piping will be performed semi-annually. The number of catch basins maintained will be tracked for subsequent reporting.

7.2 Roadways and Parking Structures

The University maintains numerous parking structures and surface parking lots throughout the Ann Arbor campus. Maintenance of the U-M roadways and parking structures incorporates sediment control activities. Street sweeping removes potential storm water pollutants before they are carried into receiving waters in runoff from a storm event. Street sweeping is performed by G&WM on the U-M streets and by Parking Services on the U-M lots and parking structures. U-M leaf and litter collection is also performed by G&WM in an effort to prevent large debris from entering the storm water system. Litter is disposed as normal municipal waste and leaves are composted in two locations that are well away from system catch basins or inlet structures. Maintenance

activities on these structures and surfaces include street sweeping, leaf pick-up, litter and pollution controls, snow and ice removal, and roadside vegetative maintenance. These activities are discussed in greater detail below.

> **Measurable Goal:** Street sweeping, leaf and litter collection will be performed continually throughout the permit term. The cost for disposal and estimated quantity of debris, trash, dirt, etc. disposed from the maintenance and cleaning/sweeping of numerous parking structures, surface lots and roadways throughout the Ann Arbor campus will be tracked annually for subsequent reporting.

7.2.1 Street and Parking Structure Sweeping and Leaf Pick-up Program

Personnel in G&WM are responsible for cleaning the U-M street system. Street sweeping occurs monthly throughout the year, weather permitting. Personnel in Parking Services are responsible for sweeping U-M parking lots and structures. All lots (approximately quarterly) and structures (typically weekly) are cleaned on a routine basis, as needed, and are cleaned following special functions. Annual cleaning of structures (water only) is performed following sweeping operations.

Leaf collection occurs from October through November each year by G&WM. During this time, leaves are cleaned from curbs and storm drains and sent to two locations to be composted. These locations are well away from system catch basins or inlet structures to prevent any compost from entering receiving waters. If any catch basins are found to be broken or defective during leaf collection, they are reported to Plant Operations for repair.

7.2.2 Litter and Pollution Controls

G&WM is responsible for the daily collection of litter on campus. In addition, students from the student service and Greek Council participate in a litter pick-up program twice per year. Litter is collected and sent for off-site disposal as municipal waste.

7.2.3 Snow and Ice Removal

G&WM predominantly uses salt for performing snow maintenance activities on the streets. Both rock salt and salt brine are used depending on the weather conditions. Brine reduces the amount of rock salt used. The rock salt is pre-wet to enhance its melting power. This results in an overall reduction of salt used, because lower application rates are employed. Sidewalks are de-iced using alternative liquid de-icing

products. These products are less corrosive than salt and more environmentally friendly than sand. Sand is only used in extreme cases.

The G&WM implements Best Management Practices (BMPs) to reduce the amount of pollutants produced from snow management activities. Proper calibration of de-icer application equipment and training of equipment operators is emphasized in this program. The U-M also ensures that proper storage procedures are used for the salt, liquid, and other de-icers used for snow maintenance. This provides environmental protection of the site and prevention of possible loss of materials. Other BMPs include: closing areas that are not frequently traveled, initiating night time snow removal crews, and alternative de-icing products, anti-icing techniques, and innovative application equipment.

> **Measurable Goal:** Incremental annual reduction in the use of salt for de-icing to reach 50% reduction based on an average annual use of 2600 tons per year from 1989 to 1999. The quantity of salt used for deicing will be tracked on an annual basis.
>
> **Measurable Goal:** Increase the use of alternative de-icers annually to replace/supplement salt use. The quantity of alternative de-icers will be tracked on an annual basis.

7.2.4 Roadside Vegetative Maintenance

G&WM is responsible for the vegetative maintenance of campus property. The U-M uses slow release fertilizers twice per year on grass areas. A broad leaf herbicide is applied annually and is only done selectively. Dormant oil and some insect control agents are also used, as needed.

G&WM has a foreman certified to train technicians in pesticide and fertilizer use. All applicators are certified.

The U-M presently has a policy of minimizing pesticide and herbicide use. In addition, G&WM is examining alternative landscaping measures for low maintenance vegetation along roadways and other public areas. One such measure is by using a "no mow" approach in several areas so that the grass will develop an extensive root system. This measure allows grass roots to grow deeper, which creates a greater plant mass to increase the ability of the vegetation to retain water.

Maintenance schedules for vegetation are based on classification of the area into one of the following categories:

- Priority three lawns are in areas of campus where the lawn is mostly observed from a distance and not actively used. A reduced mowing schedule is instituted and a taller lawn height is maintained. No mowing areas have been established and include around 1 million square feet of lawn. In addition, no fertilizer, pesticides, or weed control are used in these areas.

- Priority two lawns are around general academic buildings which are highly visible and used in moderation. Mowing is performed 4 times per month. Fertilizer is applied 3 times per season, if needed, and weed control is performed once per season. Pesticide application is limited to target problem areas.

- Priority One lawns are considered a part of the ornamental landscape of highly active buildings or areas. Mowing is performed 6 times per month. Fertilizer is applied 4 times per season, if needed, and weed control performed twice per year.

  Measurable Goal: All applicators (technicians) will be trained in pesticide and fertilizer use. The number of trained pesticide and fertilizer technicians will be tracked on an annual basis.

  Measurable Goal: Eliminate the need for vegetative replacement due to salt damage. Annual tracking of the need for replacement vegetation will tracked for subsequent reporting.

7.2.5 Road Repairs

The U-M presently has the practice of scheduling road work, as much as possible, during the summer months to reduce the possibility of debris from entering the storm water system during the rainy season.

During all road repair, or other practices (i.e., cutting, grinding, drilling, hydrodemolition) which may disturb the concrete or asphalt, protective measures are taken to protect the storm water drainage system.

7.3 Fleet Maintenance

The U-M owns and operates a large fleet of vehicles, including buses and cars, that is maintained by the Transportation Department. The U-M also owns and operates a fleet of equipment, including lawn mowers and rototillers that is maintained by G&WM. All

vehicles and equipment are regularly maintained to ensure proper and effective operation as well as prevent impacts on storm water quality.

7.3.1 Equipment Washing

The U-M's fleet maintenance areas are properly managed to prevent the release of polluting materials to the waters of the State of Michigan. Maintenance area floor drains are routed through oil interceptors, which are connected to the sanitary sewer system.

The vehicle fleet maintained by the Transportation Department is washed at the Transportation Service bus wash on an as needed basis. In order to prevent oil or other fluids from going into the sanitary sewer, the wastewater is discharged to an oil/water separator. Also, a sediment/water separator was installed to prevent any sediments, floatables or associated pollutants from going into the drainage system.

Equipment maintained by G&WM is washed at their shop on North Campus. During washing, care is taken to make sure neither wash water nor equipment fluids enter any storm drains. In order to prevent oil or other fluids from going into the sanitary sewer, the wastewater is discharged to an oil/water separator. The Grounds facilities on South Campus and Fuller Road are also equipped with oil/water separators.

7.3.2 Vehicle Fluid Dispensing

All vehicle fluids are stored and transferred at the fleet maintenance areas in accordance with the Michigan Part 5 regulations and the Spill Prevention Control and Countermeasures (SPCC) requirements.

There are two primary fueling facilities located on campus; one is located on North Campus at the North Campus Transfer Facility and the other is located on South Campus at Transportation Services. To assure that fuel dispensing activities do not impact storm water runoff quality, structural precautions were instituted to stop runoff from passing through fueling areas. These include sloped pavement around the perimeter of the fueling area and a cover over the fueling area, which prevents runoff from washing away pollutants. Dispensing hoses are equipped with automatic shutoff valves and areas around fuel tanks are designed to contain at least 110% of the tank's volume.

University workers are trained in the proper fueling procedures and how to respond quickly to spills, in case of an accident. Signs are posted around the fueling areas instructing fuel pump operators not to overfill gas tanks or leave them unattended while

fueling. Also, U-M workers are instructed to conduct routine maintenance a part of the fueling procedure so that any fluid leaks can be immediately cleaned and repaired. In case of a spill, the OSEH Emergency Response Contingency Plan has information on the name(s) of clean-up coordinators, the location of clean-up materials, and whom to contact in case of a spill.

7.4 Storm Sewer Labeling

As of March 10, 2004, any outfall structure that the U-M constructs or installs that discharges storm water to waters of the State will provide permanent identification (e.g. label, color coding, or other identifying characteristic).

The storm drains placed on campus come with the message "Dump No Waste - Drains to Waterways" engraved on it. Storm drain grates already in place have 4 inch plastic circle curb markers with the message "Keep our Michigan Waters Blue: Dump No Waste - Flows to River."

> **Measurable Goal:** All U-M storm drains will be marked with the message "Dump No Waste - Drains to Waterways", "Keep our Michigan Waters Blue: Dump No Waste - Flows to River" (or similar message) during the permit cycle. The number of storm drains marked will be tracked annually for subsequent reporting.

7.5 Flood Control Projects

In 2000, U-M established a team to study storm water flow on campus, comprised of environmental specialists, engineers, plumbers, utility and ground/landscaping individuals and an outside consultant. The team worked together to evaluate the storm water system using hydraulic models, determine the effectiveness of potential solutions for handling flood issues, and develop short-term and long-term solutions to flooding.

Short-term solutions were designed to protect buildings from flooding under the existing storm water system. They include measures such as pumps, backflow prevention valves, and waterproofing low entrances.

Long-term solutions, designed to provide flood protection from a 100-year storm event, were also developed. Some examples include construction of new storm water detention and retention facilities; replacement of undersized sewers;

addition of catch basins where necessary, ensuring that inlets do not become clogged; flood-proofing; and construction of relief sewers.

As construction, renovation or utility improvement projects are undertaken, the buildings identified as candidates for improvements are reviewed for potential flood control projects. Modeling is performed prior to new construction projects in areas identified with flooding issues or concerns to ensure opportunities to alleviate or prevent new flooding issues are appropriately addressed.

Whenever the U-M conducts new flood management projects, the impacts on water quality of the receiving water are taken into consideration. As appropriate, new flood management project include a storm water modeling component to understand the potential impacts to regional detention needs prior to decision-making on design.

In addition, as appropriate, the U-M incorporates flood management considerations into its existing projects to assess the potential for incorporation of additional water quality protection opportunities, as well as regional detention opportunities.

Examples of regional detention systems constructed on campus which contribute to flood control at the University include: a 1,000,000 gallon (approximately 3 acre feet) detention basin under the parking structure for the Life Sciences Institute/Palmer Drive complex which manages runoff from over 60 acres of Central Campus, and a detention system (approximately 11 acre feet) to manage storm water runoff from over 90 acres of North Campus.

7.6 Pesticides and Fertilizers

The application of pesticides and fertilizers is controlled by several departments including G&WM, Athletics, Matthaei Botanical Gardens, Radrick Farms and Nichols Arboretum, depending on the location. The University employs Integrated Pest Management (IPM) methodology, an ecological approach to pest management, in University buildings. All available techniques are used to reduce pest populations to acceptable levels while minimizing the potential impact of pesticides upon humans and the environment.

G&WM schedules for fertilization are based on classification of the area into one of the following categories:

- Priority three lawns are in areas of campus where the lawn is mostly observed from a distance and not actively used. A reduced mowing schedule is instituted and a taller lawn height is maintained. No mowing areas have been established and include around 1 million square feet of lawn. In addition, no fertilizer, pesticides, or weed control are used in these areas.

- Priority two lawns are around general academic buildings which are highly visible and used in moderation. Mowing is performed 4 times per month. Fertilizer is applied 3 times per season, if needed, and weed control is performed once per season. Pesticide application is limited to target problem areas.

- Priority One lawns are considered a part of the ornamental landscape of high use buildings or areas. Mowing is performed 6 times per month. Fertilizer is applied 4 times per season, if needed, and weed control performed twice per year.

G&WM uses slow release, non-phosphorous fertilizers twice a year, as needed. A broad leaf herbicide is used annually and is done selectively to areas requiring treatment. Dormant oil and some insect control agents are also used selectively on campus. The other departments use formulations of pesticides and fertilizers designed to give the best performance for the type of activity.

To further minimize the discharge of pollutants to the storm water drainage system, G&WM maintains a chemical free buffer strip in lawn areas that border any streams or ponds. Also, all priority 3 lawns are currently left untreated, but maintained to a 4 to 6 inch height to allow a more extensive root system to be established. By creating a deep root system and allowing a greater plant mass to be established, the soil is able to retain more storm water, which reduces soil erosion and sedimentation.

7.6.1 Employee Training

Employees have been trained and are licensed applicators, where appropriate. G&WM maintains a foreman certified to train all of its employees. Employees are trained in proper storage, handling and use of pesticides, herbicides, and fertilizers on the U-M campus prior to use.

7.6.2 Soil Testing

All soil that the U-M fertilizes is tested prior to any application of fertilizer. Fertilizers shall be applied only in accordance with soil test results and recommendations.

Appendix A

The University of Michigan NPDES Permit No. MI0053902

(not included)

Appendix B

List of University of Michigan Outfalls

Appendix B Outfalls of The University of Michigan Drainage System

Outfall ID #	Location of Discharge	Name of Receiving Water	Ultimate Receiving Water
O-1	S of Jefferson & Division	City of Ann Arbor	Allen Creek
O-2	Jefferson & Thomas	City of Ann Arbor	Allen Creek
O-3	William & Thompson	City of Ann Arbor	Allen Creek
O-4	S Division & Hill	City of Ann Arbor	Allen Creek
O-5	S Division & Hill	City of Ann Arbor	Allen Creek
O-6	SW of S Div. & Hoover	City of Ann Arbor	Allen Creek
O-7	SW of S Div. & Hoover	City of Ann Arbor	Allen Creek
O-8	E of Green & Hoover	City of Ann Arbor	Allen Creek
O-9	S Division & Hoover	City of Ann Arbor	Allen Creek
O-10	Sybil & Hoover	City of Ann Arbor	Allen Creek
O-11	N of Stadium Blvd.	City of Ann Arbor	Allen Creek
O-12	State St. Sports Ser. Bldg.	City of Ann Arbor	Allen Creek
O-13	State St. Sports Ser. Bldg.	City of Ann Arbor	Allen Creek
O-14	State St. SE Corner Yost	City of Ann Arbor	Allen Creek
O-15	State St. NE Corner Yost	City of Ann Arbor	Allen Creek
O-16	NW of Fuller & Glen	Huron River	Huron River
O-17	S University & Church	City of Ann Arbor	Allen Creek
O-18	Monroe & Oakland	City of Ann Arbor	Allen Creek
O-19	Hill & E University	City of Ann Arbor	Allen Creek
O-20	Church & Hill	City of Ann Arbor	Allen Creek
O-21	E of William & E Univ.	City of Ann Arbor	Allen Creek
O-22	Willard btwn E Univ. & Church	City of Ann Arbor	Allen Creek
O-23	S of Willard & Church	City of Ann Arbor	Allen Creek
O-24	E of Nichols Dr.	Huron River	Huron River
O-25	E of Nichols Dr.	Huron River	Huron River
O-26	E of Nichols Dr.	Huron River	Huron River
O-27	N of Nichols Dr.	Huron River	Huron River
O-28	W of Plymouth & Bdwy	Traver Creek	Huron River
O-29	S of Gilbert & Baits	U-M Retention Pond	Huron River
O-30	Fuller & Bonisteel	City of Ann Arbor	Huron River
O-31	E of McIntyre	Parke Davis & City of Ann Arbor	Millers Creek
O-32	E of McIntyre	Parke Davis & City of Ann Arbor	Millers Creek
O-33	NE of Bishop & Plymouth	U-M Retention Pond	Retention Pond

Outfall #	Discharge Location	Receiving Water System	Receiving Water of the State
O-34	Beal & Glazier Way	City of Ann Arbor	Millers Creek
O-35	Beal & Glazier Way	City of Ann Arbor	Millers Creek
O-36	SE of Baxter & Hur. Pkwy	Millers Creek	Huron River
O-37	SE of Baxter & Hur. Pkwy	Millers Creek	Huron River
O-38	SE of Baxter & Hur. Pkwy	Millers Creek	Huron River
O-39	S of Baxter E. of ITI	Millers Creek	Huron River
O-40	S of Baxter	Millers Creek	Huron River
O-41	S of Baxter (NE incin.)	Millers Creek	Huron River
O-42	S of Baxter E of ITI	Millers Creek	Huron River
O-43	S of Baxter E of ITI	Millers Creek	Huron River
O-44	S of Baxter	Millers Creek	Huron River
O-45	NE Hubbard & Hur. Pkwy.	Millers Creek	Huron River
O-46	E Hubbard & Huron Pkwy.	Millers Creek	Huron River
O-47	E. Huron Pkwy (SW corner Northwood 5)	Millers Creek	Huron River
O-48	SW Hubbard & Hur. Pkwy.	Millers Creek	Huron River
O-49	Varsity Tennis Retention Pond	City of Ann Arbor	Malletts Creek
O-50	Varsity Tennis Driveway	City of Ann Arbor	Malletts Creek
O-51	Eisenhower and Briar Wood Circle – south	City of Ann Arbor Retention Pond	Malletts Creek
O-52	Eisenhower and Briar Wood Circle – middle	City of Ann Arbor	Malletts Creek
O-53	Plaza Drive and Briar Wood Circle	City of Ann Arbor	Malletts Creek
O-54	Eisenhower and Industrial Parkway	City of Ann Arbor	Malletts Creek
O-55	Wolverine Tower – north	City of Ann Arbor	Malletts Creek
O-56	Wolverine Tower – south	City of Ann Arbor	Malletts Creek
O-57	Wolverine Tower – east	City of Ann Arbor	Malletts Creek
O-58	State Street Commuter Lot	Malletts Creek	Malletts Creek
O-59	University Stores	City of Ann Arbor	Malletts Creek

Appendix C

Best Management Practices in Plant Operations for Storm Water Management at the University of Michigan

Best Management Practices in Plant Operations for Storm Water Management at the University of Michigan

1.0 Introduction

The University of Michigan (UM) has two different systems to deal with the wastewater and storm water that is generated on campus. One of them is the sanitary sewer system and the other is the storm water drainage system.

The sanitary sewers collect the wastewater that is generated inside laboratories, offices, homes, and other buildings. This system delivers the wastewater to the Ann Arbor Wastewater Treatment Plant where it goes through a number of physical and chemical processes that remove pollutants and disinfect the water. After treatment at the plant, all of the treated water is discharged to the Huron River.

The storm water drainage system is intended to prevent flooding by quickly diverting rain water and snowmelt away from areas where we do not want standing pools of water. Unlike the sanitary sewer system, the storm water drainage system does not provide treatment for the water. All water that flows down the storm drains is discharged directly into the Huron River. As the water quickly flows over streets and sidewalks, it can carry contaminants with it down the drain. Care must be taken to prevent this from occurring because the river is the source of drinking water for many communities. If contaminants are carried into the river, they have the potential to harm the plants and animals that inhabit it and to degrade the quality of our drinking water.

Recognizing the impact storm water discharges have on the environment, the US Environmental Protection Agency began issuing municipal storm water permits under the National Pollutant Discharge Elimination System (NPDES). In 1995, the University voluntarily applied for a storm water permit to support the goals of the NPDES program. Under the terms of the permit, the University is required to implement a storm water management program and regulate the materials that are discharged to its storm drains. The only materials that are permitted to enter the storm water drainage system are storm water runoff and clean untreated water from a few very specific sources.

One required component of the storm water management program is the development of best management practices (BMPs) that reduce the potential for discharges to the storm water drainage system. This document is intended to identify activities within Plant Operations that have the potential to affect the quality of storm water discharges or the storm water drainage system and to assist in the development of appropriate BMPs.

Plant Operations is a division within the Business and Finance sector of UM's administration. Plant Operations is itself comprised of a number of different divisions and collectively they are responsible for a wide range of activities throughout all of the University's Ann Arbor campuses. The divisions that make up Plant Operations include: the Office of the Director, Building Services, Construction Services, Facilities

Maintenance, Grounds and Waste Management, Utilities and Plant Engineering, and the Work Control Group. The employees in each division carry out different activities that have the potential to affect the storm water drainage system or the quality of storm water discharges; each division should therefore customize its own BMPs for the activities identified below. Many of the activities identified herein may be performed according to BMPs that are already in place or that are currently being developed. Please note that this document is intended to provide an initial and inclusive assessment of the services provided by Plant Operations and the appearance of an activity in a list below does not necessarily mean that any of its current BMPs are inadequate or require revision.

2.0 Building Services

Plant Building Services maintains facilities to provide a clean, safe, and pleasant environment for the University of Michigan's students, faculty, and guests. The Building Services division is composed of the following groups: Custodial Services, Special Services, and Pest Management. Though many of the activities that Building Services engages in are performed indoors, some of them may still have the potential to affect the sanitary sewer and storm water drainage systems. The following activities and issues have been identified to have that potential:

- All waste handling procedures – Proper waste handling procedures are critical to maintaining effective drainage systems and ensuring that water quality standards are met. Written procedures and BMPs should be in place for all wastes that Building Services generates or disposes. Examples of possible wastes include, but are not limited to: mop water, de-scaling agents, and floor finish.

- Facility equipment – Having the proper means for waste collection and disposal is a necessary element of any waste management program. Each building on campus should be evaluated for the adequacy of its waste disposal facilities. Buildings without strainers for their drains should be identified for further investigation and management. In addition, proper chemical use and storage areas should be established and maintained in a manner so as to prevent the spillage or release of chemicals.

- Building plumbing and piping – The plumbing in facilities can be greatly impacted by the materials that flow through it. Materials that corrode or build up in building piping should never be allowed to enter a drain. Instead, these materials should be collected for disposal by the Occupational Safety and Environmental Health (OSEH) Hazardous Materials and Remediation (HazMat) program. Please be advised that even dirt and other sediments have the potential to collect in piping and should therefore not be allowed to enter drains.

- Carpet and upholstery cleaning – Carpet and upholstery cleaning often generates large amounts of wastewater. This wastewater should never be discharged to the

ground or be allowed to drain outdoors. When large-scale carpet and upholstery cleaning operations are going to take place, OSEH Environmental Management should be contacted for an evaluation of the wastewater disposal options. Specific guidance from the Michigan Department of Environmental Quality (MDEQ) is available on these activities if needed.

- Outdoor window washing – Outdoor window washing often involves the generation of wastewater. This water should not be discharged to the ground or be allowed to enter a drain outdoors. If any outdoor window or building washing takes place, OSEH should be contacted for an evaluation of the wastewater disposal options, which may include acquiring MDEQ authorization to discharge to ground.

- Disaster cleanup – Disaster recovery efforts often involve the disposal of waste or the generation of wastewater. It is essential that all waste be managed in a proper way according to the established BMPs. In the case of flooding, water may come in contact with materials inside the building and should therefore be directed to the sanitary sewer.

- Pest management – When not used properly, pesticides have the potential to cause serious harm to the environment. BMPs should be developed and strictly followed for the use and storage of all pesticides and Integrated Pest Management procedures should be followed.

- Vehicle and equipment fueling – The University owns and operates a large vehicle fleet. When fueling vehicles or refilling fluids, care should be taken to avoid allowing fluids to drip or accumulate on the ground.

3.0 Construction Services

Construction Services provides the University community with the resources, skills, equipment, and knowledge of a full service contractor. The department is comprised of the Cabinetry Shop, Masonry Shop, Paint Shop, Renovations, Sign Shop, and Upholstery Shop. Because many of the activities conducted by these divisions are performed outside, employees in these groups should be especially attentive to any actions that may affect the storm water drainage system. The following activities have been identified:

- Earthwork – Any work that disrupts the topsoil has potential soil erosion and sedimentation concerns.

- Concrete placement and cleanup – These activities often occur outdoors where there may not be facilities appropriate for washing equipment and disposing the unused or waste materials. Concrete and cement often contain large amounts of sediment that is unacceptable for discharge to both the storm water drainage

system and the sanitary sewer system. The pH of these materials often makes them unacceptable for discharge as well.

- Brick cutting – When cutting brick, sediments may be generated that should not be allowed to enter the storm water drainage system or the sanitary sewer system.

- Masonry cleaning – The potential issues involved with masonry cleaning vary depending on the methods that are used. If the masonry is sand blasted, sediments must be properly managed. In other cases, chemical treatments are used and the wastewater that is generated should not be allowed to drain onto the ground or enter the sanitary sewer or storm water drainage systems. Some materials of specific concern include acids, detergents, and materials containing phosphorus. Instead, all wastewater should be collected for proper disposal. OSEH may be contacted for an evaluation of the collection and disposal options.

- Exterior painting/handling of waste from exterior and interior painting operations – No materials involved in exterior painting should be allowed to affect the environment. If paint must be removed from a surface prior to painting, samples of the paint chips may need to be collected if it is suspected they contain lead. The wash water generated from washing brushes used to apply latex paint may be discharged to the sanitary sewer. Wash water containing oil-based paint however, should not be allowed to enter a sanitary drain and should be collected for disposal by OSEH. Any unused paint should be offered for re-use by listing it at http://www.plant.bf.umich.edu/grounds/ recycle/ExchangeFiles. If it can't be used, let small amounts of unwanted latex paint dry out and dispose of the can in the trash. Unusable oil-based paint and latex paint containing lead should not be allowed to dry out; instead, collect it for disposal by OSEH HazMat.

- Chemical usage, storage, and disposal – all chemicals should be used, stored, and disposed according to proper chemical hygiene practices. Some chemicals contain constituents that are not acceptable for discharge to the sanitary sewer. OSEH should be contacted if any questions arise about the appropriate method of disposal of certain materials. Examples of materials that might be investigated further are those used for carpet removal or glass repair.

- Graffiti removal – Any waste that is generated by graffiti removal operations should be collected for disposal and should not be allowed to discharge to the ground.

- Any other outdoor work – Any outdoor work that is not covered by the above topics should be evaluated by the Construction Services department for potential storm water concerns.

- Vehicle maintenance – The University owns and operates a large vehicle fleet. When fueling vehicles or performing maintenance on them, care should be taken to avoid allowing fluids to drip or accumulate on the ground.

4.0 Facilities Maintenance

Facilities Maintenance provides building maintenance, operation, and environmental monitoring of campus buildings and facilities. Centralized service shops include HVAC, Plumbing, Pumps, Steam Distribution and Insulation, Electrical, Fire Systems, Elevators, Roofing, Metal Crafts, and Machine Repair. The following activities conducted by Facilities Maintenance should be evaluated for potential storm water concerns and be carried out according to BMPs.

- Any outdoor work – Any outdoor work that generates waste or involves earth changes or excavations should be evaluated for potential storm water concerns.
    - Electric Shop – trenching and earthwork involved with outdoor lighting
    - Plumbing Shop – excavations, work involving the vacuum truck
    - Roofing Department – clean up procedures for roofing activities; cleaning of roof drains, gutters, and downspouts
    - Sheet metal – any outdoor work, disposal of metal shavings
    - Zone Maintenance – any activity that might impact the outdoors

- Flood abatement in elevator shafts and buildings – When floods occur, the water may come in contact with materials inside the building. As a result, the water should always be disposed in the sanitary sewer and in some cases it may need to be sampled prior to disposal.

- Work involving oil reservoirs in hydraulic elevators

- Work involving the restoration of compromised indoor plumbing – If plumbing is repaired due to excessive corrosion or plugging, OSEH should be contacted for an investigation into the cause of the problem and possible methods for preventing its recurrence.

- Asbestos abatement

- Parking Structures (water) annual wash down

- Proper storage, use, and maintenance of refrigerants

- Operation and maintenance of chiller systems

- Vehicle maintenance – The University owns and operates a large vehicle fleet. When fueling vehicles or performing maintenance on them, care should be taken to avoid allowing fluids to drip or accumulate on the ground.

5.0 Grounds and Waste Management

Grounds and Waste Management maintains campus grounds and landscaping, provides moving and trucking service, and manages waste and recycling collection. The employees of this department conduct a large portion of their work outdoors and they should therefore be especially watchful of all potential storm water concerns related to their activities. The following activities should be conducted according to BMPs.

- Application of herbicides and fertilizers – When not applied properly, herbicides and fertilizers have the potential to cause significant harm to the environment. Crews should be especially careful when using fertilizers containing phosphorus. Before applying fertilizers the soil should be tested and if possible, fertilizers with no or low phosphorus should be used.

- General lawn care and irrigation – Excessive irrigation can lead to increased amounts of storm water runoff. When landscaping or caring for lawns, efforts should be made to limit the amount of runoff that is generated.

- Use of mulch – Mulch is often placed under bushes and shrubs around the perimeters of buildings. Care must be taken to avoid allowing mulch to enter the storm water drainage system. In addition, if there are sanitary sewer manholes or storm water inlets in the area, they should be left exposed and not covered with landscaping materials.

- Vehicle maintenance – The University owns and operates a large vehicle fleet. When fueling vehicles or performing maintenance on them, care should be taken to avoid allowing fluids to drip or accumulate on the ground.

- Salt and sand use – Large quantities of salt and sand are applied to paved surfaces on campus during the winter months. The materials should be applied in a manner that minimizes their adverse impacts on the environment and University infrastructure.

- Pest management – Insecticides are another material that have the potential to cause great harm to the environment. These materials should be applied according to BMPs and in limited quantities. Whenever pesticides are used, Integrated Pest Management practices should be used.

- Tree planting or removal – Planting or removing trees may involve earth changes or excavations. In these cases, the disturbed earth should be managed in a manner that prevents it from entering the storm water drainage system.

- Mowing – grass clippings generated from mowing operations should not be left on sidewalks or other paved surfaces and they should never be allowed to enter the storm water drainage system.

- Seeding – Areas of land where new grass seed is being planted should be covered so as to prevent soil erosion and sedimentation.

- Rototilling – Tilled areas should not be left uncovered or exposed to prevent soil erosion and sedimentation.

- Waste management activities – All dumpsters and waste disposal and collection areas should be kept clean. In addition, all outdoor dumpsters should be covered.

6.0 Utilities and Plant Engineering

Utilities and Plant Engineering provides for the purchasing, generation, distribution, conservation, and accounting of utilities for the University. This department also provides engineering for operations, maintenance, energy management, and utilities for Plant Operations. The following activities conducted by Utilities and Plant Engineering should be conducted according to BMPs.

- All outdoor electrical work involving trenching, excavation, or other earth changes

- Operations and Maintenance activities – Operations planning, environmental trouble shooting, and preventative maintenance should all be conducted with regard to possible storm water concerns.

- Vehicle maintenance – The University owns and operates a large vehicle fleet. When fueling vehicles or performing maintenance on them, care should be taken to avoid allowing fluids to drip or accumulate on the ground.

7.0 Work Control Group

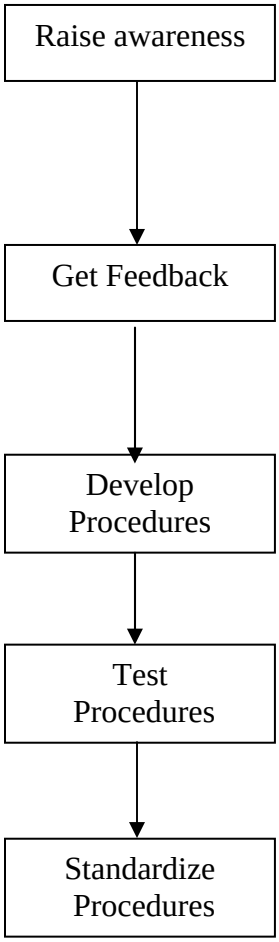
Work Control serves as the single point of contact for Plant Operations with the University community. Using the Facilities Management System, work requests are created, triaged, and sent to the responsible shop for completion. Work Control is also responsible for all estimates and preventive maintenance planning. The following activities should be conducted according to BMPs.

- Estimating – All estimates should include costs for storm water controls

- Vehicle maintenance – The University owns and operates a large vehicle fleet. When fueling vehicles or performing maintenance on them, care should be taken to avoid allowing fluids to drip or accumulate on the ground.

8.0 Developing BMPs

Because the Plant Operations employees are most familiar with the work that they do, BMPs will be most effective and easiest to implement if the employees themselves develop them. The process of developing BMPs consists of multiple steps and OSEH will make itself available to guide Plant Operations through each of them. The following chart provides a general outline of the process.



Before BMPs can be developed, employees must be aware of the need for them. All Plant Operations employees should receive awareness training so they understand the impacts that storm water discharges have on the environment and they recognize the practical and legal importance of maintaining the quality of those discharges.

After employees receive awareness training, they will be asked to evaluate their work activities to determine whether or not they have potential storm water concerns. At this point, employees should also document current practices to serve as a benchmark. Practices should be documented often, especially after revisions are made.

After all of the activities with potential concerns have been identified, OSEH will work with Plant Operations to develop BMPs where they are needed. Any obstacles to developing and implementing BMPs

After the draft BMPs have been developed, they will be tested and used in daily activities. If problems are identified, the BMPs may be revised and re-tested. This refinement process may take multiple iterations before the BMPs are feasible and effective at accomplishing their goals.

After the BMPs have been refined and it has been determined that they achieve their desired results, they should be formally documented and made standard practice. At this point all current and new employees should be made aware that they are expected to conduct their business activities according to the written procedures.

Appendix D

Storm Water System Dye Testing Guidelines

STORM WATER SYSTEM DYE TESTING GUIDELINES

The guideline below is for dye testing of the storm water and sanitary sewer systems on the University of Michigan (U-M) Ann Arbor Campus. Dye testing is conducted as part of University of Michigan Storm Water Municipal Permit MI0053902 in order to check for illicit connections. Dye testing is regulated under Rule 97 of Michigan Water Quality Standards. This regulation requires that the Michigan Department of Environmental Quality (MDEQ) approve all dye testing.

1) Call Occupational Safety & Environmental Health (OSEH) at 936-1920, **twenty-four (24) hours** prior to any dye testing. The MDEQ requires this advance notice.

2) Provide the location of the proposed dye test. Be specific, so that the potential receiving water can be determined by OSEH through a review of the campus storm water system maps. If a possible cross connection is suspected or there is potential of visible dye reaching a water body, contact the Plumbing Shop foreman at 647-2038, to have the U-M vacuum truck available to remove any dye from the storm water drainage system.

3) OSEH will forward this information to the MDEQ Jackson District Office. OSEH will also notify other units on campus that should be aware of the activities, such as the Plumbing Shop, the Department of Public Safety and the OSEH on-call emergency responder. OSEH will also contact the City of Ann Arbor Waste Water Treatment Plant, the Washtenaw County Drain Commissioner, and Washtenaw County Department of Environmental Health.

4) After the dye testing notification has been made, dye can be obtained from the Plumbing Shop foreman. Before obtaining the dye, review the guidelines and sign the attached form agreeing to follow these guidelines. Follow the manufacturers recommendation on the amount of dye used. Norlab, Inc. liquid powder tracing dye yellow green is the approved color for use on campus. Norlab, Inc. recommends using 1 oz. dye per 250 gallons of water or 1 oz. of dye per 100 gallons of water with high turbidity.

5) Check for dye downstream of the testing location in manholes on the storm and sanitary systems to determine the sewer line connections. The time required for monitoring will vary, depending on flow in the lines that are tested. In order to make sure the test is properly conducted, the individual checking the downstream manholes should be in place prior to the introduction of the dye. Based on the circumstances at each location, additional people may be needed to monitor multiple locations. It is recommend that radios be utilized to maintain contact during the dye test.

6) If connections to the storm water drainage system are suspected, have the vacuum truck available and positioned by what is thought to be a down stream storm water manhole. If necessary, use the vacuum truck to remove any of the water and dye

from the storm water system prior to it reaching a water body. Discharge the dye and water mixture to an approved sanitary sewer location.

If any illicit connections are discovered, report them to OSEH immediately. Provide information about the actions that will be taken to prevent the illicit discharge (if possible) and to correct the cross connection. OSEH will verbally notify the MDEQ Jackson District Supervisor within 24 hours of any confirmed illicit connection that is suspected of being a danger to health or the environment as specified under NPDES permit MI0053902. For discharges that do not pose imminent danger to health or the environment, OSEH will provide notification to the MDEQ Jackson District Supervisor, verbally or in writing, within 5 days of discovery. Written documentation will be submitted to the MDEQ within 14 days in either case. This information is also included in the semi-annual and annual storm water permit reports, which are submitted to the MDEQ.

These dye testing guidelines will be reviewed on a periodic basis to determine if any modifications are required. Contact OSEH at 936-1920 with any questions regarding this guideline.

Revised: March 3, 2003

dmc:hb

I have reviewed the storm water system dye testing guidelines and agree to follow these guidelines.

Print Name	Signature	Date

T:\EP\Stormwater Program\Illicit Discharges\Dye testing\2003

Appendix E

Dry Weather Screening Program Guidelines

Dry Weather Screening Program Guidelines

June 2005

The guideline below is for dry weather screening of the storm water system on the U-M Ann Arbor Campus. The purpose of the dry weather screening program is to preliminarily determine the existence, location and extent of possible illicit discharges into the U-M storm water system. The screening program will target points within the storm water system to evaluate non-storm water flow. Where non-storm water flows are present at the screening points, samples will be collected for observations of physical properties and measurements of specific chemical parameters. Evaluation of both the physical properties and the chemical parameters provide information about the presence of possible illicit discharges into the system.

1. Selection of Sample Points

For the purposes of dry weather screening, the U-M Ann Arbor campus has been divided into four geographical regions. The regions are as follows:

- Central Campus
- Medical Campus
- North & East Campuses
- South Campus

Dry weather screening is performed on each campus region, in turn, until the entire campus has been covered. Typically, four or five rounds of screening are performed over the 5-year permit cycle. Prior to screening, the campuses are evaluated to determine the location of feasible inspection and sampling points. The guidelines and criteria used to selecting screening points in each campus are based on the outline provided in the EPA's *Guidance Manual for Preparation of Part 1 of the NPDES Permit Applications* (April 1991). In selecting the points, a grid of perpendicular north-south and east-west lines are overlaid on a map of the U-M. From the grid, twenty (20) field screening points are selected to provide an effective and representative analysis of the storm water system on that campus. The selection of specific points is based on the criteria below:

- points that consider the safety of the sampling personnel
- points that drain the largest area of the grid cell
- points that are upstream and downstream of the interconnections with the City of Ann Arbor and Michigan Department of Transportation (MDOT) systems
- points at which the storm water piping has a large diameter
- points that are located on lines connected to a system outfall

After identification, each point is assigned a control number for tracking purposes.

2. Sampling Procedures

At each field screening point, the manhole cover is removed and the storm water drainage system is observed for flow. If no flow is observed, the result is recorded and the next location is evaluated. If flow is observed, an initial sample is collected and a follow-up sample is collected between 4 and 24 hours later.

At points where flow is observed, visual/olfactory inspections for color, odor, clarity, and floatables are logged; the pH, temperature, and estimated flow rate are recorded; samples are collected and sent to the U-M OSEH Environmental Laboratory for analysis; and the flow is backtracked to the source building, structure, or inlet. When samples are collected, the sample collection device is cleaned and rinsed with distilled water before use at subsequent sampling locations. The flow rate may be estimated by measuring the cross-sectional area of the flow and estimating the velocity by using the most practicable method. The flow rate may alternatively be estimated by measuring the volume of water collected over a specific time period at an outfall.

3. Weather Conditions

Because the purpose of field screening is to identify illicit discharges, all field screening activities must take place during dry weather. For the purposes of this program, dry weather conditions are defined as less than 0.1inch of rain during a 48 hour period. Sampling will not occur for 72 hours after a major storm event, defined as more than 1 inch of rain over a 24 hour period. Sampling will also not occur for at least 48 hours after the end of the event for rain events between these limits.

Some rain events may be too short or too low an intensity to cause storm water to enter the storm water drainage system. It will be the responsibility of the field sampler to determine whether or not it is appropriate to postpone sampling if precipitation occurs during field screening activities. In the event that non-dry weather conditions arise in the time between two sample collections at a single location, the first sample will be repeated and a second sample will be collected between 4 and 24 hours later.

4. Parameters for Evaluation

Table A lists the physical and chemical parameters that are evaluated during field screening activities. Field test kits or laboratory analysis will be used for the chemical analyses of water samples collected during the field screening activity.

Table A – Physical and Chemical Parameters

Physical	Chemical
Temperature	pH
Color	Phenol
Odor	Copper
Clarity	Chlorine
Floatables	Detergent

- Chlorine
  Chlorine is a highly reactive gaseous element not found in nature. In aqueous solution, chlorine has strong oxidizing properties and is an excellent biocide. It is commonly used to treat potable waters, municipal wastes, and swimming pools. Chlorine is also used in the manufacture of many chemical products including insecticides, plastics, solvents, and cleaning agents. The presence of chlorine in water samples may indicate the presence of household or non-domestic discharges.

- Copper
  Copper is found naturally in the Earth's crust and is often used as a catalyst in oxidation reactions. Copper is also an important component of fungicides and insecticides. Copper-containing fungicides are often used to control biological growth in non-potable water systems. Copper and its compounds are used extensively in the electrical industry, agricultural chemicals, and in analytical chemistry.

- Detergents
  Detergents enter waters and waste waters mainly by discharge from laundering and other cleaning operations. Detergents impart properties such as foaming, emulsification, and particle suspension to receiving waters. Concentrations of detergents in typical domestic wastewater are found in the range of 1 to 20 mg/L. Generally, detergents are found in natural waters at levels less than 0.1 mg/L, except near an outfall or other point of entry.

- pH
  Natural waters usually have pH values in the range of 4 to 9, and most are slightly basic because of the presence of bicarbonates and carbonates of the alkali and alkaline earth metals. Typical potable well waters have pH values ranging from 6.5 to 8 and the City water has a pH as high as 9.5. A pH value outside of those limits may indicate the presence of an illicit discharge.

- Phenols
  Phenols are the simplest forms of a group of organic chemicals that include cresols, xylenols, and catechols. Phenols are also common ingredients of disinfectants. The presence of high concentrations of phenols can indicate contamination from a waste discharge.

- Temperature
  Temperature extremes, either high or low, may indicate the presence of illicit discharges.

5. Identification of Illicit Discharges

Follow-up tracking activities will be initiated if the dry weather screening and sampling identifies a discharge. In such an event, the following procedures will be carried out:

- The storm water system maps will be checked to identify potential sources of the discharge.
- Additional access points will be sampled between the identified sample point and other potential discharge points if available.
- Connections will be surveyed inside the building once a discharge is tracked back to a specific facility. This may involve a review of construction plans, dye testing, in-line camera work, or other measures.
- Follow-up actions will be initiated as discussed in Section 4.4 below once the connection is specifically identified.

6. Quality Assurance and Quality Control (QA/QC)

The QA/QC procedures for the field screening work are designed to assure that the information obtained is precise, complete, and reliable. The QA/QC procedures are:

- One person in each crew will fill out the log sheets. The other crew member will check the sheet for completeness, verify the location information, and initial the form prior to leaving the screening location.
- Duplicate analyses will be run routinely on 5 percent of the samples.
- The field supervisor will routinely check the sampling procedures used by the field crews.
- The field supervisor will check the field logs each day to ensure that they are filled out completely, that re-sampling is done as necessary, and that duplicate analyses are performed.
- A retest will be conducted for constituents with values outside of a specified range. A third test will be performed if the second test shows a substantially different result. All results will be recorded on a data sheet. The specified ranges that require a retest are specified in Table B below:

Table B – Analytical Results Requiring a Retest

Analyte	Result
Chlorine	> 5 mg/L
Copper	> 12 mg/L
Detergents	> 5 mg/L
pH	< 6.0 or > 9.0
Phenols	> 10 mg/L

Appendix F

Storm Water Management Basin Descriptions

Appendix F: Storm Water Management Basin Descriptions

Several wet detention and retention basins have been identified as part of the U-M storm water system. These basins are located on East Campus (EC), Medical Campus (MC), North Campus (NC), Central Campus (CC), and South Campus (SC). These structures receive direct runoff from the U-M storm water system and are defined as:

- Arbor Lakes 3 basins (EC)
- East Ann Arbor Health Center basin (EC)
- Matthaei Botanical Gardens 3 basins (EC)
- UMHHC basin (MC)
- Fuller Park Parking Lot basin (MC)
- M-76 Wall Street/Maiden Lane Parking Lot basin (MC)
- North Campus detention/retention basin and wetland (NC)
- Moore Music Building basin (NC)
- UHHC North Campus Administrative Complex 3 basins (NC)
- North Campus Commuter Lot 3 basins (NC)
- North Campus Grounds 2 basins (NC)
- Biomedical Engineering basin (NC)
- Palmer Drive cistern (CC)
- Parking Lot SC35 (SC)
- State Street Commuter Lot basin (SC)
- University Golf Course basin (SC)
- Varsity Tennis Center basin (SC)
- Eisenhower Corporate Park basin (off campus)

Arbor Lakes 3 basins are located northeast of the intersection of Plymouth and Earhart. The basins receive runoff from the surrounding grass areas, storm drains in the parking lot, and runoff from Whitehall Drive. Overflow from the pond discharges to an adjacent dry marsh.

East Ann Arbor Health Center basin is located on the east side of Earhart Road and south of Plymouth. The basin receives roof drain runoff from building roof drains, grass areas, parking lots, and overland flows in the area.

Matthaei Botanical Gardens on Dixboro Road has 3 wetland basins. One of these basins was constructed in 1995 to handle irrigation water from the green house. These wetland basins discharge to Fleming Creek.

UMHHC basin is located between Nichols Drive and East Medical Center Drive northeast of the medical complex, and adjacent to the Huron River. The basin removes sediment from incoming storm water, roadway and grass area overland flows in the

Hospital area. The basin discharges to the Huron River through a standpipe overflow structure.

Fuller Park Parking Lot basin is located on the south side of Fuller Road, west of Huron River. The basin receives runoff from the parking lot storm sewer and discharges to the Huron River through a restricted standpipe. The Fuller Park Parking Lot was designed and built by the University, but located on City of Ann Arbor property and leased to the University. This basin is maintained by the City of Ann Arbor as part of the lease agreement.

M-76 Wall Street/Maiden Lane Parking Lot basin is located between Wall Street and Maiden Lane, southeast of Broadway. The basin receives runoff from the parking lot storm sewer and discharges to the City storm water system through a stand pipe before flowing to the Huron River.

North Campus detention/retention basin and wetland is currently under construction. This storm water treatment system is located next to the Art & Architecture Building on Bonisteel. The system will control runoff from approximately 91 acres of North Campus.

Moore Music Building basin on North Campus receives roof drain runoff from the School of Music building and overland flows from grass areas immediately adjacent to the pond. Overflows from the pond discharge directly to the U-M storm water system. From that point, the water discharges to the City storm water system and flows to the Huron River.

UMHHC North Campus Administrative Complex 3 basins on the North Campus area receive roof drain runoff from building, parking lot runoff, and overland flows from grass areas immediately adjacent to the basins. Overflow from one basins discharges to the City storm water system and then Millers Creek. The overflow from two of the basins discharges directly to Millers Creek. From that point, the water then is discharged to the Huron River.

North Campus Commuter Lot basin is located at the northwest corner of Huron Parkway and Glazier Way. This basin receives runoff from the storm drains in the commuter parking lot. From that point, the water discharges to the City storm water system and then enters Miller Creek before reaching the Huron River.
.
North Campus Grounds 2 retention basins receive storm water from the surrounding area. The surfaces in this area include grass, gravel, and pavement. The basins have no discharge outlet.

Biomedical Engineering (BME) basin is located at the south end of the new parking lot for BME at the northwest corner of Fuller and Beal. The basin handles runoff from the parking lot and new building area. The basin discharges to the City storm water system and then the Huron River.

Palmer Drive basin is located under the new LSI parking garage. This basin will handle storm water flow from the Palmer Drive area as well as some rerouted flow from south of the area. This will help to alleviate flooding at the Dana/Randall buildings. The basin itself will act as a settling tank for silt and other debris. A pump will introduce the detained storm water into the storm line after the storm event has subsided.

Parking lot SC35 is located south of Hoover Avenue at Brown Street on South Campus and contains a basin. The basin drains through the City storm water drainage system to Allen Creek.

State Street Commuter Lot basin is located on the west side of State Street, one-third of a mile north of Eisenhower Pkwy. The basin receives runoff from the parking lot storm sewer and discharges to a tributary of Mallett's Creek via a restricted standpipe.

University Golf Course basin is located on U-M property in the South Campus area. The basin is part of Allen Creek. The only storm water runoff from U-M property that enters this basin is "sheet flow" from adjacent grass areas. This basin receives all direct storm water inflows from the City storm water system. South of Stadium, Allen Creek is under the jurisdiction of the Washtenaw County Drain Commissioner’s Office.

Varsity Tennis Center basin is located along south State Street on South Campus. The runoff from the property associated with the tennis facility flows, through a network of storm piping as well as overland flow, into the basin. The basin flows through the City storm water system, to Mallets Creek.

Eisenhower Corporate Park basin is located at the northwest corner of Industrial and Eisenhower. The basin receives storm water flow from the parking lots. The basin appears to drain to the city storm water system and then is discharged to Mallets Creek.