MDOT Storm Water Management Plan
Module 3: Maintenance Considerations

Together… Better Roads, Cleaner Streams

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CONSULTING ENGINEERS

Storm Water Management
MDOT
Michigan Department of Transportation

As part of MDOT's National Pollution Discharge Elimination System's (NPDES) Phase I Storm Water Permits, all municipal separate storm sewer systems (MS4s) serving populations of 100,000 or more must acquire a storm water permit. In Michigan there are 6 phase I municipalities, which include Ann Arbor, Flint, Grand Rapids, Sterling Heights, Warren, and Livonia.

The Michigan Department of Transportation has separate storm sewer systems on state roads within these cities and is required to hold a NPDES Storm Water Permit for each city. As required by the Storm Water NPDES Permit, MDOT has developed a storm water management plan for MDOT facilities within those cities. A portion of the storm water management plan states that MDOT will educate its employees and contractors about storm water management and how to reduce storm water pollution. This series of training modules address the NPDES permit requirements and provides concise and valuable information on storm water management.

The project theme, "Together… Better Roads, Cleaner Streams", was developed in planning discussions with MDOT environmental, communications, and policy staff, with assistance from Tetra Tech MPS. It complements the overall Michigan Department of Transportation Mission Statement.

This is Module 3 of a four part series of short presentations intended to inform staff and contractors about the MDOT Storm Water Program. The topics of the training modules are:

Module 1- Introduction to Storm Water Management

Module 2- Best Management Practices

Module 3- Maintenance Considerations

Module 4- Illicit Discharge Elimination Program

National Pollutant Discharge Elimination System (NPDES) Program

- Three Parts to NPDES Program
  1. Municipal Program (i.e. MDOT's Stormwater Program)
  2. Construction Program-Notice of Coverage
     - –Phase I regulated 5 acres and larger
     - –Phase II regulates any construction over 1 acre
  3. Industrial Program-Not applicable to MDOT

NPDES is more than just soil erosion sedimentation control it also includes a much broader scope of storm water management.

There are three main components of the Federal National Pollutant Discharge Elimination (NPDES) Program pertaining to storm water.

1. Municipal Program- Phase I and II – Discussed in this module, more detail on the next slide, MDOT Stormwater Management Program.
2. Construction Program- Phase I and II – This program is primarily focused on soil erosion and sedimentation control. You are familiar with this in your routine projects involving earth disturbance requiring weekly inspections.
3. Industrial Program- Phase I – This program does not impact MDOT

MDOT's NPDES Municipal Program

- Phase I - Six MDOT Phase I Storm Water NPDES permits
- Phase II - Applied for Statewide Permit March 10, 2003, over 300 cities in MI
- MDOT is actively participating with watershed groups including the Rouge River Watershed.

•According to the USEPA,storm water pollutants may affect:

- •water quality
- •recreational activities
- •aesthetic value (appearance, odor, etc.)
- •wildlife habitat
- •normal life-cycle of organisms and animals

•To address this concerns, in 1990, USEPA developed rules establishing Phase I of the National Pollutant Discharge Elimination System. Under the Phase I program, MDOT was required to apply for an NPDES Phase I Storm Water Permit. MDOT then developed a Stormwater Management Plan (SWMP) for each permit it holds.

•MDOT currently has six Phase I permits in Ann Arbor, Flint, Grand Rapids, Livonia, Sterling Heights, and Warren.

•The USEPA developed the Storm Water Phase II Program to further protect, preserve and improve public waters from storm water runoff. Phase II like Phase I requires MS4s, including MDOT, to apply and receive a Phase II storm water permit and then develop a storm water management plan.

•MDOT will also be required to have coverage in all MS4 Municipalities where state roads and storm sewers exist. There are approximately 300 such communities in the State of Michigan.

Module 3: Maintenance Considerations

- Where Does the Pollution Come From?
- Pollution Prevention
  - Soil Erosion
  - Vehicle Maintenance
  - Equipment & Material Storage
- Illicit Discharges/Connections
- What To Do If You Suspect a Problem
- Where to Learn More

Training Module 3 seeks to educate MDOT employees, contractors, contract counties and municipalities on storm water maintenance consideration. This presentation will include a discussion of where pollution comes from, pollution prevention/good housekeeping, illicit discharges/connections, what to do if you suspect a problem, and where to learn more.

There will be a survey questionnaire at the end of this presentation.

Where does Pollution Come From?

- Leaky fluids from improperly maintained equipment
- Washing vehicles and equipment (soap and dirt)
- Runoff from materials storage areas
- Servicing of equipment in inappropriate locations
- Improper disposal of materials

Where does Pollution Come From?

•Leaky fluids such as oils, brake fluid, and antifreeze are a real problem; these fluids get washed away when it rains and cause heavy metals to build up in local waterways.

•Servicing of equipment in inappropriate locations; for example servicing a vehicle outside in a parking lot. After servicing a vehicle, any drippings such as oils and grease would be washed off by the rain to the nearest waterway. These materials are pollutants and impact water quality.

•Runoff from storage of materials such as salt or sand piles.

•Washing vehicles and equipment outside where the runoff is not properly collected and treated.

•Improper disposal of materials into catch basins, storm sewers, ditches or similar. For example waste oils, debris, sanitary wastes, etc.

Where does Pollution Come From?
Continued

- Soil erosion
- Eroding/exposed drainage ditches
- Trash and debris in waterways
- Improper salt handling procedures
- Sanitary discharges to the storm drainage system
- Non-storm water discharges

Where does Pollution Come From?

•Soil erosion from earth disturbing activities; soil erosion is increased dramatically due to the exposed earth.

•Failing drainage ditches; can fail if vegetation is not properly maintained in them once again causing erosion to occur. Also a drainage ditch can fail when more flow than what the capacity of the drainage ditch is carried through the ditch. This excess flow can contribute to higher velocities, which in turn can erode the drainage ditch. Open ditches, which can experience failure contribute large amounts of sediment to the rivers and streams.

•Improper salt loading procedures; excess salt should be swept up after loading the salt truck along with any excess salt around buildings and driveways to avoid runoff to nearby lakes and streams.

•Sanitary discharges to the storm drainage system; this is where someone has accidentally or intentionally discharged sanitary sewage into the storm drainage system.

•Examples of non-storm water discharges include floor drains or a car wash discharging to the storm water drainage system.

Last Resort: Example of Oil Spill Containment

This picture shows a containment boom installed to collect oil or other floatable pollutants after a spill has occurred.

Example Sources of Soil Erosion and Sedimentation

- Earth disturbing practices
  - Slope flattening
  - Cutting back banks
  - Ditching operations
- Eroding drainage ditches or swales
- Improper stockpiling of materials
- Lack of timely stabilization of soils

Soil erosion is a natural process. This erosion process is accelerated dramatically due to exposed earth, this is why it is critical to develop and follow through with your soil erosion and sedimentation control plan. This additional erosion adversely impacts lakes, streams and wetlands by causing increased turbidity, picking up other pollutants, and causing sedimentation which can fill in habitat for fish and macroinvertebrates.

Soil Erosion and Sedimentation

- How to Prevent Storm Water Pollution
  - Follow the MDOT Soil Erosion and Sedimentation Control Manual and the Maintenance Performance Guide
  - Timely stabilization of exposed soils
  - Properly maintain all drainage systems
  - Correct placement of spoil piles

How to prevent storm water pollution

•Follow instructions in the MDOT Soil Erosion and Sedimentation Control Manual

•Properly maintain all open drainage systems

•Soil Erosion Controls are required by law to implement and maintain on ALL MDOT ACTIVITIES!

•Timely Stabilization of Soils- Legally this must be done within 5 days.

This slide shows a large sediment plume heading into Lake Michigan from Lake Macatawa due to storm water runoff and nonpoint source pollution. It will take the education of all our government agencies, local municipalities and residents working together to reduce the amount of sediment eroding from our landscape across the state.

Lake Macatawa is located near Holland, Michigan.

Vehicle Maintenance and Washing

- Maintain vehicles indoors
- Assure that interior floor drains are not discharging to the storm drainage system
- Don't allow wash water to discharge to a storm drain
- Wash vehicles in designated areas

KNOW WHERE YOUR STORM WATER GOES

Vehicle Maintenance and Washing

•Dirt, oil, grease, and salt are likely to be attached to trucks and heavy duty vehicles.

•Be sure to clean/wash these vehicle near a sanitary sewer drain to ensure proper wastewater treatment.

•ALWAYS AVOID discharging to a storm sewer, the wash water will go directly to the nearest stream.

•Vehicle maintenance should be done indoors in an appropriate servicing garage.

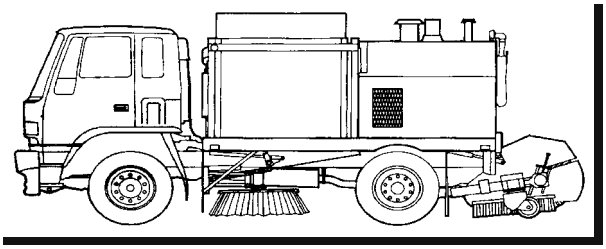
•Interior floor drains should not discharge to the storm drainage system.

At HOME:

Always wash your car on your lawn, away from storm drains to avoid runoff to local lakes and streams!!!

Examples of Equipment

- Trucks and street sweepers
- Other examples???



Presenter to engage the audience to ask for examples of equipment!

Examples

- Trucks
- Street sweepers
- Snowplows
- Lawn mowing equipment
- Catch basin cleaning equipment
- Tar kettles
- Spray rigs
- Endloaders
- Backhoe/Bulldozer

Equipment Storage

- How to Prevent Storm Water Pollution
  - Properly maintain all equipment
  - Wash equipment prior to storage
  - Maintain storm water BMPs
  - Interior floor drains are not discharging to the storm drainage system

How to Prevent Storm Water Pollution

•Properly maintain all equipment to prevent leaking of polluting materials such as oils, antifreeze, hydraulic fluid and brake fluids. These chemicals if discharged to a natural waterbody have the potential of doing significant harm to the aquatic ecosystem.

•Wash equipment appropriately prior to storage. Sediment that accumulates on a vehicle or grass clippings on a lawn mower are also considered pollutants. These should be washed off in an appropriate area prior to storage.

•Maintain storm water BMPs, such as oil and water separators, berms around loading pads, sweeping excess salt, etc.

•Check to make sure that floor drains are not discharging to the storm drainage system.

Example Material Storage

- Sand, Salt
- Other examples???

- A good rule of thumb:
  - When it rains, check to make sure your materials aren't leaving the site.

Presenter to engage the audience to ask for examples of equipment!

Example Material Storage Facilities:

•Sand

•Salt

•Asphalt cold patch

•Pesticides

•Fertilizers

•Fuel

•Oils

•Paint

•Solvent

Material Storage

- How to Prevent Storm Water Pollution
  - Keep polluting materials in secondary containment
  - Follow your PIPP - Pollution Incident Prevention Plan
  - Be familiar with your spill containment equipment
  - Keep materials away from drainage facilities
  - Maintain a clean storage yard
  - Maintain BMPs to address typical pollutants that may escape the site in storm water runoff

How to Prevent Storm Water Pollution

•Polluting materials must be kept in approved secondary containment. Keep materials protected by storing them inside, under a permanent roof, or covered with a tarp to prevent the rain from washing the material away.

•Keep the materials away from drainage facilities. For example; don't store a pile of sand next to a catch basin or next to the edge of a county drain.

•Spill containment equipment includes absorbent socks, floor dry or other. Employees should know where the equipment is stored, how to use it and how to properly dispose of it.

•Maintaining a clean storage yard is important. After loading and unloading materials excess material tracked away from the pile should be swept up to prevent wash off during a rain storm.

•Providing BMPs for the storage yard is also important. Typical BMPs may include sediment traps if the storage yard is paved. If the storage yard is unpaved, BMPs may include vegetative buffer strips around the perimeter, silt fence and rock aprons for trucks to drive over and drop the dirt from their tires prior to driving out on public streets.

Illicit Connections & Discharges

- When pollutants discharge into a storm drain from a specific source into the MDOT right-of-way
- Sources include:
  - Sewer Tap
  - Floor Drains
  - Wash Water from Carwashes/Laundromats
  - Dumping Motor Oil
  - OTHERS???

This pollutant discharge may be a result of specific prohibited activities taking place near MDOT's ROW.

Presenter to engage the audience to ask for examples of other sources!!

Sources of illicit connections include:

- Sanitary sewer tap
- wash water from Laundromats or carwashes,
- floor drains,
- overland drainage from a carwash,
- dumping used motor oil in or around a catch basin
- other similar sources.

Illicit Connections and Discharges

- Recognizing the Problem
  - A bad odor like rotten eggs or sewage
  - High turbidity, oil sheen
  - Floatables such as sewage and toilet paper
  - Vegetation (algae)
  - Dry weather flow

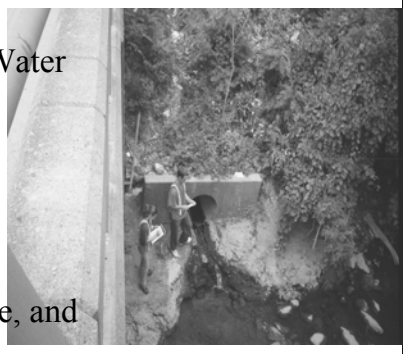
Recognizing a Problem-Illicit connection indicators

- A bad odor like rotten eggs or sewage
- High turbidity (cloudiness, not able to see though), oil sheen
- Floatables such sewage and toilet paper
- Vegetation (algae)
- Dry weather flow

Training Module 4 provides additional education about illicit connections and discharges. Maintenance crews are encouraged to learn more about these issues

Steps to follow if you suspect a problem

- Non-Emergency
  - Notify your supervisor immediately
  - Notify the MDOT Regional Storm Water Coordinator
- Pollution Emergency
  - Call Local First Responder (911)
  - Call PEAS Hotline **1-800-292-4706**
  - Notify your Supervisor, Maintenance, and Regional Storm Water Coordinator



Storm Water Management MDOT Michigan Department of Transportation

Examples of Non-Emergency – see previous slide

Non-Emergency

•Notify your supervisor immediately

•Notify your MDOT Regional Storm Water Coordinator (See last slide for list)

Pollution Emergency: An environmental pollution emergency (defined by the critical materials register) includes tanker accidents, pipeline breaks, releases of hazardous substances, oil, salt, or other polluting materials. If this occurs calls PEAS. PEAS is the Pollution Emergency Alerting System.

What information do you need to pass on to the emergency responders, supervisor and coordinators?

•Location

•Extent of spill or discharge

•Source of spill or discharge if known

•Nearby water bodies

•Call back information

Where to Learn More

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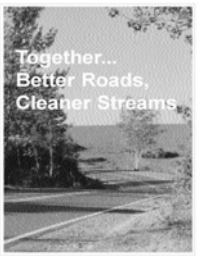

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Module 4: Illicit Discharge Elimination Program

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•MDOT will also be required to have coverage in all MS4 Municipalities where state roads and storm sewers exist. There are approximately 300 such communities in the State of Michigan.

Module 4: Illicit Discharge Elimination Program (IDEP)

- Overview
- Definitions
- Locating an Illicit Connection/Discharge
- What to Do if You Suspect a Problem
- Where to Learn More

Module 4 will explain the illicit discharge elimination program and define what an illicit discharge/connection is. It will also explain how illicit connections are located, what to do if you find one, the PEAS (Pollution Emergency Alerting System) steps, and how to ensure that illicit connections are eliminated in future work.

There will be a survey questionnaire at the end of this presentation.

MDOT's Illicit Discharge Elimination Program Overview

- Inventory and Mapping Outfalls using Arc View GIS and Database
- Field Investigation of All Outfalls with Follow-Up for Suspected Problems

The illicit discharge plan is seeking to complete an inventory and field investigations of all outfalls in the MDOT right-of-way in the Phase I and Phase II communities. All the outfall information is being tracked in Arc view GIS with yearly updates using construction and as-built maps. This work is being done by our storm water consultants. Information is available in the annual reports, which is available on the public web site. Additional information is available from the Regional Storm Water Coordinators.

The permit requires MDOT take actions to eliminate illicit discharges and connections.

Illicit Connections & Discharges

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- Sources include:
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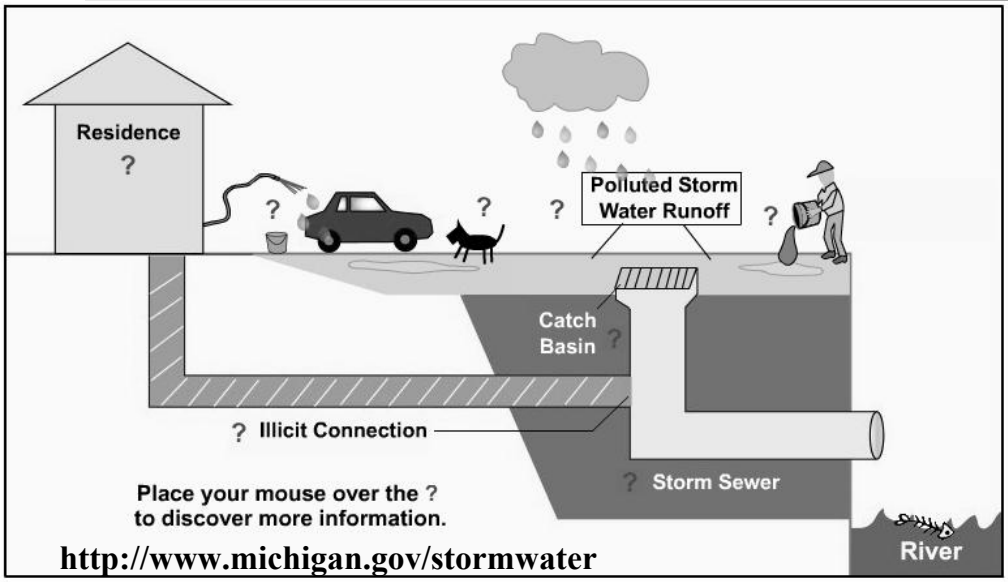
- other similar sources.

Illicit Discharge/Connection

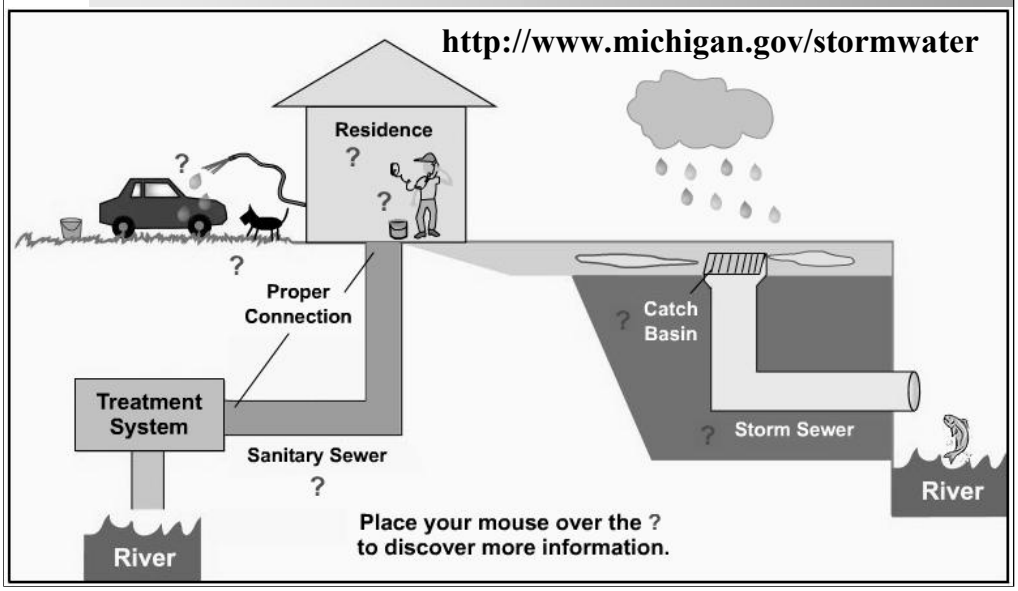


http://www.michigan.gov/stormwater

This slide depicts an animated graphic located on MDOT's Storm Water Web site. This site is found by first going to MDOT's Storm Water Public web page at this address **http://www.michigan.gov/stormwater**. Then click on the left side of the screen on **Illicit Discharge- Don't**.

This graphic shows how **NOT** to connect to storm sewer and other detrimental water quality habits. Up on the right hand side of the graphic, someone is pouring used oil down the storm drain. This drains to the river, not to the local treatment plant. Also, the car washing water is running directly into the storm drain as well. Car washing should be done on grass to absorb and filter the wash water or in maintenance designated sites. The residence or business has an illicit connection leading their sanitary or industrial waste erroneously into the storm drain. Pet waste is also a major concern when it is left on the sidewalk or yard. Much of the nutrients and bacteria runoff during rain events into local streams untreated. Dispose of pet waste properly. These are all examples of illicit discharges and connections.

Correct Connections



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Of special note, the catch basin in this diagram is only taking storm water to the stream. Other potential pollutants such as car washing runoff, sanitary sewer, industrial waste, and pet waste are being disposed of properly (not in the storm drain, but sanitary sewer and garbage).

How to Recognize an Illicit Connection

- Illicit Connection Indicators
  - A bad odor like rotten eggs or sewage
  - High turbidity, oil sheen
  - Floatables such as sewage and/or toilet paper
  - Vegetation (algae)
  - Dry weather flow

Most Illicit Connections will be located by personnel from Maintenance, Construction, or Contractors.

Dry weather flow means water coming out of a storm drain during dry weather conditions when you wouldn't normally expect to see flow.

Steps to follow if you suspect a problem

- Non-Emergency
  - Notify your supervisor immediately
  - Notify the MDOT Regional Storm Water Coordinator
- Pollution Emergency
  - Call Local First Responder (911)
  - Call PEAS Hotline **1-800-292-4706**
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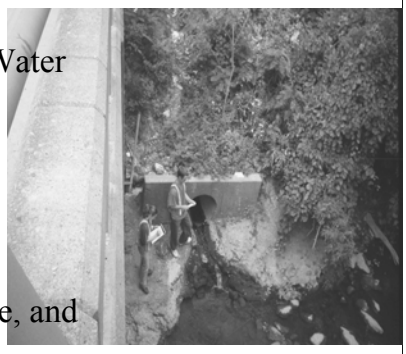

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Please contact the following individuals in the region for more information on MDOT's Storm Water Management Program.

MDOT Stormwater Internal Training Module 1 Questionnaire

Name: _____

Date: _____

Presenter: _____

Module #1

1. Q: Name three examples of non-point source pollution?

2. Q: What does NPDES stand for?

   N_____

   P_____

   D_____

   E_____

   S_____

3. Q: Name 3 of the six minimum measures for NPDES permit requirements?

4. Q: Where can you find a copy of MDOT's Stormwater Management Plan?

MDOT Stormwater Internal Training Module 2 Questionnaire

Name: _____

Date: _____

Presenter: _____

Module #2

1. Q: What does BMP stand for?

2. Q: Name a Structural BMP

3. Q: Name a Vegetative BMP
   a) Applying fertilizer
   b) Vegetative Buffers
   c) Mulching and Matting
   d) Seeding
   e) b, c, and d

4. Q: Name an Operational BMP
   a) BMP inspection and maintenance
   b) Spill response and prevention plan
   c) Street sweeping
   d) Installing silt fences
   e) a, b, and c

Match the BMPs with its category on the left

5. Non-Structural BMPs _____
   Structural BMPs _____

   a.) Spill Response Prevention
   b.) Used Oil Recycling Program
   c.) Ponds (Basins)
   d.) Mulching and Matting
   e.) Infiltration Basin

MDOT Stormwater Internal Training Module 3 Questionnaire

Name: _____

Date: _____

Presenter: _____

Module #3

1. Q: Who contributes to non-point source pollution?
   a.) Your neighbor
   b.) Yourself
   c.) Pets
   d.) B and C are true
   e.) All the above

2. Q: Name sources of non point source pollution:
   a) Leaky fluids including oil, brake fluid, and antifreeze
   b) Washing vehicles and equipment
   c) Salt and sand piles
   d) Fertilizers, herbicides and insecticides runoff
   e) All of the above

3. Q: List two ways to recognize Illicit Connections or Discharge Problems?

4. Q: Name a source where soil erosion and sedimentation are likely to occur without adequate control?

5. Q: True or False-Should you wash your vehicle near storm water drain? If not, where should you wash it?

6. Q: What is a Pollution Prevention Method?
   a) Provide BMPs on storm water runoff
   b) Read MDOT's Storm Water Management Plan
   c) Keep your grass cut short
   d) Apply fertilizers only before heavy rain

MDOT Stormwater Internal Training Module 4 Questionnaire

Name: _____

Date: _____

Presenter: _____

Module #4

1. Q: What does IDEP stand for?

2. Q: If you locate a potential illicit connection that **is not a major emergency**, whom should you contact?
   a) Your supervisor
   b) Your regional storm water coordinator
   c) Both A & B
   d) Call PEAS

3. Q: If you locate an illicit connection/discharge that **is an emergency**, whom should you contact?
   a) Call Local First Responder (911)
   b) Your supervisor
   c) Your regional storm water coordinator
   d) Call PEAS
   e) All of the Above

4. Q: Why is storm water pollution a problem?
   a) Harms wildlife habitat
   b) Increases recreational activities
   c) Decrease aesthetic valves
   d) Degrades the quality of Michigan's water
   e) All above are true
   f) A, C, and D are true

Match the term with its definition:

5. ____ Storm water runoff	a.) Discharge from your separate storm sewer drainage system directly to waters of the state
6. ____ Impervious surface	b.) When pollutants are discharging into a storm drain from a specific source overland into the MDOT right-of-way
7. ____ Outfall	c.) Water that flows off roofs, driveways, parking lots and streets
8. ____ Illicit Connection	d.) Roofs, driveways, parking areas, sidewalks, decks, patios, concrete or asphalt streets
9. ____ Illicit Discharge	e.) When a pipe intended for a sanitary sewer ends up in a storm drain

MDOT Stormwater Internal Training Module Answer Key

Module #1 Answer Key

1. Q: Name three examples of non-point source pollution?
   A: Fertilizers, oil, pet waste, illegal dumping, failing septic systems, and trash

2. Q: What does NPDES stand for?
   A: National
   Pollutant
   Discharge
   Elimination
   System

3. Q: Name 3 of the six minimum measures for NPDES permit requirements?
   A: Public Education and Outreach
   Public Involvement
   Illicit Discharge Detection and Elimination
   Pollution Prevention and Good Housekeeping
   Construction Site Runoff Control
   Post-Construction Runoff Control

4. Q: Where can you find a copy of MDOT's Stormwater Management Plan?
   A: MDOT's Stormwater Public Website: http://www.michigan.gov/stormwater

Module #2 Answer Key

1. Q: What does BMP stand for?
   A: Best Management Practices

2. Q: Name a Structural BMP
   A:
   a) Street Sweeping
   b) Detention basin
   c) Picking pet waste
   d) Project Phasing

3. Q: Name a Vegetative BMP
   A:
   a) Applying fertilizer
   b) Vegetative Buffers
   c) Mulching and Matting
   d) Seeding
   e) b, c, and d

4. Q: Name an Operational BMP
   A:
   a) BMP inspection and maintenance
   b) Spill response and prevention plan
   c) Street sweeping
   d) Installing silt fences
   e) a, b, and c

5. Non-Structural BMPs _A, B, ___
   Structural BMPs _C, D, E, _

   a) Spill Response Prevention
   b) Used Oil Recycling Program
   c) Ponds (Basins)
   d) Mulching and Matting
   e) Infiltration Basin

Module #3 Answer Key

1. Q: Who contributes to non-point source pollution?
   A: a.) Your neighbor
   b) Yourself
   c) Pets
   d) B and C are true
   e) All the above

2. Q: Name one place where non point source pollution comes from?
   A: a) Leaky fluids including oil, brake fluid, and antifreeze
   b) Washing vehicles and equipment
   c) Salt and sand piles
   d) Fertilizers, herbicides and insecticides runoff
   e) All of the above

3. Q: List two ways to recognize Illicit Connections or Discharge Problems?
   A: odor, algae, dry weather flow, floatables

4. Q: Name a source where soil erosion and sedimentation are likely to occur without adequate control?
   A: Construction sites
   Failing drainage ditches and swales
   New and reconstruction

5. Q: True or False-Should you wash your vehicle near storm water drain? If not, where should you wash it?
   A: False, wash it on your lawn.

6. Q: What is a Pollution Prevention Method?
   A: **a) Provide BMPs on storm water runoff**
   b) Read MDOT's Storm Water Management Plan
   c) Keep your grass cut short
   d) Apply fertilizers only before heavy rain

Module #4 Answer Key

1. Q: What does IDEP stand for?
   A: Illicit Discharge Elimination Program

2. Q: If you locate a potential illicit connection that **is not a major emergency**, whom should you contact?
   A:
   a) Your supervisor
   b) Your regional storm water coordinator
   c) Both A & B
   d) Call PEAS

3. Q: If you locate an illicit connection/discharge that **is an emergency**, whom should you contact?
   A:
   a) Call Local First Responder (911)
   b) Your supervisor
   c) Your regional storm water coordinator
   d) Call PEAS
   e) All of the Above

4. Q: Why is storm water pollution a problem?
   A:
   a) Harms wildlife habitat
   b) Increases recreational activities
   c) Decrease aesthetic valves
   d) Degrades the quality of Michigan's water
   e) All above are true
   f) A, C, and D are true

Match the two sides together

5. __C__ Storm water runoff	a.) Discharge from your separate storm sewer drainage system directly to waters of the state
6. __D__ Impervious surface	b.) When pollutants are discharging into a storm drain from a specific source overland into the MDOT right-of-way
7. __A__ Outfall	c.) Water that flows off roofs, driveways, parking lots and streets
8. __E__ Illicit Connection	d.) Roofs, driveways, parking areas, sidewalks, decks, patios, concrete or asphalt streets
9. __B__Illicit Discharge	e.) When a pipe intended for a sanitary sewer ends up in a storm drain