

3.0 STORMWATER INFRASTRUCTURE

3.1 OVERVIEW

A storm drain system is a network of constructed inlets, underground pipes, drainage channels, and other structures that carry and temporarily hold stormwater to be discharged into streams and waterways. This network is the focus of our section on infrastructure operation and maintenance.

Stormwater infrastructure is designed to move volumes of water from a site typically as quickly as possible. For the purposes of this guide, this section will discuss the maintenance practices associated with stormwater infrastructure within the MS4 boundaries and at municipal operations. This section may overlap with your infrastructure mapping and illicit discharge detection and elimination (IDDE) program.



Photo credit Hendricks County Clean Water.

3.2 SITE ASSESSMENT

3.2.1 Infrastructure Mapping

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| Regulation 327 IAC 15-13-17 (b)(1)(B) | Written documentation of maintenance activities, schedules, and long term inspection procedures for BMPs to reduce floatable and other pollutants discharged to the storm sewers. |
| Implementation BMPs | <ul style="list-style-type: none"> • Create and maintain maps of site BMPs and conveyance systems. Site maps differ from IDDE maps in that they are infrastructure maps for each municipally owned facility (Street Departments, Jail, Wastewater Treatment Plant, etc.), whereas an IDDE map will focus on the entirety of each MS4 jurisdictional boundary (refer to 327 IAC 15-13-14 (b) for IDDE). Use existing infrastructure maps for the municipal facility’s site map as part of its SWPPP or other management plan. • Create and maintain inspection plan/logs for BMPs and conveyance systems. • Identify and mark conveyance structures. |
| Programmatic Indicator | <ul style="list-style-type: none"> • Number and locations of storm drains marked, segregated by marking method. • Estimated or actual linear feet or percentage of MS4 mapped and indicated on an MS4 area map. • Number and locations of area outfalls mapped. • Number and location of MS4 area outfalls screened for illicit discharges. |
| Possible Measurable Goals | <ul style="list-style-type: none"> • Number of structures marked as stormwater receiving points. • Number of structures located and mapped utilizing GPS data. • Maintain a structure map as new information becomes available. |
| Documentation | Record the location of all BMP structures and conveyance systems on an aerial map for each MS4 facility, including the date last updated. |

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| Advanced BMPs (optional) | <ul style="list-style-type: none"> • Posted maps of BMP structures and conveyance systems. • Maps indicating areas needed for repair/maintenance. • Maps indicating structures marked/unmarked. • Utilize GIS systems for mapping and data collection for BMP structures and conveyance systems. |
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3.2.2 Infrastructure Monitoring, Maintenance and Rehabilitation

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| Regulation 327 IAC 15-13-17 (b)(1)(B) | An MS4 shall develop and implement a program to ensure that existing operations are performed in ways that will reduce contamination of stormwater discharges. Periodic BMP structure cleaning is defined in the MS4's SWQMP. |
| Implementation BMPs | <ul style="list-style-type: none"> • Locate, identify, and map BMP structure systems, owned and operated by the MS4, including pipes, dry wells, under drains, linings, fill/rip-rap, and outfalls. This information can be obtained from previous mapping efforts. • Create and maintain written documents that describe the frequency of inspection, data collection requirements for maintenance of BMP structures and conveyance systems. This is implemented through the IDDE program. |
| Programmatic Indicator | <ul style="list-style-type: none"> • Estimated or actual linear feet or percentage and location of MS4 conveyances cleaned and repaired. • Number of structures cleaned. • Number of annual inspections for each BMP or conveyance. |
| Possible Measurable Goals | <ul style="list-style-type: none"> • Decrease sediment movement through reduction of scouring outfalls. • Reduce sediment introduced to system through pipe repairs. • Linear feet of buried pipe videotaped or televised (if completed). • Conduct inspections according to schedule in the written document. • Track the number of completed work orders or other tracking process for linear feet of pipe videotaped (if possible), number of inspections completed, linear feet of road side shoulders stabilized, and linear feet of berming. |
| Documentation | <ul style="list-style-type: none"> • Record location and linear feet of pipe or conveyance repaired. • Record location and quantity of material removed from structures cleaned. • Record number of outfalls repaired and quantity of rip-rap used/replaced. • Record and track inspections through an inspection log listing all BMPs and conveyances for the facility. |
| Advanced BMPs (optional) | <ul style="list-style-type: none"> • Introduce infiltration trenches and check dams to existing conveyance systems. • Introduce vegetated filter strips and bio-swales where appropriate. • Implement pervious pavement areas to reduce surface runoff. • Assess self-monitoring inspections for opportunities to implement Advanced BMPs such as, bio-retention, rain gardens, and constructed wetlands to replace failing or ineffective existing measures. • Utilize video or televising for conveyance system evaluation. • Review requirements for Class V injection wells if utilized. |
| Additional Resources | <ul style="list-style-type: none"> • Iowa Department of Natural Resources – Stormwater Manual • University of Wisconsin Extension – Managing Storm Water Runoff: A Self-Assessment Guide for Wisconsin Businesses • North Carolina Department of Environment and Natural Resources – NPDES Phase I/II Inspection Guidance and Checklists |

3.2.3 Litter Pick-Up

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| Regulation: 327 IAC 15-13-17 (b) (1) (A) | Written documentation of maintenance activities, maintenance schedules, and long term inspection procedures for BMPs to reduce floatables and other pollutants discharged from the separate storm sewers. Maintenance activities shall include, as appropriate, the following: (A) Periodic litter pick up as defined in the MS4 area SWQMP. |
| Implementation BMPs | <ul style="list-style-type: none"> • Create and maintain written documentation that describes litter pick-up for the separate storm sewer system. This could be SOPs, SWPPPs, P2&GHMs, or other applicable format. • Include a frequency or schedule for the collection of litter along roadways in the MS4 community and at municipal properties. • Implement employee training for litter collection (refer to Section 2.0 for more information on training requirements). |
| Programmatic Indicator | None. |
| Possible Measurable Goals | <ul style="list-style-type: none"> • Decrease the amount of trash and litter reaching waterways by: <ul style="list-style-type: none"> • Providing public education on the impacts of litter, and • Tracking the number of trash receptacles available in public spaces. • Estimated or actual amount of litter collected both monthly and annually. • Percent of MS4 area where litter has been collected. • Track the number of public education brochures on litter pick-up distributed. • Number of work orders or other document completed for litter collection. • Identify problem sites and post signs or other devices to deter littering. • Number of recycling and/or heavy trash events and the amounts collected. |
| Documentation | <ul style="list-style-type: none"> • Document the amount of solid waste materials collected during litter/trash pickups. • Document the number of times litter/trash is picked up along roadways, waterways, and around recycling centers within an MS4 area through work orders, complaints, or other method. |
| Advanced BMPs (optional) | <ul style="list-style-type: none"> • Provide barriers (fences) around recycling centers to prevent materials from being blown away from the recycling center. • Provide trash and recycling receptacles in downtown and other urban areas. • Require commercial areas to have both trash and recycling receptacles available for the public to use. • Require industries to implement source control practices in their waste disposal areas. • Require Special Events and Public Events to provide trash and recycling receptacles and to implement litter pick-up procedures at the end of the event. • Assess the use and value of trash racks on outlet pipes or other devices in streams to reduce the amount of trash reaching local waterways. Implement where and when possible. |

3.2.4 Remediation of Stormwater Outfall Scouring or Deterioration

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| Regulation: 327 IAC 15-13-17 (b) (1) (F) | Written documentation of maintenance activities, maintenance schedules, and long term inspection procedures for BMPs to reduce floatables and other pollutants discharged from the separate storm sewers. Maintenance activities shall include, as appropriate, the following: (F) Remediation of outfall scouring conditions. |
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| Implementation BMPs | <ul style="list-style-type: none"> • Create and maintain written documentation that describes how to address outfall scouring or deterioration. This could be SOPs, SWPPPs, P2&GHMs, or other applicable format. • Document the condition of an outfall during outfall mapping for future reference. • Implement employee training for outfall scouring (refer to Section 2.0 for more information on training requirements). |
| Programmatic Indicator | <ul style="list-style-type: none"> • Number and location of stormwater outfall areas remediated from scouring conditions. |
| Possible Measurable Goals | <ul style="list-style-type: none"> • Initiate the permit process to replace outfalls identified to have scouring or deterioration issues within two (2) months of discovery. Permits could include disturbance in a waterway from IDEM or Army Corps of Engineers or fill within a floodway from the Department of Natural Resources. • Fix identified outfalls within one (1) year of receiving applicable permits. • Track the number of completed work orders or other documentation of repairs of outfall scouring. |
| Documentation | <ul style="list-style-type: none"> • Retain documentation of new projects that are installed which reduce outfall scouring and stream bank erosion. • GPS the location of the outfall (if it is not already from previous mapping projects) and provide information to the MS4's GIS specialist in order for information to be updated/added to the MS4's stormwater outfall layer. • Retain copies of all applicable permits. |
| Advanced BMPs (optional) | <ul style="list-style-type: none"> • Put in place measures that will prevent scouring or pipe deterioration from occurring during construction or after the fact if needed. • Require both public and private projects to install measures to reduce the velocity of stormwater runoff. • Inspect all outfalls at least once every five years. • When possible, document the remediation process by taking pictures of the before and after conditions of the outfall. • Assess if the project is required to obtain other state or federal permits. |
| Additional Resources | <ul style="list-style-type: none"> • IDEM OWQ - Waterways Permitting Handbook • IDEM OWQ - Indiana Wetlands, Lakes, and Streams Regulation • Indiana DNR Regulatory Programs – Flood Control Act (1-2-3) • Indiana DNR - Construction in a Floodway Permit • USACE – How to Obtain a Permit |

3.2.5 Maintenance Conducted in the Field

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| Regulation: 327 IAC 15-13-17 (b) (1) | <p>Written documentation of maintenance activities, maintenance schedules, and long term inspection procedures for BMPs to reduce floatables and other pollutants discharged from the separate storm sewers.</p> <p>Examples of maintenance activities include: highway/road repairs, bridge maintenance, pothole patching, erosion repairs, infrastructure repair or replacement, roadside stabilization/maintenance, the application of coal tar or other sealants, etc.</p> |
| Implementation BMPs | <ul style="list-style-type: none"> • Create and maintain written documentation for maintenance work conducted in the field. This could be SOPs, SWPPPs, P2&GHMs, or other applicable format. • Provide annual reminders on the importance and necessity of documenting maintenance activities to employees who work in the field (refer to Section 2.0 for more information on training requirements). • Review the forms of documentation once every two years to ensure accurate and relevant information is being retained. • Review maintenance schedules annually. |

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| <p>Programmatic Indicator</p> | <ul style="list-style-type: none"> • Type of inspection and number of inspections conducted annually. • Number of BMPs inspected. • Number of BMPs receiving maintenance. |
| <p>Possible Measurable Goals</p> | <ul style="list-style-type: none"> • Maintenance reports, work orders or other documentation will be filled out each time a maintenance activity occurs and contain detailed information about activities observed and completed in the field. • Track the number of completed work orders or other documentation for maintenance in the field. • Track the number of inspections completed. • Track the amount of material collected by vacuum drains. • Track the number of potholes filled and amount of material used. • Track the number of miles paved and type of material. • Amount of pollutants prevented from discharging from separate storm sewer systems. |
| <p>Documentation</p> | <ul style="list-style-type: none"> • Examples of activities where in-field inspections need to be documented are: <ul style="list-style-type: none"> • Street maintenance/repair and street sweeping • Storm drain maintenance • Maintenance of stormwater quality measures owned and operated by the MS4 including: detention/retention basins, green infrastructure practices, and stormwater treatment structures. • Responses to spills, leaks, illicit discharge incidents, etc. • Stabilization of disturbed soils due to MS4 activities or natural erosion. • Retain all maintenance reports, work orders, and/or other forms of documentation. Documentation needs to be well organized so a person unfamiliar with the facility and the MS4's activities can follow what has been completed. |
| <p>Advanced BMPs (optional)</p> | <ul style="list-style-type: none"> • Inspections of activities at an MS4 Facility may include a check box indicating work orders were reviewed. • Implement an electronic reporting system that can be completed in the field on a digital device. • Provide documentation reports for other MS4 field activities such as construction or land disturbing projects. • Provide example inspection report or documentation templates. |