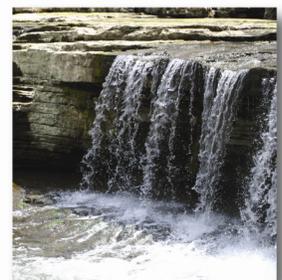
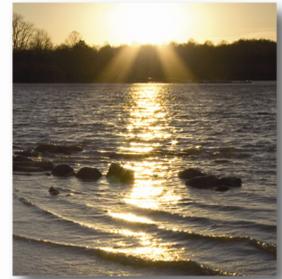


Indiana Storm Water Quality Manual



**Planning and Specification
Guide for Effective Erosion
and Sediment Control
and Post-Construction
Water Quality**



INDIANA DEPARTMENT
OF ENVIRONMENTAL MANAGEMENT

INDIANA STORM WATER QUALITY MANUAL

Planning and Specification Guide
for Effective Erosion and Sediment Control
and Post-Construction Water Quality

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This manual was developed as a cooperative effort between the Indiana State Department of Agriculture's Division of Soil Conservation (formerly with the Indiana Department of Natural Resources) and the Indiana Department of Environmental Management's Office of Water Quality.

Some of the materials presented in this manual have been adapted from similar storm water/erosion and sediment control manuals and documents published by several other states, the United States Environmental Protection Agency, and private consulting firms. A list of these references can be found in the appendices of this manual.

Special thanks to the following for their willingness to review drafts and provide comments and recommendations during the preparation of this manual:

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This manual is a comprehensive resource of planning principles and standards that can be implemented as land is being developed. The manual is a basic reference for the preparation of a storm water pollution prevention plan and for the design, installation, and maintenance of individual storm water quality measures. It is intended to help land users and others comply with state and local storm water quality regulations.

This manual replaces the Indiana Handbook for Erosion Control in Developing Areas. The Indiana Storm Water Quality Manual expands on the basic planning principles and storm water quality measures presented in the original handbook. The manual not only addresses erosion and sediment control, but provides a discussion on environmentally sensitive design and post-construction storm water quality measures.

The manual has been prepared as part of the Indiana Department of Environmental Management's public education and outreach efforts. IDEM's Office of Water Quality will continue its efforts to protect Indiana's natural resources by supporting education and training through the development and distribution of technically accurate reference materials and the promotion and utilization of economically feasible storm water quality principles and procedures.

The Indiana Storm Water Quality Manual is a companion manual to the Indiana Drainage Manual, which is an administrative and technical guide that describes management measures associated with drainage activities. The scope of the Indiana Drainage Manual is limited to agricultural drainage improvement activities that take place within or immediately adjacent to Indiana drainage-ways. Although there are several measures that are duplicated in this manual and the Indiana Drainage Manual, each manual is unique in its application. Depending on the nature of the project and the activities involved, the user may choose to maintain a copy of each document. For more information or to order a copy of the Indiana Drainage Manual, please contact:

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www.IN.gov/dnr/water/surface_water/DrainageHandbook

Each year thousands of acres of Indiana land undergoes disturbance and/or is converted for the construction of subdivisions, commercial and industrial centers, highways, and other land uses. Agriculture and urban development are the two major types of land-disturbing activities in Indiana. Both are very important to the economic well being of the citizens of the state. Without proper planning and the wise selection of storm water management measures, these areas of soil disturbance are very vulnerable to accelerated erosion and sedimentation.

Whenever vegetation is removed from the land's surface, the soil becomes exposed to the erosive effects of wind and water. Although erosion is a natural process, it can be greatly accelerated by human action that disturbs the land's surface. While it is true that the tons of soil eroded on agricultural lands is much greater, it has been proven that the amount of soil eroded on a per-acre basis can be many times greater on active construction sites. The loss of soil through erosion commonly results in the loss of good topsoil and the associated minerals and nutrients required for plant establishment and growth.

Soil erosion not only causes on-site damage problems, but can also negatively impact water quality downstream through sediment pollution. It has been shown that sediment is the number one water quality pollutant by volume in Indiana.

Sediment damage can take many forms. Sediment accumulation in wetlands can reduce their capacity to retain storm water and its value to wildlife. Sediment deposition in storm sewers can reduce their efficiency and capacity. Sediment, and accompanying nutrients, often reaches lakes and leads to algal blooms, a decrease in lake depth, and a decrease in the recreational and aesthetic value of the lake.

In addition to erosion and sediment damage, the building of residential subdivisions, shopping centers, industrial parks, schools, recreational attractions, etc. can have a significant effect on the patterns and amounts of storm water runoff during and after construction takes place. This often leads to water quality degradation and more frequent flooding events. The final land use associated with many projects will also contribute to the discharge of pollutants. These pollutants will typically be generated by the activities that are associated with the final land use.

It is important to practice effective storm water management and treatment of storm water runoff before, during, and after construction. Otherwise, the land-owner and/or public may end up paying more for project reconstruction and replacement/maintenance of existing infrastructure. Furthermore, public environmental awareness demands that land users work with nature, and not against it, to protect Indiana's land and water resources.

There are many ways to minimize the impacts of urbanization and protect the integrity of Indiana's natural resources. One method is through careful planning and inclusion of proven storm water management measures in a project's construction and development plans. Careful planning can prevent or at the very least alleviate much of the damage caused by erosion and sedimentation and the pollutants that will be associated with the final land use. However, careful planning and incorporation of appropriate storm water quality measures into a project's construction plans is not enough. These measures must be deployed and maintained on the site throughout all construction phases.

This manual provides engineers, developers, builders, contractors, government officials, and others with guidelines and specific storm water quality measures for controlling soil erosion; controlling and treating the nonpoint source pollution associated with sediment-laden runoff; and the management and treatment of pollutants associated with post-construction land uses. Adhering to these guidelines and properly applying appropriate storm water quality measures will help minimize the adverse impacts that land disturbance, construction activity, and development can have on soil and water resources, and ultimately, the cost of those impacts to society as a whole. In addition to a variety of storm water quality measures, the manual also discusses the philosophy and planning procedures critical to developing an effective storm water pollution prevention plan.

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- A step-by-step procedure that walks the plan designer through the process of developing a plan that addresses pollution prevention from preconstruction all the way through the final land use;
- Information on the assessment of pollutants associated with preconstruction, construction, and post-construction activities; and
- Guidance in developing a construction sequence schedule and selecting appropriate storm water quality measures that will minimize the impact of pollutants generated during construction phases as well as those generated from the inherent land use after the final project is completed.

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Appendices

The appendices contain a glossary of common terms, a list of exhibits and worksheets for many of the storm water quality measures contained in Chapter 7 of the manual, technical information on various erosion and sediment control measures and materials, and a list of references in the writing of this manual.

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Appendix B: Worksheets & Exhibits

Appendix C: Guide for Use of Geotextiles

Appendix D: Indiana Department of Transportation
Coarse Aggregate Size Specifications

Appendix E: Reading and Understanding Fertilizer Labels

Appendix F: Seed Standards for Indiana

Appendix G: U.S. Department of Agriculture—Natural Resources
Conservation Service Standards & Specifications for
Selected Storm Water Quality Management Measures

- Constructed Wetland
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- Filter Strip
- Grade Stabilization Structure
- Grassed Waterway
- Lined Waterway or Outlet
- Mulching
- Pond
- Riparian Forest Buffer
- Sediment Basin
- Streambank and Shoreline Protection
- Stream Channel Stabilization
- Subsurface Drain
- Tree/Shrub Establishment
- Well Decommissioning

Appendix H: References

Appendix I: Disclaimer & Updates

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