Michigan State University
Storm Water Management Program

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Chapter 1 - Storm Water Management Program (SWMP) Overview

This Storm Water Management Program (SWMP) has been developed by Michigan State University (MSU) in accordance with the requirements of the State of Michigan National Pollutant Discharge Elimination System (NPDES). The NPDES Program protects the surface waters of the state by assuring that discharges of wastewater comply with state and federal regulations. Anyone discharging or proposing to discharge wastewater to the surface waters of the state shall make application for and obtain a valid NPDES permit prior to the wastewater discharge. NPDES permits are required under Section 402 of the Federal Clean Water Act (the Federal Act), as amended (33 U.S.C. 1251 et seq., P.L. 92-500, 95-217), and under Part 31, Water Resources Protection, of Michigan's Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (the Michigan Act). Part 31 of the Michigan Act also provides authority for the State to issue NPDES permits. The Michigan Department of Environmental Quality (MDEQ) administers the NPDES permit program for the State of Michigan.

The SWMP contains language referring to the State of Michigan Application for Discharge of Storm Water to Surface Waters from a Municipal Separate Storm Sewer System (MS4). The MSU East Lansing campus is located in the Lower Red Cedar River Watershed, and storm water discharges to the Red Cedar River.

MSU is working to meet its permit requirements by implementing campus-based storm water management activities and collaborative activities with other communities within the Red Cedar River Watershed. The regional and campus-based frameworks for these activities are described below.

Greater Lansing Regional Committee (GLRC)

The Greater Lansing Regional Committee (GLRC) for Storm Water Management is a guiding body comprised of participating communities within the Greater Lansing Region. The committee has been established to guide the implementation of the storm water programs for the communities within three identified urbanized watersheds: the Grand River, the Red Cedar River and the Looking Glass River watersheds.

GLRC Members

The participating MS4 entities that make up the GLRC are as follows:

- City of DeWitt
- City of East Lansing
- City of Grand Ledge
- City of Lansing
- City of Mason
- Delhi Charter Township
- Delta Charter Township
- DeWitt Charter Township
- Lansing Charter Township
- Meridian Charter Township
- Oneida Charter Township
- Lansing School District
- Windsor Charter Township
- Waverly Community Schools*
- Clinton County
- Clinton County Road Commission
- Eaton County
- Ingham County
- Michigan State University

*Waverly Community Schools joined the GLRC in 2016

Within the GLRC, a number of committees have been established to guide various components of the regional storm water activities, with others added as needed. MSU plays an active role crafting and implementing GLRC storm water activities with partnering communities. A list of action items for meeting the storm water permit requirements is detailed in the Action Plan Table, which is included as Appendix 1.

While many of the activities listed are being completed by various GLRC committees, a number of the action items are the responsibility of the individual permittees. Those activities from the GLRC Action Plan Table to which MSU has committed and that are directly applicable to the storm water permit requirements are described in this SWMP.

Campus Storm Water Management and MSU Storm Water Committee

Storm water is managed on the MSU campus by a team of faculty, staff and students representing a broad cross-section of the University. Units and Departments that are playing a role in managing storm water runoff include the Office of Environmental Health and Safety (EHS), IPF Planning, Design and Construction (PDC), IPF Landscape Services, IPF Power and Water, Land Management Office, MSU Athletics, IPF Campus Planning, IPF Sustainability, Residential and Hospitality Services, Institute of Water Research, MSU Police, Department of Community, Sustainability, Department of Biosystems and Agricultural Engineering, and Department of Horticulture. A summary of roles and responsibilities for campus storm water management is included as Appendix 2.

A Storm Water Committee comprised of a subset of these representatives and chaired by the University Engineer guides the implementation of the SWMP. The committee meets monthly to oversee SWMP activities and to direct additional campus-based storm water activities

Regulated Area

MSU is located in the Greater Lansing urbanized area, as delineated in the 2010 Census. The MSU regulated area is shown in the map which is included in Appendix 3.

Outfalls and Points of Discharge
The Red Cedar River is the discharge point for MSU's MS4 discharges. The University's discharge database and outfall maps are included as Appendix 4.

Enforcement Response Procedure
Environmental compliance staff members from EHS have the authority to inspect and monitor storm water-related activities on campus and require full compliance with all storm water permit requirements. Any issues noted through the monitoring and inspection process are immediately shared with representatives from the MSU IPF, which then take necessary corrective actions. If necessary, the violation/issue is reviewed with the Storm Water Committee to discuss appropriate corrective actions and associated timelines. Records of any violations or other issues and corrective actions are maintained by EHS. Those records include the date and location of the violation/issue, a description of the violation/issue, a schedule for returning to compliance and the date the violation/issue was resolved.

Authority is granted to EHS, MSU IPF and the MSU Storm Water Committee through reporting lines to both the Office of the Vice President for Research and Graduate Studies and the Office of the Vice President for Strategic Infrastructure Planning and Facilities.

Storm Water Management Program Components

The following are required components of the SWMP:

Public Education Plan (PEP), to promote, publicize, and facilitate education for the purpose of encouraging the public to reduce the discharge of pollutants to storm water to the maximum extent practicable.

Public Participation/Public Involvement (PPP), to share components of the SWMP and encourage participation in its review and implementation

Illicit Discharge Elimination Plan (IDEP), to detect and eliminate illicit connections and discharges to the MS4.

Post Construction Storm Water Runoff for New Development and Redevelopment Projects, to address post-construction storm water runoff from projects that disturb one acre or more, including projects less than one acre that are part of a larger common plan of development that would disturb one acre or more.

Construction Storm Water Runoff Control, to augment Part 91 rules dealing with soil erosion, offsite sedimentation and other construction-related wastes.

Pollution Prevention and Good Housekeeping Program, to minimize pollutant runoff to the maximum extent possible from municipal operations that discharge storm water to the surface waters of the state.

These SWMP components are detailed in the chapters that follow.

Chapter 2 - Public Education Plan

The MSU Storm Water Public Education Plan (PEP) seeks to promote, publicize, and facilitate watershed education for the purpose of encouraging the public to reduce the discharge of pollutants in storm water to the maximum extent practicable. The PEP has been developed to ensure that the targeted audiences are reached with the appropriate messages to meet the intent of the storm water permit.

MSU's PEP is designed to raise awareness among faculty, staff, students and visitors to campus about the importance of the Red Cedar River and ways to protect water quality. Initial public education activities focused on relatively simple concepts, such as "Watershed Awareness," "Storm Water Management" and "Our Actions Affect the River." Current and planned outreach activities are emphasizing the importance of reporting illicit discharges and specific best management practices that can be undertaken to protect water quality. The University is implementing the PEP in collaboration with the Greater Lansing Regional Committee for Storm Water Management (GLRC) to comply with the storm water permit requirements.

Required Topic Areas

The PEP has been developed to ensure that the targeted audiences are reached and includes the eleven topic areas required in the permit:

An adequate PEP will implement a sufficient amount of educational activities to ensure that the targeted audiences are reached with the appropriate message(s) for the following topics:

(A) Promote public responsibility and stewardship in the applicant's watershed(s).

(B) Inform and educate the public about the connection of the MS4 to area waterbodies and the potential impacts discharges could have on surface waters of the state.

(C) Educate the public on illicit discharges and promote public reporting of illicit discharges and improper disposal of materials into the MS4.

(D) Promote preferred cleaning materials and procedures for car, pavement, and power washing.

(E) Inform and educate the public on proper application and disposal of pesticides, herbicides, and fertilizers.

(F) Promote proper disposal practices for grass clippings, leaf litter, and animal wastes that may enter into the MS4.

(G) Identify and promote the availability, location, and requirements of facilities for collection or disposal of household hazardous waste, travel trailer sanitary wastes, chemicals, yard wastes, and motor vehicle fluids.

(H) Inform and educate the public on proper septic system care and maintenance, and how to recognize system failure.

(I) Educate the public on, and promote the benefits of, green infrastructure and Low Impact Development.

(J) Promote methods for managing riparian lands to protect water quality.

(K) Identify and educate commercial, industrial, and institutional entities likely to contribute pollutants to storm water runoff.

Public Participation/Involvement

As required, the Storm Water Management Program (SWMP) is available to the public via the MSU-WATER website. Local public notice requirements are met as appropriate. The SWMP and appropriate contact information are included to encourage public review. The public will be invited to participate in the implementation and periodic review of the SWMP. In addition, progress reports are included on the website after submittal to the MDEQ.

In addition, the GLRC PEP and other appropriate supporting documents are posted on the GLRC website. The GLRC website serves as a tool for information sharing with the public. All GLRC documents (template manuals, progress reports, implementation materials, brochures, quarterly newsletters, annual reports, etc.) are available on the website. The GLRC maintains a calendar for sharing public meeting information, workshops, trainings and events. The GLRC also recognizes the importance of social media. Facebook and Twitter accounts are used to reach a variety of demographics to expand the reach. The GLRC will continue to utilize social media as a communication and outreach tool.

GLRC Topic Prioritization and PEP Evaluation

Evaluation mechanisms are essential to assess the effectiveness of public education programs. Identification of quantifiable measures provides both measurability and accountability for program activities. The GLRC conducted a water quality survey of residents in fall 2006. The purpose of the survey was to provide a benchmark to gauge the effectiveness of regional and local public outreach campaigns on water quality issues in the Greater Lansing Region. The survey results provided a baseline for evaluating the effectiveness of regional and local water quality initiatives over time. These results have been used by the GLRC and other organizations in the region to prioritize and implement public education programs through the most effective and efficient methods possible.

The GLRC PEP Committee will evaluate and determine the effectiveness of the overall public

education activities for the Greater Lansing storm water activities. The GLRC conducted large-scale, statistically valid surveys of citizens in previous permit cycles, and survey results were used to modify education and outreach activities. The PEP Committee will explore the following options for assessing PEP effectiveness in the new permit cycle: a duplicate of the previous surveys (conducted either in-house or contracted out); the utilization of an online survey; conducting focus groups; or conducting targeted interviews of individuals in the region. This will be completed by the end of the permit cycle, scheduled for October 2023. The purpose of this evaluation will be to assess changes in public awareness and modify PEP activities to ensure the effectiveness of public education program.

As required by the storm water permit, the PEP Committee prioritized the public education topic areas into high, medium and low categories. Many factors were considered in this process including the survey results, available resources, cost effective outreach methods, existing public knowledge levels and potential for collaborating with other programs currently underway.

High priority topics areas include:

(B) Inform and educate the public about the connection of the MS4 to area waterbodies and the potential impacts discharges could have on surface waters of the state.

(C) Educate the public on illicit discharges and promote public reporting of illicit discharges and improper disposal of materials into the MS4.

(I) Educate the public on, and promote the benefits of, green infrastructure and Low Impact Development.

The GLRC will report on the measureable goals achieved during the regular progress report submissions. In addition, the GLRC PEP Committee will conduct a follow up survey to be completed when approaching the end of the permit cycle. The survey will be used to evaluate successes and challenges and to determine the overall effectiveness of the PEP. The GLRC is also working with several partners in the larger surrounding area to accomplish a variety of public education efforts. The Middle Grand River Organization of Watersheds (MGROW) is developing a regional public education campaign to provide educational resources for smaller watershed groups (including the GLRC, friends groups, Middle Grand River Watershed Management Planning Project (319) and the Red Cedar River Watershed Management Planning Project (319)). The GLRC will work with MGROW and the 319 groups to develop consistent, meaningful public education messages and delivery mechanisms that will benefit the entire region. This effort will incorporate the GLRC survey results and several other survey results in the region.

The MSU PEP is designed to raise awareness among faculty, staff, students and visitors to campus about the importance of the Red Cedar River and ways to protect water quality. Activities in the PEP include those that are watershed-wide and thus implemented in partnership with the GLRC as well as activities planned and implemented solely on the MSU campus.

PEP Implementation Plan

Activities listed below correspond directly with the eleven topic areas A - K for compliance. For all applicable topics, the PEP identifies:

1. Target audiences
2. Applicable topic areas and priority level
3. Key messages
4. Delivery mechanisms
5. Timetable
6. Responsible party (or parties)
7. Evaluation techniques

(A) Promote public responsibility and stewardship in the applicant's watershed(s).

Activity:	Continue to maintain watershed signage at road and river crossings.
Corr. Topic area:	A, C
Priority:	Medium
Target Audience:	Public
Key message:	Promoting local water resources, connecting the public to their surrounding environment. Signs read "Please Protect the Red Cedar River Watershed."
Delivery Mech.	Passing vehicles, people biking, walking or running will view the signs.
Timetable:	Signs are in place and maintained by Landscape Services
Responsibility:	MSU Landscape Services
Evaluation:	Estimated number of public exposed to the signage.

Activity:	Use "Do you know your watershed?" brochure and update as appropriate.
Corr. Topic area:	B
Priority:	Medium
Target audience:	Public
Key message:	The brochure educates the public about what a watershed is, our local watersheds and general information about watershed protection.
Delivery Mech:	Posted on the GLRC website, handed out at public events, posted in community lobbies.
Timetable:	The brochure will be used at all public events (Adopt A River, Quiet Water Symposium, Michigan Water Environment Association (MWEA) Watershed Summit), and updated as appropriate.
Responsibility:	PEP Committee and MSU
Evaluation:	Number of brochures provided throughout the year and website link traffic.

Activity:	Support and promote Mid-Michigan Environmental Action Council (Mid-MEAC) in their volunteer stream monitoring efforts.
Corr. Topic area(s):	C, J

Priority:	Medium
Target audience:	Public – recruiting volunteers for action.
Key message:	Educate the public (volunteers) about macroinvertebrates and why they are an important indicator of water quality. This provides an opportunity to discuss pollutant sources and reporting of illicit discharges and riparian buffer purpose and management.
Delivery Mech:	Direct communication with volunteers, recruitment through events (when using the educational display), GLRC website and social media postings.
Timetable:	Macroinvertebrate collections are done annually in the spring and fall, identification is completed in the fall.
Responsibility:	GLRC Coordinator
Evaluation:	Number of volunteers participating in the collections and identification of macroinvertebrates.

Activity:	Use informational display and handout materials for use at various campus events.
Corr. Topic area:	B, C, I
Priority:	Medium
Target audience:	MSU Students faculty, staff and visitors to campus
Key message:	Our actions affect our local watersheds; report illicit discharges; take individual action to protect water quality
Delivery Mech:	The displays are used at many local events including the river cleanup events, Grandparents University, Autumnfest, and others as identified. Brochures, stickers, bookmarks, etc. are distributed at the events.
Timetable:	An MSU-specific watershed display, using the Pollution Isn't Pretty tagline, was developed in 2014 for use at various events.
Responsibility:	MSU-IWR
Evaluation:	Number of events and potential foot traffic, general conversations with the public. Review website traffic after an event to assess change.

Activity:	Update basic educational graphic with tag line and GLRC website
Corr. Topic area(s):	B, C, D, E, F, G, H, I, J, K (all)
Priority:	Medium
Target audience:	Public
Key message:	Pollution awareness using the tagline "Pollution Isn't Pretty"
Delivery Mech:	Various handout materials, billboard and website links
Timetable:	2014-ongoing
Responsibility:	PEP Committee
Evaluation:	Website link traffic. The graphics are displayed on the GLRC and MSU-WATER Website and are included in all education materials.

Activity:	Utilize existing news articles and update them to be more flexible with different media outlets (Twitter, shorter columns, etc.).
Corr. Topic area(s):	B, C, D, E, F, G, H, I, J, K (all)
Priority:	Medium
Target audience:	Public, elected officials

Key message: Articles cover the following topics:

What is a Watershed	Pet Waste
Riparian Areas	Storm v. Sanitary Sewer
Who/What is the GLRC	Car Washing
Onsite Septic Systems	Adopt Your Catch Basin
Fertilizers	Illicit Discharges
Vehicle Maintenance	Wetlands

Delivery Mech: Articles (including a posting timeline) are posted on the GLRC website, community websites and newspapers.
Timetable: Continue to maintain articles on the GLRC website. The articles are also included on the MSU-WATER website at the following URL: http://msu-water.msu.edu/what-is-stormwater/
Responsibility: GLRC Coordinator, PEP Committee and MSU-IWR
Evaluation: Number of articles posted and website statistics.

Activity: MSU Science Festival Participation
Corr. Topic area(s): B, C, D, E, F, G, H, I, J, K (all)
Priority: Medium
Target audience: Elementary students, teachers and parents
Key message: Water resource awareness, pollution prevention, source water protection, water conservation, infiltration, etc.
Delivery Mech: Educational sessions/tours held on the MSU campus
Timetable: Conducted annually
Responsibility: MSU-IWR
Evaluation: Number of participants

Activity: Red Cedar River Cleanup Events
Corr. Topic Area(s): B, C, I
Priority: Medium
Target Audience: Students, visitors, faculty and staff
Key Message: Individual involvement in stewardship has a synergistic effect
Delivery Mech: Faculty will work with the MSU Fisheries and Wildlife Club, Residential Instruction on the Study of the Environment (RISE) and other student organizations as they are identified to host fall and spring cleanup events on the Red Cedar River.
Timetable: Minimum of once each fall semester
Responsibility: Student organizations, Landscape Services, Residential and Hospitality Services, Surplus Store & Recycling Center
Evaluation: Summary of materials collected and number of volunteers

Activity: Website Development
Corr. Topic Area(s): B, C, D, E, F, G, H, I, J, K (all)
Priority: Medium

Target Audience:	Students, faculty, staff, citizens
Key Message:	Watershed management is an important concept; MSU is taking a proactive approach toward it.
Delivery Mech.:	Various campus service units will contribute information regarding their activities that can be included on a project website.
Timetable:	Various stormwater-related materials are provided.
Responsibility:	MSU-IWR
Evaluation:	Website statistics

(B) Inform and educate the public about the connection of the MS4 to area waterbodies and the potential impacts discharges could have on surface waters of the state.

Activity:	Affix curb markers to catch basins
Corr. Topic area:	A, C
Priority:	High
Target Audience:	Students, faculty, staff, visitors
Key message:	Bring awareness to the general public that storm drains flow to waterways of the state, to not dump pollutants into the drains.
Delivery Mech.	Continue the campus curb marker labeling program, and provide ongoing maintenance for catch basin curb markers.
Timetable:	Ongoing
Responsibility:	MSU Environmental Health and Safety (EHS) and IWR
Evaluation:	Curb markers are checked each summer season, with a replacement rate of approximately 20% across the MSU campus.

Activity:	Student Outreach
Corr. topic area:	A,C
Priority:	High
Target audience:	Students (both on- and off- campus)
Key message:	Storm water runoff and how students can play a role in protecting water quality
Delivery Mech.:	Posters or displays in residence halls
Timetable:	Once per permit cycle
Responsibility:	Residential and Hospitality Services, MSU-IWR
Evaluation:	Track estimated numbers of students exposed to the materials

Activity:	GLRC webpage titled “My Watershed”
Corr. Topic area:	A
Priority:	High
Target audience:	Public, elected officials
Key message:	This section of the website promotes watershed health information, describes what citizens can do, how our water is impacted, etc.
Delivery Mech.	GLRC website and social media, community website link to the GLRC webpage
Timetable:	Continuous posting on the website, updated as appropriate.
Responsibility:	GLRC Coordinator

Evaluation:	Website statistics.

Activity:	GLRC quarterly newsletters and annual report
Corr. Topic area(s):	A, C, D, E, F, G, H, I, J, K (all)
Priority:	High
Target audience:	Public, elected officials
Key message:	The newsletters and annual report provide information on specific GLRC activities/events related to the six minimum measures. It also provides information related to relevant partner events and activities. It serves to educate municipal staff, elected officials, and also the public.
Delivery Mech.	GLRC website, social media, and links on the MSU-WATER website.
Timetable:	Ongoing, newsletters are completed quarterly and the annual report is completed after the first of the calendar year.
Responsibility:	GLRC Coordinator and MSU-IWR
Evaluation:	Website statistics

(C) Educate the public on illicit discharges and promote public reporting of illicit discharges and improper disposal of materials into the MS4.

Activity:	Maintain the GLRC website for community-specific pollution reporting phone numbers for illicit discharges.
Corr. Topic area:	N/A
Priority:	High
Target audience:	Public
Key message:	To report illicit discharges (description provided) and illegal dumping
Delivery Mech.	GLRC website and social media, MSU IPF website
Timetable:	Ongoing
Responsibility:	GLRC Coordinator, PEP Committee, MSU IPF
Evaluation:	Website link traffic.

Activity:	Employee Information Dissemination – Written Materials
Corr. Topic Area(s):	A, B, I
Priority:	High
Target Audience:	Campus Community, IPF Staff Members
Key Message:	General watershed and storm water information; How to spot and report illicit discharges
Delivery Mech.:	Articles and videos that discuss stormwater-related issues, including reporting illicit discharges, benefits of low impact design and how the campus is managing stormwater
Timetable:	Each permit cycle
Responsibility:	Campus Sustainability, IPF communications staff and IWR
Evaluation:	Summary of articles/videos produced each permit cycle

Activity:	Employee Information Dissemination – Staff Training
Corr. Topic Area(s):	A, B
Priority:	High

Target Audience:	RHS staff members
Key Message:	General watershed and storm water updates; How to spot and report illicit discharges
Delivery Mech.:	storm water printed materials or training sessions as appropriate
Timetable:	A minimum of three sessions provided over the permit cycle, beginning in 2014
Responsibility:	IPF communications staff, RHS Sustainability and IWR
Evaluation:	Summary of sessions held/articles distributed

(D) Promote preferred cleaning materials and procedures for car, pavement, and power washing.

Activity:	Series of posters and brochures covering: car washing, pet waste, motor oil and fertilizer reduction.
Corr. Topic area(s):	A, B, F, G
Priority:	Medium
Target audience:	Public
Key message:	The posters and brochures describe the impact that bad practices related to car washing, pet waste disposal, motor oil disposal and fertilizer application can have on water quality. They also provide alternatives or best management practices for each of the four topics.
Delivery Mech.	Posters and brochures are available in hard copy for use at various events. They are also posted to the GLRC and MSU-WATER website.
Timetable:	Continuous use at public events (Adopt A River, Quiet Water Symposium, MWEA Watershed Summit), etc., updated as appropriate.
Responsibility:	GLRC Coordinator, PEP Committee and MSU-IWR
Evaluation:	Number of brochures provided throughout the year and website statistics

(E) Inform and educate the public on proper application and disposal of pesticides, herbicides, and fertilizers.

See corresponding topic area G below.

(F) Promote proper disposal practices for grass clippings, leaf litter, and animal wastes that may enter into the MS4.

Activity:	Promote existing materials related to grass clippings and leaf litter.
Corr. Topic area(s):	A, K
Priority:	Medium
Target audience:	Public, small businesses
Key message:	Use best management practices for management of grass clippings and leaf litter.
Delivery Mech.	Website and social media postings, promoted through the GLRC educational display.
Timetable:	Ongoing
Responsibility:	GLRC Coordinator and MSU-WATER website

Evaluation: Number of flyers/brochures handed out and website statistics

(G) Identify and promote the availability, location, and requirements of facilities for collection or disposal of household hazardous waste, travel trailer sanitary wastes, chemicals, yard wastes, and motor vehicle fluids.

Activity:	Promote local Household Hazardous Waste Collection and Recycling Events.
Corr. Topic area(s):	D, E,
Priority:	Medium
Target audience:	Public, small businesses
Key message:	Pollution prevention by using available resources for appropriate disposal of waste.
Delivery Mech.	GLRC website, social media
Timetable:	Continuous, updates as necessary and as events are scheduled.
Responsibility:	GLRC coordinator. MSU Surplus Store and Recycling Center promotes recycling and community reuse days.
Evaluation:	Website statistics

(H) Inform and educate the public on proper septic system care and maintenance, and how to recognize system failure.

Activity:	Promote and post local Point of Sale/Time of Sale septic/well inspection ordinances in Eaton and Ingham Counties. Also partner with local 319 groups addressing existing *E.coli* TMDL, post materials developed, explore educational opportunities, etc.
Corr. Topic area(s):	A
Priority:	Low
Target audience:	Public
Key message:	Maintain your septic system; it could be contaminating local water bodies through storm water runoff.
Delivery Mech.:	GLRC website, social media
Timetable:	Continuous
Responsibility:	GLRC coordinator
Evaluation:	Website statistics

(I) Educate the public on, and promote the benefits of, green infrastructure and Low Impact Development.

Activity:	Promote Low Impact Development (LID) brochure, update as appropriate.
Corr. topic area:	A
Priority:	High
Target audience:	Public, elected officials, small businesses
Key message:	Promote the use of LID and green infrastructure (GI) as a tool for reducing polluted runoff from development sites. The brochure explains what LID and GI are and provides examples and resources (links).

Delivery Mech.	GLRC website, social media, use with MSU educational display
Timetable:	Ongoing
Responsibility:	GLRC Coordinator and MSU-IWR
Evaluation:	Number of brochures handed out and website traffic linked.

Activity:	LID Signage
Corr. topic area:	A
Priority:	High
Target audience:	Students, faculty, staff and visitors to campus
Key message:	Signs promote the benefits of GI
Delivery Mech.:	Signs are posted at various LID practices on campus and linked to information on the MSU-WATER website: http://msu-water.msu.edu/stormwater-walking-tour/
Timetable:	Ongoing
Responsibility:	IPF, Surplus Store and Recycling, MSU-IWR
Evaluation:	Track inquires generated by the signs through the Storm Water Committee

(J) Promote methods for managing riparian lands to protect water quality.

Activity:	Riparian buffer brochure developed**,** other resources posted to the GLRC website
Corr. topic area:	A
Priority:	Medium
Target audience:	Riparian landowners
Key message:	The brochure provides general information about native riparian buffers and why they are important for water quality and habitat.
Delivery Mech.:	GLRC website, social media, use with educational display, MSU-WATER website
Timetable:	Ongoing
Responsibility:	GLRC Coordinator and MSU-IWR
Evaluation:	Number of brochures provided at events, website statistics

Activity:	Grow Zone Signage
Corr. topic area:	A
Priority:	Medium
Target audience:	Students, faculty, staff and visitors to campus
Key message:	Signs emphasize importance of buffers for protecting waterways
Delivery Mech.:	Signs are posted along the campus stretch of the river corridor
Timetable:	Ongoing
Responsibility:	Landscape Services
Evaluation:	Track inquires generated by the signs through the Storm Water Committee

(K) Identify and educate commercial, industrial, and institutional entities likely to contribute pollutants to storm water runoff.

Activity:	Explore opportunities to connect with local business regarding pollution prevention through storm water runoff. This may include business publications, presentation to associations and focus groups.
Corr. topic area(s):	A
Priority:	Medium
Target audience:	Businesses, industries, institutions
Key message:	Improve storm water management to reduce pollution.
Delivery Mech.:	Visits or phone calls, 2018-2023
Timetable:	GLRC Coordinator will outreach to local businesses twice per permit cycle.
Responsibility:	PEP Committee
Evaluation:	Number of connections made with local businesses

Activity:	Proper Waste Disposal Information Dissemination
Corr. Topic Area:	N/A
Target Audience:	Faculty, Staff and Students
Key Message:	Proper waste disposal
Delivery Mech:	The Office of Environmental Health and Safety at MSU is an independently-reporting administrative support unit created to provide educational and consultative programs and services to the faculty, staff and students of Michigan State University. Through onsite visits and training programs, EHS personnel address proper handling, transportation and disposal of generated hazardous waste; various Chemical, Radiation, Environmental and Biological support training; Laboratory Safety and Inspections; State and Federal regulation compliance requirements
Timetable:	Ongoing
Responsibility:	EHS
Evaluation:	Summary listing of EHS training and educational programs per permit cycle

Chapter 3 - Illicit Discharge Elimination Program

The Illicit Discharge Elimination Program (IDEP) describes current and proposed Best Management Practices (BMPs) to meet the minimum control measure requirements to the Maximum Extent Practicable. The following definitions apply to the IDEP:

- Illicit Discharge: Any discharge to, or seepage into, an MS4 that is not composed entirely of storm water or uncontaminated groundwater except discharges pursuant to an NPDES permit.

- Illicit Connection: A physical connection to an MS4 that primarily conveys non-storm water discharges other than uncontaminated groundwater into the MS4; or a physical connection not authorized or permitted by the local authority, where a local authority requires authorization or a permit for physical connections.

In addition to prohibiting illicit connections as part of the Plumbing Code in the University's Construction Standards, Standard Operating Procedures that prohibit illicit discharges into the University's storm sewer system are in place, and are under the purview of MSU's Office of Environmental Health and Safety (EHS). Those Operating Procedures are included in Appendix 5.

Storm Sewer System Map

A current version of MSU's storm sewer system map is located at the MSU IPF – Planning, Design and Construction (PDC).

Finding and Eliminating Illicit Discharges: Field Identification and Review

As part of the first storm water permit cycle, the University identified and mapped its outfall locations along the Red Cedar River. The initial discharges to the Waters of the State were identified using existing records. The river corridor was then walked and the listing of discharges was revised to reflect the actual conditions in the field. Details on each discharge point were gathered during the original field investigations, including the size and location of the discharge pipe and other pertinent information. This discharge data is reviewed and updated during reinspections every five years.

As previously noted, a listing of the known MS4 discharges and maps are included in Appendix 4. The maps and specific data on individual discharges will be updated as needed to account for new discharge points as they are constructed or newly identified discharges discovered during the reinspections every five years.

Procedure for Performing Field Observations: Discharge Sampling and Analysis

In addition to periodic site-specific investigations conducted by EHS staff members, reinspections of all MS4 discharge points will be completed once per permit cycle. The inspections are performed under dry weather conditions. Dry weather flow is defined as flow which occurs a minimum of 48 hours after any precipitation. The inspection program will include the following:

- At a minimum, the dry weather field inspection includes observing each MS4 discharge point for flow and its receiving water's characteristics. The inspection includes water clarity, color and odor; the presence of suds, oil sheens, sewage, floatable materials, bacterial sheens, algae, and slimes; staining of banks and unusual vegetative growth. MS4 discharge structures are also observed for unusual vegetative growth, staining, undocumented connections, and integrity of the structure.
- Preparing a list of any needed maintenance items on the discharge pipe, structure, or receiving water which need to be addressed by the maintenance crews.
- Updating all existing file data to reflect any structural repairs or maintenance performed on the discharge.
- Noting any new discharge points not previously identified. If a new discharge is identified, the source of the discharge will be investigated to ensure that it is a legally permitted discharge. The existing records will then be updated as appropriate and the data on the new discharge (including GPS coordinates) will be submitted to Michigan Department of Environmental Quality (MDEQ).

If flow is observed from any MS4 discharge points, the inspection crew will proceed as follows:

1. If the discharge can be identified as a legal discharge from an obvious source, the discharge will be noted and no further action taken.
2. Where an illicit discharge and its source are obvious, the University will correct it.
3. If the nature or source of a dry weather discharge cannot be readily identified, a sample will be collected and an analysis of the flow shall be conducted to determine if the discharge is illicit. At a minimum, the analysis will include pH, ammonia, surfactants, and *E. coli*.
4. If an illicit discharge is detected and verified through testing and analysis, but the source has not been readily identified, the University will need to identify the source of the illicit discharge. The University will utilize one or more of the following methods to identify the source of the illicit discharge:

- Indicator parameter sampling
- Dye testing
- Video testing
- Smoke testing
- Documented visual observations or physical indicators
- Drainage area investigations

MSU continues to collaborate with the Ingham County Health Department and other jurisdictions within the county on the Ingham County Surface Water Roundtable, which conducts weekly *E. coli* sampling throughout the Red Cedar River Watershed April-October. That data is available as a link from the MSU-WATER website (http://msu-water.msu.edu/surface-water-monitoring-on-the-red-cedar-river/).

Responding to Illicit Discharges and Spills

Spill response procedures require prompt and decisive action and well-trained staff. MSU is committed to providing the required level of manpower, equipment, and materials to ensure timely and effective action to minimize impacts to the environment as a result of a spill or illicit discharge. EHS staff shall work with the IPF staff to determine the source of any known or reported illicit discharge. IPF departments involved include; Plumbing, Roofing, Metal Services and PDC. The objective is to minimize impacts to the Red Cedar River. When MSU becomes aware of an illicit discharge, EHS will dispatch a staff person to address the situation immediately (within the hour). If warranted, sampling will be conducted at that time, with necessary follow-up actions initiated.

Upon discovery of a spill or illicit discharge, trained facility personnel will initiate the following actions:

1. Identify exact source and extent of the released materials with field observation and follow-up source investigation conducted as appropriate.
2. Deploy booms or pads as needed.
3. Notify IPF and MSU Police, as needed.
4. Evacuate all non-essential personnel from the immediate area, if required.
5. Stop processes and operations that may be causing release.
6. Take all steps necessary to minimize and mitigate the spill and contact outside emergency contractor, if necessary.
7. Use booms or dikes around drains.
8. Use inert absorbent materials to clean up the spill. Place booms around outfalls with illicit discharge.
9. Collected spilled material and all cleanup materials will be placed into drums, which are in good condition and properly labeled for proper storage and disposal.

Depending on the type of material spilled, proper protective equipment shall be worn prior to response activities. All spill cleanup debris will be disposed of according to local, state, and federal regulations.

Source investigations will be completed promptly, although the timeline will depend on the complexity of the system. In most situations, response will be completed within seven days. More complicated investigations may require a longer period.

Reporting Any Releases of Polluting Materials

All response agencies required to respond to the spill event will be notified as necessary by EHS staff personnel, including state and federal authorities.

Emergency Contact List

Michigan Department of Environmental Quality, PEAS:	**800-292-4706**
National Response Center:	**800-424-8802**
East Lansing Fire Department:	**911**
MSU Police Department:	**911**
Ingham County Environmental Health Department:	**517-887-4312**
Young's Environmental Services	**800-496-8647**

Authority to Inspect, Investigate, and Monitor

EHS and the IPF are authorized by both the Office of the Vice President for Research and Graduate Studies and the Office of the Vice President for Strategic Infrastructure Planning and Facilities to investigate any illicit discharges and to take appropriate measures to stop and eliminate the illicit discharge. Where an illicit discharge is found, the University will document the steps taken to eliminate the discharge and to assure that the discharge is in fact removed permanently. Where the discharge is due to improper housekeeping practices rather than due to a structural connection periodic inspections of the facility will be performed by EHS.

Documentation of Illicit Discharges

Illicit Spills that occur on University property will be documented with the following information:

1. Date, time, and duration of the release
2. Type of Incident
3. Materials involved
4. Storm drains and outfalls impacted
5. Recovered material;
6. Corrective action taken
7. Prevention measures

In addition, implementation of the IDEP program will be reviewed annually by the MSU Storm Water Committee to discuss effectiveness of existing procedures and make changes as necessary.

IDEP Implementation Responsibility and Training

Staff members from the MSU IPF Division, EHS and Institute of Water Research will be responsible for overseeing the IDEP program, performing the IDEP inspections, and preparing the annual IDEP report. One of these staff members is an active member of the GLRC.

IDEP training will be conducted both internally for MSU staff members and in cooperation with the Greater Lansing Regional Committee (GLRC) for Storm water Management. The GLRC IDEP Committee has included training for the IDEP inspectors and people associated with the IDEP program. MSU has participated in those training sessions. Staff members involved with the IDEP inspection process who have not yet been trained will be trained on IDEP protocol once prior to the expiration of the current permit cycle.

In addition, Landscape Services staff members and construction inspection representatives in the MSU IPF will receive training on identifying and reporting illicit discharges. This training has been developed and incorporated as part of the existing online storm water training program and is tracked through the EHS training database. All staff members who will be performing illicit discharge investigations will be trained once during the permit cycle, with new hires trained within their first year of employment.

IDEP Evaluation

The effectiveness of the IDEP program can be measured by summarizing compliance with the prohibition of illicit discharges into Waters of the State. This will be measured by the number of suspected illicit discharges that are actually confirmed and then removed.

MSU will maintain records of its IDEP screening program and any illicit discharges that are identified. The records will include details of the methods used to eliminate the discharge, and follow up investigations to assure that the discharge has been permanently removed. Summary information regarding each outfall will also be collected as part of the evaluation activities, as shown in the Action Plan Table that follows.

MSU will also track calls from staff members and the public regarding illicit discharges. Currently students, faculty/staff and visitors are advised to call the Office of Environmental Health and Safety (EHS) at (517) 355-0153 with any observed environmental concerns regarding the Red Cedar River. EHS will then investigate the incident. As part of its investigation procedures, EHS maintains contact with IPF at (517) 353-1760, where operators identify appropriate IPF staff members who can help with IDEP follow-up investigations. EHS is then responsible for reporting incidents to the MDEQ as necessary and tracking information regarding the incident.

Calls from the public and the campus community are routed from either the MSU Police or the IPF to the Environmental Compliance Office of EHS. The Environmental Compliance Office then makes a record with the time/date of the call and the nature of the concern. As soon as practicable, a staff member physically verifies any issues. If any discharges are noted, a sample is taken and analyzed, and further investigation is undertaken to determine the source of the discharge. If no issues are verified by the MSU staff, a note will be made on the record, and the approximate location will be watched in the future to see if the issue arises again. Records of these calls and responses are maintained by EHS.

A Red Cedar River Contingency Plan is also in place that would be followed in the event of a release that triggers requirements under the Clean Water Act. Copies of the plan are maintained at

EHS, MSU Police and the East Lansing Fire Department with a summary of any corrective measures, if required.

The MSU Storm Water Committee will review the implementation of the IDEP program annually, including a review of training records and response to complaints.

Illicit Discharge Regulatory Mechanism

Standard Operating Procedures that address illicit discharges are in place and enforced by EHS. These are included as Appendix 5. In addition, MSU's Pollution Prevention Incident Plan (PIPP) and its Spill Prevention, Control, and Countermeasure (SPCC) plan are designed to meet the requirements under R323.2190, Part 31 to prevent the release of chemicals, petroleum products or waste products into the waters of the State of Michigan. Good housekeeping, inspections, training and rapid response are measures used to minimize impacts to local waterways.

The IDEP Action Plan, Timeline and Evaluation Methods are included in the table below:

Minimum Measure	BMPs	Begin By	Complete By	Evaluation Methods	Comments
IDEP	Identify illicit discharges and take corrective actions		Long Term	No. of illicit discharges identified and database of corrective actions taken.	
IDEP	Update map and listing of all MS4 annually to DEQ if new discharges are added.		Ongoing	No. of new discharges added, mapped & provided to DEQ	
IDEP	GPS all MS4 outlets to Waters of the State and provide latitude and longitude to DEQ for their use.		Completed	No. of outlets tracked through GPS	
IDEP	Inspect all on-campus discharge points	2018	2023	Summary of each discharge point, including photographs	
IDEP	Staff Training on IDEP inspection procedures	Continued from first permit cycle	Ongoing	List of staff trained on IDEP protocol	
IDEP	Staff Training on identifying and reporting illicit discharges		Ongoing	List of staff trained	

Chapter 4 - Post Construction Storm Water Runoff

Post-construction storm water runoff controls are necessary to maintain or restore stable hydrology in receiving waters by limiting surface runoff rates and volumes and reducing pollutant loadings from sites that undergo development or significant redevelopment. Under Michigan's MS4 storm water permit, post-construction storm water runoff from all new and redevelopment projects that disturb one acre or more, must meet the following storm water discharge criteria:

- Treatment methods shall be designed on a site-specific basis to achieve discharge concentrations of total suspended solids (TSS) not to exceed 80 milligrams per liter (mg/l) resulting from up to one inch of rainfall.

- The channel protection criteria shall maintain post-development site runoff volume and peak flow rate at or below existing levels for all storms up to the 2-year, 24-hour event (2.42 inches).

Much of the campus has been developed or urbanized, and soils generally have limited infiltration and percolation capacity. Meeting these storm water requirements on an individual project basis in the developed part of campus is very difficult since there is inadequate land area to create Low Impact Design (LID) techniques for volume control or to store storm water for rate control. The MSU Storm Water Committee met with representatives from the Michigan Department of Environmental Quality (MDEQ) throughout the second MS4 permit cycle to pursue an alternative approach to meeting the storm water requirements. In 2010, the MDEQ approved the University's alternative approach to meeting post-construction storm water controls. The approval letter is included as Appendix 6.

Storm Water Design Standards and Off- Site Mitigation

The approach for MSU views the campus as one parcel with the Red Cedar River as its outlet. Each individual development or redevelopment project is required to evaluate a method of complying with the storm water requirements at the site and prepare a cost estimate for construction, following the procedures in the MSU Storm Water Design Standards, which will then be submitted to the campus Storm Water Committee. The methodology used in the development for the design standards was vetted through DEQ staff in a series of meetings. A copy of the MSU Storm Water Design Standards is included in Appendix 7.

Under the alternative approach, projects that may alter the storm water volume or peak-rate characteristics will be tracked on a campus-wide basis and tabulated in a credit system or bank. Projects contributing to the bank will include demolition projects (e.g., buildings, parking lots, roadways) and storm water improvement projects (e.g., porous pavement parking lots, bio-retention areas, etc.).

Recognizing that new projects located in highly developed zones of campus will have difficulty

meeting the storm water permit standards without incurring excessive costs or without resorting to impractical solutions such as storm water pumping, the Storm Water Committee may recommend that a project use credits from the campus bank to meet its storm water requirements under the new general permit. This decision will be made on a project-by-project basis after a site-specific evaluation and cost estimate has been completed. If a project applies for bank credits, the project may be charged a proportionate cost to help pay the capital costs associated with a larger, regional project that would be implemented to maintain the storm water bank. Under the alternative approach, regional projects would have to demonstrate effectiveness of a 1.2 multiplier for all permit parameters over a site specific solution. Larger development projects that have enough land area available for LID techniques that exceed their storm water requirements may also contribute to the campus bank. If the offset bank has been expended and an offsite project is deemed necessary, the regional storm water control project must be completed concurrently with the development or within one calendar year of substantial completion of the project.

The University is well suited to taking an alternative approach to meeting the permit requirements for several reasons. As a large, single landowner within the Red Cedar River Watershed, MSU has a strong and centralized ability to manage all development projects occurring on its property. A robust Campus Master Plan is in place that emphasizes planning principles that encompass environmental protection. The University is committed to linking central storm water management planning and modeling to its long-range capital improvement and construction planning process, as well as coordinating storm water management with its existing plans to enhance campus green space. In addition, as a Land Grant institution, MSU is committed to demonstrating new techniques for managing storm water and involving faculty members and students in researching the effectiveness of cutting-edge approaches to dealing with storm water management alternatives.

Documentation of Existing System

The MSU IPF Division is responsible for maintaining the storm sewer maps and infrastructure records for the campus. All storm sewer pipes and structures have been mapped and documented in a Geographic Information System (GIS) database. The campus storm sewer pipes range in size from 12 inches to 84 inches and provide storm water conveyance for approximately 2,200 acres of north campus. All storm sewer revisions completed on construction projects are recorded as the projects are completed so the GIS system stays current.

Of the 2,200 acres on the urbanized portion of campus, approximately 1,302 acres are located within four large sub-districts (33, 37, 42 and 53). These areas comprise the south central academic core area and include the most likely locations for future campus development projects. A Storm Water Management Model (SWMM) detailing the hydraulic characteristics of these primary sub-districts was completed to provide an accurate planning tool for future projects considered in these districts. Storm water improvement scenarios can be quickly evaluated for these districts, allowing MSU to accurately depict conditions and proposed water quality improvements and volume control parameters on a subwatershed basis.

A number of LID techniques have been implemented across the campus over the first two storm water permit cycles, including bioretention areas, green roofs and porous pavement. Proprietary

treatment systems have been installed as well, including numerous storm water separators located throughout campus and a nutrient-separating baffle box that was installed at Birch and Wilson Roads.

As of July 1, 2010, any development project greater than one acre in size that has not yet completed the Schematic Design phase of the planning process is required to meet the MSU Storm water Design Standards and submit plans for storm water controls to the MSU Storm water Committee. All projects that have had impervious changes will be documented in a yearly change log and monitored as part of the permit compliance activities. A runoff coefficient will be used to estimate runoff values for different land uses. When projects that reduce impervious surfaces (such as the demolition of buildings or road and sidewalk removals) are completed, a "credit" is calculated. Table 9 in the Storm water Design Standards is used as a guideline in determining the weighted runoff value for the proposed condition, which is then compared to the current site condition to establish a credit. For example, when a parking lot area with a c value of 0.90 is changed to a grassy site with a c value of 0.15, the resulting credit would be based on the acreage times the c value reduction – in this case 0.90-0.15 or a .75 reduction. Calculations for the proposed and existing site conditions are reviewed by the Storm water Committee and tabulated annually in the impervious change summary table. The IPF Division is responsible for maintaining the log and ensuring accurate record keeping regarding the post construction controls for each development project.

The 2017 Storm Water BMPs Impervious Surface Summary is included as Appendix 8.

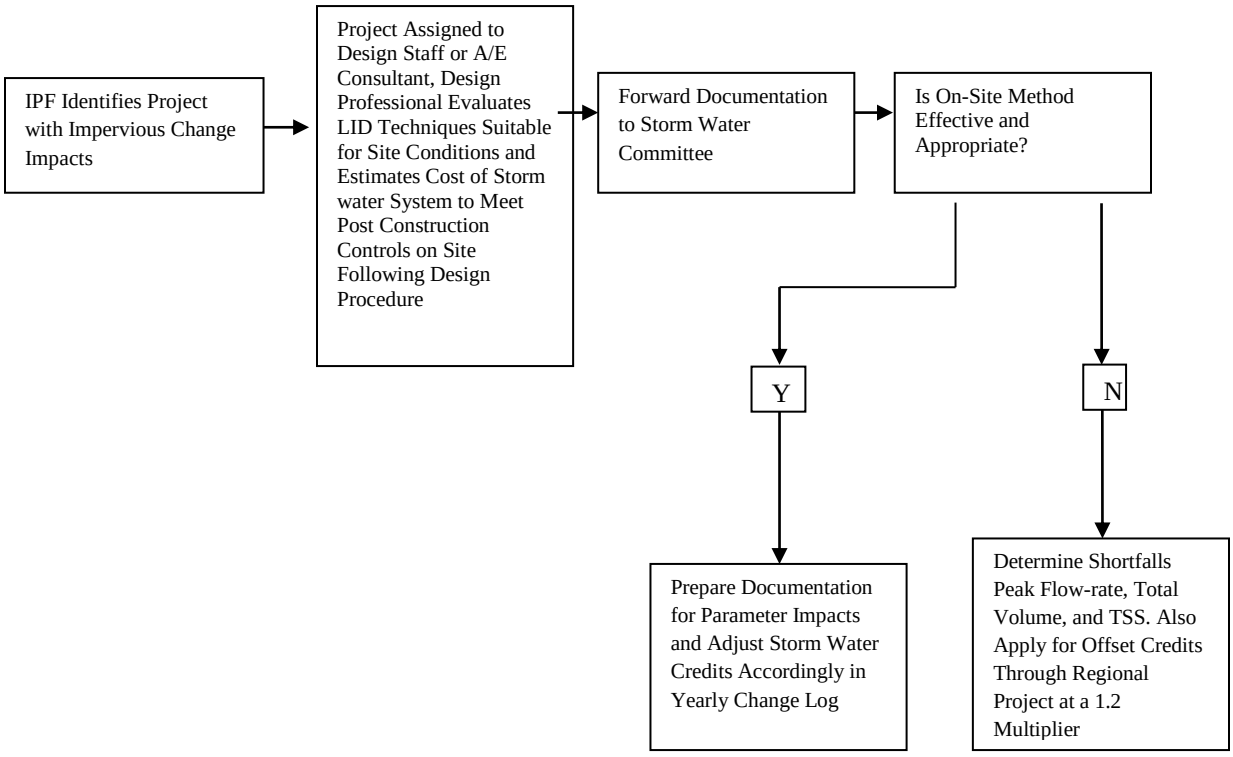
Site Specific Requirements

The Storm Water Committee will be responsible for reviewing the use of infiltration BMPs to meet the water quality treatment and channel protection standards for new development or redevelopment projects in areas of soil or groundwater contamination in a manner that does not exacerbate existing conditions. The committee meets monthly to discuss upcoming development projects, including proposed storm water treatments options. Design review methodology discourages infiltration BMPs in areas of known soil or groundwater contamination. In these areas, alternative BMP designs are discussed and proposed. The committee will annually review and assess the effectiveness of this procedure. A regional approach for storm water infiltration may be required in instances where groundwater contamination exists. The committee is also charged with reviewing the appropriateness of infiltration techniques for land uses with high potential for contamination.

The MSU Storm Water Committee will assess each project on a site by site basis when determining potential locations for offsite storm water controls. The committee serves as an unbiased entity that seeks to balance storm water compliance, the campus master plan, aesthetics and costs for all new development projects. The committee first reviews the project for appropriateness of using onsite storm water controls. If the cost for managing storm water onsite approaches double that of a typical treatment system, the committee will consider a regional project in the same subwatershed district. If, due to considerations such as available land area, aesthetics or excessive cost, this alternative is deemed inappropriate, the committee will then look at subwatershed districts in the next upstream district(s) for a regional project location.

Site Plan Review

The flow chart below depicts the process that will be used for reviewing and implementing Post Construction Runoff Controls:



All projects that may affect impervious changes to the MSU campus are administered through the MSU IPF Division. For larger projects, the IPF contracts with an Architectural/Engineering (A/E) firm to develop the design and construction documents. All A/E firms must follow the MSU Construction Standards. These standards have been written to require sustainable design and LID techniques and outline the storm water parameters all new construction projects must meet.

As a project design evolves, the A/E consultant is required to complete a preliminary design review and propose a methodology for dealing with storm water management for the specific site in accordance with the MSU Storm Water Design Standards. Depending on the location of the project and the density of development for the existing site, there will be a limit to the amount of LID techniques that can be practically implemented. Some sites will be able to meet the post construction control requirements on their own; others may require the alternative approach to compensate for the shortfall. The storm water control methodology and cost estimate for the project to meet the permit requirements must be submitted for review.

A formal Storm Water Committee oversees compliance with post construction runoff controls. Chaired by the University Engineer and comprised of staff members representing Planning, Design and Construction, Landscape Services, the Land Management Office, Environmental

Health and Safety and the Institute of Water Research, the committee will view the development plan and determine if the project is best suited to meeting storm water permit requirements onsite, or if a regional project may be used to meet the permit requirements on a partial or entire basis. If a regional project is determined by the committee to be a necessary option, then a capital cost may be assigned to the project for the parameter shortfalls.

When the final decision is made, each element of the storm water standards will be documented, and the yearly change log will be updated. This yearly log maintenance is an integral part of the alternative approach and is subject to periodic audit by the MDEQ.

Long-Term Operation and Maintenance of Best Management Practices (BMPs) and Record Keeping

Ongoing operation and maintenance of the storm water BMPs is a critical component of the Storm water Management Plan. To ensure timely inspection and maintenance of the BMPs, MSU's Storm water Management Interactive Map and mobile application have been developed and utilized. This is a web-based map of the campus that is integrated with the campus GIS system (MUNSYS), and the preventive maintenance system (FAMIS). When a BMP is added to the system, the attributes are added to the campus GIS system and the BMP is categorized and given an equipment number. A maintenance and inspection checklist is then included in the database along with a required schedule for periodic inspections. IPF Landscape Services is responsible for ongoing inspection and maintenance of storm water controls. When the inspection and maintenance activities are completed on the mobile application the webpage dashboard is updated simultaneously.

The IPF Capital Project Procedures requires the lead designer for IPF PDC to complete a FAMIS budget sheet as the project goes to the construction phase. If a capital project has a storm water BMP of any kind, the task code (435) is completed to establish the 20-year O&M fee. This is the trigger for the Landscape Services task to enter the BMP in to the MUNSYS data base. Landscape Services working with PDC then sets up an equipment number and determines the appropriate inspection protocol based on the type of BMP that is being installed. This is done as the project is approved for construction. In most cases the equipment number and the associated graphical updates for the device including the tributary area served are placed in MUNSYS prior to the device being constructed. The survey crew then documents the as-built condition and updates MUNSYS as necessary when the device is placed in the field. The basis of design, construction drawings and design review are filed with the project using the *Meridian* file manager. A map of campus storm water BMPs is maintained at IPF PDC.

Chapter 5 - Construction Storm Water Runoff

Storm water permit requirements specifically reference discharges from construction activities where the pollutants enter the MS4 owned or operated by the permittee and when the pollutants are in violation of any of the following:

- Section 9116 of Part 91 of the Michigan Act- *Sec.9116. A person who owns land on which an earth change has been made that may result in or contribute to soil erosion or sedimentation of the waters of the state shall implement and maintain soil erosion and sedimentation control measures that will effectively reduce soil erosion or sedimentation from the land on which the earth change has been made.*
- Michigan's Permit-by-Rule at R 323.2190(2)(a)- *Not directly or indirectly discharge wastes such as discarded building materials, concrete truck washout, chemicals, lubricants, fuels, liter, sanitary waste, or any other substance at the construction site into the waters of the state in violation of Part 31 of the Act or rules promulgated there under.*

Procedure to Ensure that Construction Activity One Acre or Greater in Total Earth Disturbance with the Potential to Discharge is Conducted by an Approved Authorized Public Agency

The University works with the City of East Lansing, Ingham County and Meridian Township, which are designated by DEQ as Authorized Public Agencies and Municipal Enforcing Agencies pursuant to Part 91. As such, campus development projects must obtain a Grading/Soil Erosion and Sedimentation Control permit from the City, County or Township. A number of staff members from the MSU IPF Division and Land Management Office (LMO) have successfully completed the Certified Storm water Operator (CSWO) training and passed the CWSO/SESC Inspector exam. These individuals serve as the campus project representatives to ensure that all SESC requirements are met for new development projects.

Procedures to Ensure Adequate Allowance for Soil Erosion and Sedimentation Controls on Preliminary Site Plans, as Applicable:

As part of standard design and construction procedures on campus, staff members from IPF Planning, Design and Construction (PDC) or the LMO review or prepare all Soil Erosion and Sedimentation Control Plan drawings and specifications. These documents are produced by a consultant or internally. PDC or LMO staff members begin site analysis in the Schematic Design stage or earlier. If the SESC document is being produced by a consultant, they are provided with the SESC/Storm Water Discharge checklist and other information as appropriate.

The acreage of the project and proximity to surface waters determines whether the proposed construction will require a permit. If a permit is required, the site location determines the appropriate governing agency; City, County or Township. The SESC documents are reviewed by PDC or LMO staff, in cooperation with the appropriate governing agency, multiple times throughout the design process to ensure that the appropriate controls will be in place according to

the specific site. Documents are put out for bid PDC or LMO staff confirm that all necessary SESC devices and techniques are all clearly located and quantifiable.

Throughout the construction process, regular site visits are performed by PDC or LMO staff members, who are Certified Storm Operators. MSU staff will go onsite either weekly or after a rain or snow melt event. If SESC deficiencies are found, the contractor is notified of changes that need to be made, and the site is re-inspected within 24 hours to ensure that corrective actions have been completed. If not, depending on the severity of the violation, the contractor is issued a 24-hour notice. If the problem has not been addressed within 24 hours, a separate contractor is then employed to fix the issue. MSU staff members and the City of East Lansing SESC staff members periodically exchange phone calls and/or emails to provide status updates on active sites. MSU staff call East Lansing SESC staff for direction and guidance regarding problem sites.

If the University suspects that the discharge may endanger public health or the environment, the violation will be reported within 24 hours of becoming aware of the discharge. The CSWO assigned to that project location will work with the MSU Office of Environmental Health and Safety (EHS), which will ultimately report the discharge to MDEQ.

Procedures for the Receipt and Consideration of Complaints or Other Information Submitted by the Public Regarding Construction Activities Discharging Wastes to the MS4:

The University's CSWOs from the IPF and LMO inspect all permitted construction sites on a regular basis. As part of the Public Education Plan activities, individuals will be instructed to contact IPF at 517-353-1760 with concerns about construction activity discharges. If a complaint is received dispatch operators will then notify the CWSO assigned to that location for immediate review. All complaints will be reviewed by no later than the next business day after receipt. Any action required by the contractor will be processed immediately.

Chapter 6 - Pollution Prevention and Good Housekeeping Program

The NPDES storm water requirements stress the importance of developing proper pollution prevention procedures and maintaining good housekeeping practices on municipal property.

Municipal operations cover a wide variety of activities and land uses that are potential sources of storm water pollutants. These include, but are not limited to roadways; parking lots; transportation and equipment garages; fueling areas; warehouses; stockpiles of salt and other raw materials; open ditches and storm sewers; turf and landscaping for all municipal properties, including parks; and waste handling and disposal areas.

A document entitled MSU Standard Operating Procedures: Good Housekeeping and Pollution Prevention Activities: Infrastructure Planning and Facilities - Landscape Services is on file at IPF Landscape Services. In addition, operating procedures pertaining to specific requirements in the storm water permit are included below.

Municipal Facility and Structural Storm water Control Inventory

MSU's separate storm water drainage system consists primarily of separate storm sewer pipes, manholes, inlets, catch basins and bioretention areas, as well as oil-water separators and proprietary devices for treating storm water runoff. Web-based University utility maps and/or mobile applications are available, which identify catch basins and storm drains as well as help inspection and maintenance staff locate and document work tasks. These are maintained by the MSU IPF Division, and serviced by Landscape Services. A listing of storm water controls is maintained by MSU IPF.

Updating and Revising the Inventory

The University's Capital Project Procedures requires the lead designer for IPF Planning Design and Construction (PDC) to complete a budget sheet as the project moves to its construction phase. If a capital project has a storm water best management practice of any kind, the task code (435) is completed to establish the 20-year operation and maintenance fee. This is the trigger for the Landscape Services staff to enter the BMP into a database. Landscape Services, working with PDC, then sets up an equipment number and determines the appropriate inspection protocol based on the type of BMP that is being installed. This is done as the project is approved for construction. In most cases the equipment number and the associated graphical updates for the device including the tributary area served are placed in the database prior to the device being constructed. The survey crew then documents the as-built condition and updates the database as necessary when the device is placed in the field. The basis of design, construction drawings and design review are filed with the project using the *Meridian* file manager.

Facility-Specific Storm Water Management

MSU's Storm Water Committee has reviewed the facilities with the potential to discharge pollutants to surface waters of the state. The committee meets monthly to review campus-wide

storm water issues. When assessing the pollution potential of a facility, the committee takes into account the following factors:

- Amount of urban pollutants stored at the site (e.g., sediment, nutrients, metals, hydrocarbons, pesticides, fertilizers, herbicides, chlorides, trash, bacteria, or other site-specific pollutants)
- Identification of improperly stored materials
- The potential for polluting activities to be conducted outside (e.g., vehicle washing)
- Proximity to waterbodies
- Housekeeping practices
- Discharge of pollutants of concern to impaired waters

High-Priority Sites

The committee identified the following facilities as high-priority:

1) MSU Transportation Services
2) MSU Surplus Store & Recycling Center
3) Forest Akers Golf Course Maintenance Facility.

A Storm Water Pollution Prevention Plan (SWPPP) has been developed for each of these facilities, and are included as Appendices 11, 12 and 13, respectively.

The goals of those plans include:

1) Maximize control of significant polluting materials
2) Reduce the potential levels of these materials that could enter storm water
3) Ensure that storm water discharges from the site will not cause a violation of Michigan's water quality standards.

A copy of each SWPPP is located at the respective facilities. An Industrial Storm Water Operator in the Office of Environmental Health and Safety (EHS) is responsible for monitoring the implementation of the plans.

Procedures for spill prevention and control are documented in the University's Spill Prevention, Control and Countermeasure (SPCC) plans for campus, which are designed to meet federal requirements under 40CFR Part 112 dealing with aboveground oil storage facilities. MSU's Pollution Prevention Incident Plan (PIPP) exists to meet the requirements of Part 5 Rules of the State of Michigan dealing with chemical and petroleum storage.

The Landscape Services facility and the T. B. Simon Power Plant are both piped to the sanitary sewer system and are thus not considered high priority sites for this SWMP.

Medium-and Low-Priority Sites

MSU's parking lots and parking ramps have been identified by the Storm Water Committee as medium-priority facilities. For these and the remaining facilities identified as lower-priority sites,

standard operating procedures as included in the GLRC "Good Housekeeping and Pollution Prevention for Municipal Activities" guide as well as procedures documented in this chapter of the Storm water Management Program are followed.

Parking lots are swept on a regular basis following the street sweeping rotating schedule. All University-owned vehicles are required to undergo annual inspections to ensure that they are in proper working condition and not leaking potential pollutants. No long-term storage of student vehicles is allowed in University parking lots (lots are regularly monitored by MSU Police for inactive vehicles and vehicles are towed if necessary).

University-owned rolloff bins are visually inspected by MSU Surplus and Recycling staff throughout the construction season. In addition, roll-offs are inspected when they are returned to the Recycling Center, and staff members communicate directly with departments to address any issues with disposal of materials that may pose a risk to water resources.

In addition, MSU's Construction Standards contain provisions for addressing construction debris control. An excerpt follows:

CONSTRUCTION DEBRIS CONTROL

A. The Contractor shall provide and administer a system for disposal of construction debris, and shall be responsible for seeing that the site and the new building are at all times free of accumulated debris caused by the construction. For purposes of this paragraph, debris shall include ALL materials used in construction including construction roads and pads. Special attention should be given to materials that could leach into the ground, including but not limited to lime based materials, all chemicals, and any liquids except clean water.

B. The Contractor shall comply with LEED Materials & Resources Credit 2, including documentation of the Construction Waste materials recycled, reused and sent to the landfill, using the Construction Waste Management form and process provided by the Owner in Unifier. This form shall be submitted monthly, and will be generated from completed payment applications. Negative reports are required.

C. This shall include, but not be limited to, rubbish containers conveniently located throughout the site for the daily disposal of debris directly into them from each work location. Debris shall not be allowed to accumulate on the ground through-out the site overnight.

D. All combustible debris shall be removed to a solid waste disposal site properly licensed under Act 87 of the Public Acts of 1965 of the State of Michigan.

E. No burning of debris will be permitted on the Project site or elsewhere on the Owner's property.

F. Should the Contractor not execute the work required in this section, the Owner reserves the right to perform the work by other forces and deduct the cost from the contract price.

Pesticides are applied only by certified applicators, and pesticide/fertilizer applications are documented by IPF Landscape Services.

Each Spring and Fall, EHS completes a campus-wide windshield inspection to check parking lots and other areas that may potentially be contributing pollutants to the Red Cedar River. Items of concern are addressed immediately. Those inspections are documented by EHS.

Structural Storm water Control Operation and Maintenance Activities

The University's inventory of storm water structural controls includes:

- Catch basins – 2430
- Detention basins – 14 (3.28 acres)
- Oil/water separators – 22
- Pump Stations – 4
- Secondary Containment – Aboveground Storage Tanks:
  - Landscape Services – 3 – double-walled, inside concrete secondary containment
  - Golf Course – 2 – concrete secondary containment
  - MSU Power Plant – 2 - inside concrete secondary containment
- Secondary Containment – Underground Storage Tanks:
  - MSU Fueling station – 3 – double walled with interstitial monitoring

Vegetated swales – 4 (0.18 acres)
Constructed Wetlands – 3 (29.16 acres)
Porous pavement – 65 (7.25 acres)
Rain Gardens – 12 (1.10 acres)
Underground Storage Vaults or Tanks - 19

Landscape Services is responsible for collecting and disposing of debris and wastes from MSU's sewer and catch basin cleaning; street sweeping and other sources of pollution that may otherwise be discharged into the separate storm water drainage system. MSU's Office of Environmental Health and Safety (EHS) oversees compliance with Part 121 rules dealing with liquid industrial wastes, including ensuring that contractors meet all applicable requirements. The IPF Division is responsible for ensuring compliance with Part 115 solid waste disposal.

After catch basins are cleaned, the collected material is dumped into a 20-yard rolloff box. A plastic box liner is placed into the box prior to dumping to avoid leaks. Prior to hauling the container to the landfill, the remaining liquids are vacuumed from the rolloff box. These liquids are pumped into a tanker trailer to be hauled to a licensed facility for treatment.

Street sweeping solids are temporarily stored in a 10-yard rolloff box and hauled to landfill.

Landscape Services is responsible for the cleaning of the separate storm sewers and all catch basins and inlets associated with the public infrastructure and structural controls, with the work ultimately completed by a licensed contractor. The work is done as a corrective action when warranted, but is typically completed as a preventative measure. Guidelines exist for cleaning and inspection frequencies, as detailed below.

Catch basins are inspected annually. Structures with debris volume greater than 50% of the sump capacity are identified as required for cleaning. Those units are then cleaned within one (1) year

of being identified. Debris is measured and recorded prior to disposal. Waste collection and disposal is completed by a licensed contractor. That process is detailed in Appendix 12. As part of the cleaning process, the individual catchbasins are inspected for any structural defects or abnormalities. If any defects are found, the Landscape Services supervisor will communicate with the Maintenance Services supervisor to camera the pipes connecting to the structure to check for breaks which may have caused an increase in sediment.

The contractor responsible for servicing the University's storm drain system has in place established procedures for inspecting and cleaning catch basins and oil water separators on the campus. In addition, maintenance procedures for individual catchbasins are provided in the GLRC Ordinance Committee's manual on "Good Housekeeping and Pollution Prevention for Municipal Activities" which is used as a reference by Landscape Services staff members.

As part of the University's hazardous waste program, procedures are in place to document the proper methods of handling and disposing of known hazardous or toxic materials. Annual training is required for staff members involved with handling and disposing of hazardous waste on the campus. EHS is responsible for management and compliance of regulatory requirements that are outlined in the Part 111 waste storage facility operating license and requirements set forth in CFR 262-264.

The design and maintenance of specific structural storm water devices is included as part of the MSU Storm Water Design Standards (see Appendix 7) and the State of Michigan Low Impact Development Manual. The IPF PDC staff members are following these documents as part of the Post Construction Storm Water Runoff controls (see Chapter 4).

All projects (with the exception of repair and replace) are designed through IPF PDC following the capital projects procedures. The Storm Water Design Standards outline the procedure for post construction control requirements for any project that will disturb more than one acre. This design standard is followed by internal design staff (or by an outside consultant working under the direction of PDC) to design appropriate BMPs for all site projects. Where the impervious quantity is not changing, the criteria is limited to storm water quality BMPs. When the impervious area is being increased, then the water quality and the infiltration criteria outlined in the standard must be met. The design is sent to the Storm Water Committee to review and approve. The committee then documents the design criteria has been appropriately met by reviewing the designer's documentation for accordance with the established standard. The lead designer then files this documentation with the project design file. For larger projects, the Landscape Services maintenance group will also be involved with the design process to provide input on future operation and maintenance requirements.

Municipal Operations and Maintenance Activities

IPF staff members have developed a storm water facilities inspection spreadsheet that includes various BMPs and routine inspection and maintenance tasks for each. IPF also maintains a database and interactive map application to document inspection and maintenance dates and labor hours for each BMP. The spreadsheets are housed on the IPF server. The Storm Water Committee reviews the storm water controls inspection and maintenance activities at least

annually, and provides oversight to ensure the inspection and maintenance tasks are completed. The committee meets monthly to discuss campus-wide storm water issues. At those meetings, any inspection findings of import or citizen complaints are discussed. Any necessary changes to the inspection and/or cleaning schedule are made within 30 days.

MSU Landscape Services uses the GLRC Ordinance Committee's manual on "Good Housekeeping and Pollution Prevention for Municipal Activities" as a reference manual. Several of the Source Control BMPs contained in the manual address these items. In addition, the following activities are currently being implemented:

Street Sweeping, Parking Lot, Sidewalk and Bridge Maintenance

Landscape Services is responsible for sweeping streets and parking lots on the MSU campus. All equipment is maintained on a fixed schedule; streets and parking lots are currently swept annually. Parking structures are swept as needed and washed annually or as required. Sweepings are stored in a rolloff bin and hauled to an approved landfill. No street sweepings are composted.

Street sweeping is prioritized in the spring by starting with streets that have a larger amount of debris on them. Staff members then sweep streets and parking areas that are located near commencement activities prior to their completion in early May. From there the remaining roads are completed, beginning with main roads such as Farm Lane and Trowbridge. The next priority is parking lots, beginning with lots that are being line stripe painted that particular year. The goal is to have all streets swept initially by the end of May and this is an ongoing project throughout the spring, summer and fall. Streets and parking lots are continuously monitored to keep them clean and safe. If any issues concerning street cleaning are seen, the campus community is encouraged to contact MSU IPF or Landscape Services to report them. One large sweeper and one smaller vacuum work together to efficiently keep the streets and parking lots clean. The University does not dewater waste materials, and all street sweeping waste is hauled to the landfill.

Leaves are blown off the roads and back into the lawn area for composting throughout fall on a weekly basis. Leaves are not blown into the Red Cedar River. All organic matter (e.g., pine needles and leaves – no soil or gravel) is composted, mixed with topsoil, and recycled for use on campus.

All sweeping activities are documented in a log completed by the operators. The MSU Storm Water Committee meets monthly to discuss campus-wide storm water issues. At those meetings, any inspection findings of import or citizen complaints are discussed. Any necessary changes to the inspection and/or cleaning schedule are made within 30 days.

Construction standards are in place for all major construction projects to ensure that good housekeeping practices are followed, including hazardous materials handling, soil erosion and sedimentation control and construction debris control. Pre- and post- audits are conducted by IPF staff on all projects. Each project is assessed on an individual basis, with appropriate best management practices implemented as necessary. MSU maintains three vehicle bridges and three pedestrian bridges. Vehicle bridges are periodically cleaned following the same procedure as street cleaning. The pedestrian bridges have a urethane non-slip coating surface applied to them

and are periodically recoated.

All significant maintenance projects including periodic concrete restoration, urethane coating and painting are completed with oversight by IPF following the established S*tandards for Construction* that include general requirements for dust control and treatment of storm water during construction.

Cold Weather Operations

Snow and ice removal on the Michigan State University campus is a major priority of MSU Landscape Services. A delicate balance of maintaining safe conditions while reducing the use of deicing products is an ongoing challenge. With the Red Cedar River running through campus, a significant investment in building structures and a beautifully landscaped campus arboretum, deicer usage is not preferred but is a necessary strategy to ensure safety. Landscape Services follows DEQ Salt and Brine Storage guidance materials. In addition, over the past several years, the University has implemented changes in salt application practices to better protect surface water supplies. The University is using the Accubrine brine maker, which lessens salt use for deicing. In addition, a campus snow removal plan (which addresses snow storage) is in place and can be viewed at the following URL: http://ipf.msu.edu/green/practices/snow-removal.html

Snow is piled in various locations on campus, which are identified each winter by IPF Landscape Services. Staff members choose locations based on available space, ensuring that piles are not located near the river or in the floodplain, and are located away from existing storm water BMPs and contaminated sites.

No vehicle washing occurs on campus in areas that have the potential to discharge to surface waters. MSU vehicles use the Automotive Services car wash that discharges to the sanitary sewer. Large MSU trucks that do not fit in the MSU car wash, including Recycling Center and Surplus Store vehicles, are sent to an off-site location for washing.

Managing Vegetated Properties

University employees who apply pesticides and fertilizers are required to possess a valid commercial applicator's license from the State of Michigan. As part of the continuing education/recertification requirements, employees are trained in proper storage, handling and use of pesticides, herbicides, and fertilizers on the MSU campus.

MSU continues to expand areas with tall and intermediate grass within the developed landscape. All ponds and landscape drains are currently surrounded by some type of vegetation. An online campus map currently delineates a buffer zone of irregular width and coverage. Staff members allow for the evolution of natural plant material, supplemented with areas of native wildflowers and prairie grasses where appropriate, and have reduced areas of turfgrass on selected areas of campus property. These no-mow zones include educational signs as part of the University's storm water Public Education Program.

Employee Training

MSU has an online storm water training program in place. The training program includes the Excal video

entitled *Rain Check: Storm Water Pollution Prevention for MS4s.* MSU-specific information is included at the end of the training video, as well as a short quiz.

Employees who are tasked with implementing Good Housekeeping requirements will complete the storm water training program once during the permit cycle. New staff members will be trained within the first year of employment. The online training program is tracked through the EHS website. The storm water training program is located at the following URL: http://www.oeos.msu.edu/training/search_results.htm?-DB=training&-Lay=Training%20Course%20Form&-format=search_results.htm&-sortorder=ascending&-sortfield=Course%20Name&-op=eq&Display%20On%20Web=Web&-op=eq&Area=Environmental&-max=All&-Find. University credentials are required to access the training program.

Contractor Requirements and Oversight

Contractor training pertaining to storm water was incorporated into the Woody Plant Protection training sessions that are regularly conducted by Landscape Services staff members. Project representatives are trained to provide oversight to contractors to ensure that storm water BMPs are followed. The campus Storm Water Committee reviews the contractor training materials and assess the efficacy of the training program annually.

The Good Housekeeping Action Plan, Timeline and Evaluation Methods are provided below:

Minimum Measure	BMPS	Evaluation Methods	Comments
Pollution Prevention and Good Housekeeping	Identify areas along the river corridor as candidates to install riparian buffer preservation (no mow).	Map of river corridor with buffer areas delineated	
Pollution Prevention and Good Housekeeping	Install Grow Zone Signs	Number of signs installed along the river corridor	
Pollution Prevention and Good Housekeeping	Staff Storm Water Training	No. of staff trained. Freq of training.	
Pollution Prevention and Good Housekeeping	Review existing salt application practices; make changes if necessary	Existing practices reviewed, improvements implemented, number of staff trained	
Pollution Prevention and Good Housekeeping	Sweep/clean University parking lots and streets	Freq of sweeping, amount of material collected	
Pollution Prevention and Good Housekeeping	Clean catch basins on a regular basis and ensure proper disposal of waste materials	As required.	Freq of cleaning and amount of material collected. Waste is handled by a licensed contractor.
Pollution Prevention and Good Housekeeping	Develop storm water training materials for contractors.		Storm water information has been incorporated into existing training programs.

Chapter 7 – Total Maximum Daily Load – *E. coli* in the Red Cedar River

Section 303(d) of the federal Clean Water Act (CWA) and the United States Environmental Protection Agency's (USEPA) Water Quality Planning and Management Regulations (Title 40 of the Code of Federal Regulations, Part 130) requires states to develop Total Maximum Daily Loads (TMDLs) for water bodies that are not meeting water quality standards. A TMDL was established by MDEQ for portions of the Red Cedar River and subsequently approved by the USEPA. A TMDL establishes the allowable level of pollutants for a water body based on the relationship between pollution sources and in-stream water quality conditions. TMDLs provide a basis for determining the pollutant reductions necessary from both point and nonpoint sources to restore and maintain the quality of water resources.

The State of Michigan has officially established the limits for its E.coli TMDL to be a concentration-based standard as follows: "For this TMDL, the WQS of 130 E.coli per 100mL as a 30-day geometric mean and 300 E.coli per 100mL as a daily maximum to protect the TBC use are the target levels for the TMDL reaches for May 1 through October 31, and 1,000 E.coli per 100mL as a daily maximum year-round to protect the PBC use."

Procedure for identifying and prioritizing BMPs currently being implemented or to be implemented during the permit cycle to make progress toward achieving the pollutant load reduction requirement the TMDL.

The MSU Storm Water Committee reviewed the MDEQ document entitled *Total Maximum Daily Load for E. coli in Portions of the Red Cedar River and Grand River Watersheds* as well as the *Red Cedar River 319 Watershed Management Plan*, which was approved by the MDEQ and USEPA in 2015, to set priorities for the *E. coli* TMDL implementation. Available monitoring data was also reviewed. The committee meets on a monthly basis, annually assesses progress in meeting TMDL requirements, and directs management strategies to address sources and causes of bacterial loading.

Monitoring conducted by the Ingham County Health Department and the 319 watershed project showed that bacteria were present during both dry and wet weather events throughout the watershed. Pollution presence during certain weather conditions can be indicative of the sources of the pollution. Dry weather sources of *E.coli* can be attributed to such things as leaky septic tanks, illicit connections, livestock, wildlife and regrowth of bacteria. Wet weather sources of *E.coli* are often associated with overland runoff. Source tracking showed the presence of both equine and bovine DNA in a majority of the subwatersheds analyzed.

The campus of MSU storm drain system discharges to the Red Cedar River subwatershed, as delineated in the 319 watershed plan. Potential sources of E. coli and current and/or planned best management practices to reduced bacterial loading within this subwatershed are summarized in the table below.

List of Prioritized BMPs currently being implemented or to be implemented to make progress toward achieving pollutant load reductions:

Source of *E. coli* pollution in Red Cedar River Subwatershed	**Campus Best Management Practices**	**Responsible Party**
Wildlife/waterfowl	· Riparian buffers · Educational signage about waterfowl feeding	· Landscape Services · MSU-IWR
Pet waste	· Public education materials to encourage pet owners to properly dispose of pet waste	· MSU-IWR · GLRC
Livestock	· Comprehensive Nutrient Management Plan(s) for South Campus Farms · Incorporation of manure during application · No manure application on frozen ground · Buffer strips/grassed waterways around inlets · Covered manure storage.	· Land Management Office and South Campus Farm staff members
Illicit Discharges	· IDEP implementation, including ongoing *E. coli* monitoring	· Environmental Health and Safety
South Campus Septic Systems	· Regular maintenance/pumping · Updated database · Recordkeeping	· Land Management Office

Monitoring plan for assessing the effectiveness of the BMPs currently being implemented or to be implemented, in making progress toward achieving the TMDL pollutant load reduction requirement, including a schedule for completing the monitoring.

IDEP sampling will continue in the new permit cycle. Those activities include low-flow assessment and sampling of all MSU outfalls. E. coli is among the parameters sampled when flow is present under low-flow conditions (see Chapter 3).

MSU will also continue to participate in the ongoing sampling and monitoring program established by the Ingham County Health Department (ICHD) in 2004. The ICHD currently samples at 10 sites along the Red Cedar River, including sites at S. Hagadorn Road; Farm Lane Road; S. Harrison Road; and Kalamazoo Street. Sample results are available online. In 2015 and 2016, samples were taken weekly at each location for 22 weeks from the beginning of May through the end of September. Data from the two sites at the eastern- upstream end of campus (S. Hagadorn Road) and the western- downstream end of campus (Kalamazoo Street) may provide some indication of the effect that discharges from MSU and the City of East Lansing have on the overall *E.coli* contributions to the Red Cedar River.

Along with this continued in-stream weekly monitoring, wet-weather, end-of-pipe sampling will be conducted within four subwatersheds on the MSU campus: the drainage areas for outfalls 33, 37, 42, 53. Those subdistricts encompass the campus academic core with continued development and expansion. In addition, subdistrict 53 includes drainage from the south campus farms area.

Per MDEQ, wet weather sampling should focus on the first flush within the first 30 minutes if possible but not longer than the first 60 minutes. Also per MDEQ, analysis must occur within 6 hours of collection of the sample.

If the level of *E.coli* found in an individual discharge within the Red Cedar River subwatershed, during the initial rounds of sampling is significantly higher than in other samples, and it exceeds the partial body contact limits (1,000 *E.coli* per 100ml), the subwatershed will be resampled and analyzed in further detail. The resampling will be performed during a wet-weather event within one year of the original sampling date. The follow-up sample will be taken from the same location. Microbial source tracking may be used to identify the source of the bacteria.

The information gathered from the sampling and evaluation of results will help the MSU Storm Water Committee assess the effectiveness of the campus *E. coli* reduction BMPs. Changes to the management strategies will be made based on the sampling results in order to ensure progress toward achieving the required TMDL pollutant load reductions.