Final Draft
03-06-03
Revised
02-08-05
12-06-12
07-03-13
04-14-15
12-14-21

PHASE II

STORM WATER MANAGEMENT PROGRAM PLAN

Table of Contents

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Section A

Executive Summary

Deerfield Township, Warren County, Ohio, a Municipal Separate Storm Sewer System (MS4), is required to submit a storm water management plan (SWMP) in accordance with 40 CFR Part 122.32 and Ohio law. This document outlines the steps Deerfield Township is taking to maintain, implement and enforce a SWMP designed to reduce the discharge of pollutants to the maximum extent practicable, to protect water quality, and to satisfy the appropriate requirements of the Clean Water Act (CWA) in accordance with the Ohio EPA National Pollutant Discharge Elimination System (NPDES) Phase II Program. This SWMP addresses the six Minimum Control Measures (MCMs) as required by state and federal regulations. The Notice of Intent (NOI) and the original Deerfield Township SWMP were submitted before March 10, 2003.

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Section B

Program Background

Deerfield Township is the most populous township in Warren County, Ohio. The 16square mile township is home to 38,600 residents. Deerfield Township is highly developed and contains five major tributaries to the Little Miami River which establishes its eastern boundary. The area faces unique storm water concerns which set it apart from most other Warren County townships. In 2003 it was determined that Deerfield Township would form a regional storm water district under Ohio Revised Code 6119 to take responsibility for the Township's compliance with Ohio EPA's permit and to address regional storm water concerns.

The Deerfield Regional Storm Water District (DRSWD) was formed at the end of 2003 and the DRSWD Board convened in March of 2004. DRSWD has developed this SWMP to identify the activities and procedures the District implements to meet its goals. Many of these activities are mandated by CWA regulations or are otherwise supporting the Township's NPDES Phase II permit. Other activities, while not mandated, are necessary to advance the District's goals of addressing storm water concerns in Deerfield Township.

Most townships in Ohio rely solely on County agencies to maintain compliance with Ohio EPA's NPDES Phase II Permit and address storm water issues. DRSWD works with partner agencies at Deerfield Township and Warren County to implement the Township's SWMP. An organizational table which identifies partner agencies responsible for implementing activities associated with each of the program's minimum control measures can be found in **Appendix A**. These Partner Agencies communicate regularly with the DRSWD and provide progress reports at the end of each year.

While this SWMP is the official management plan for the program, DRSWD and its partners keep their websites up-to-date as a resource for its residents and businesses.

DRSWD:
https://www.choosedeerfield.com/government/stormwater/about-stormwater/
Deerfield Township:
https://www.choosedeerfield.com/
Warren County Engineer's Office:
http://www.wceo.us/

Warren County Soil and Water Conservation District:
https://www.warrenswcd.com/

Warren County Combined Health District:
http://warrenchd.com/

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Section C

Legal Authority

The Township's legal counsel has advised that Ohio townships lack the legal authority to implement various aspects of the six minimum control measures. Consequently, Deerfield Township is incapable of fully satisfying the Phase II requirements without the assistance of other entities. The DRSWD is charged with administering and coordinating the majority of this SWMP, but it defers much of the program to its partner agencies at Warren County due to legal constraints.

1. Permit Coverage Area

The SWMP covers all properties owned by the Deerfield Township Board of Trustees or maintained by Deerfield Township and that lie within an "Urbanized Area" as defined by the U.S. Census Bureau. In general, this includes all legal road rights of way maintained by the Township and all Township owned facilities. A map of the affected road rights of way and a listing of the affected facilities and other places of interest are attached as **Appendix B**.

2. Reporting Requirements

Deerfield Township will submit its required report annually. The report will include the status of compliance with the permit conditions, and assessment of the appropriateness of the Best Management Practices (BMPs) and progress toward achieving the measurable goals for each of the six minimum control measures. A summary of the activities Deerfield Township will undertake during the reporting cycle and any changes to BMPs or measurable goals and all relevant data obtained during the reporting period.

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Section D

Storm Water Management Program Plan

The Plan outlines the six minimum control measures which are expected to result in reductions in pollutants discharged in Deerfield Township, Ohio. The six minimum control measures will address the water quality pollutants that are identified during the planning process. Each minimum control measure will have four stages: planning, programming, implementation, and maintenance. During the planning stage, water quality pollutants were identified, BMPs were selected and programs and program materials were developed. During the Programming Stage, the programs developed during the planning stage will be scheduled. Finally, the programs will be implemented and once they are fully implemented, maintenance procedures will be adopted.

The six minimum controls are:

(1) Public education/outreach;

(2) Public participation/involvement;

(3) Illicit discharge detection/elimination;

(4) Construction site runoff control;

(5) Post construction runoff control;

(6) Pollution prevention/good housekeeping.

Deerfield Township is completely contained in the Little Miami River Lower Watershed. The DRSWD has reviewed and evaluated the recommendations provided in the Little Miami River Lower Watershed Total Maximum Daily Load (TMDL) report approved by U.S. EPA in the March of 2011. The DRSWD's Storm Water Management Program Plan includes several program components that have been implemented to address sources of impairment to aquatic life and recreation, including Construction Site and Post Construction Runoff Control measures to mitigate sedimentation and siltation and an Illicit Discharge Detection and Elimination plan to address and prevent illicit connections and discharges to the Township's separate storm sewer system.

1. Public Education and Outreach

Rationale Statement: The DRSWD will work in cooperation with the Warren County Soil and Water Conservation District (WCSWCD) to provide education and outreach to at least 50% of the Township's population over each permit term, using at least one mechanism to target at least five different storm water themes. The WCSWCD staff will serve as the lead agency on this Minimum Control Measure. The DRSWD has in past years contributed to the Regional Storm Water Collaborative to provide further outreach to the Township's population.

The DRSWD and WCSWCD will focus its public education and outreach efforts on the following target audiences:

- Township Residents
- Students
- Developers
- Township Businesses

The DRSWD and WCSWCD will provide education and outreach on the following messages:

- Watershed Awareness
- Nutrification
- Sedimentation
- Hydromodification
- Household Hazardous Waste

The DRSWD and WCSWCD will provide education and outreach utilizing the following mechanisms:

- school presentations
- material distribution at local events
- regular WCSWCD and DRSWD meetings
- television-based outreach
- web-based outreach
- direct response to calls to the Township's storm water hotline
- storm drain labeling
- stream signage

The DRSWD and WCSWCD will evaluate the public education and outreach BMPs annually during the development of the Township's Annual Report.

Minimum Measure Objective: Implement a public education and outreach program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of storm water discharges and steps the public can take to reduce pollutants in runoff.

BMP 1.1: Storm Water Material Distribution Mechanisms
Measurable Goals: Reach at least 20% of the Township's population utilizing at least two (2) public outreach mechanisms each program year.

The DRSWD maintains an informational website for web-based outreach. This website also contains program policy information, program documents, public meeting announcements and updates the District's progress toward addressing storm water issues. The DRSWD website can be accessed at https://www.choosedeerfield.com/government/stormwater/about-stormwater/.

The DRSWD collaborates with WCSWCD to provide school presentations, distribute material at local events and organize public involvement activities. The WCSWCD strives to reach as many school aged children as possible with classroom presentations that are relevant to the curriculum standards for water quality. Networking with local educators is done by distributing a brochure of programs offered by the WCSWCD from which teachers and schools can schedule programs (Appendix C). In addition, printed materials such as brochures are distributed out of the WCSWCD office, at district booths at fairs and festivals, and are available for printing on websites, all of which are tracked for reporting purposes.

Media outreach is available to 100% of the population of Deerfield Township. The DRSWD partners with the Regional Storm Water Collaborative to provide television-based outreach as well as to assist in providing web-based outreach. This technique educates the public about potential sources of pollution, equips them to prevent and report pollution effectively, and offers other valuable storm water messages. Television spots aired are reported by local stations on a monthly basis. Website hits can be tallied upon request and are counted for an annual total each year. Social media affords the ability to track very specific numbers such as views, comments, and likes for posts while reaching a large and local audience.

BMP 1.2: Storm Water Program Support Mechanisms
Measurable Goals: Maintain DRSWD website. Continue to participate in regional partnerships. Provide residents access to resources to call and report storm water pollution violations.

The DRSWD provides information to the public at its regular Board Meetings, maintains partnerships with its partner agencies and the Regional Stormwater Collaboration, and provides direct responses to calls about general drainage issues.

The DRSWD also coordinates with the WCSWCD to provide information to the public at its regular meetings.

DRSWD provides a list of contacts and hotlines for public reporting of storm water pollution and other relevant topics including general drainage issues, other discharges, spills, or pollution, leaking HSTSs, and sediment and erosion control issues. The list is located on the DRSWD website.

BMP 1.3: MS4 Identification Measures
Measurable Goals: Continue to provide drain stenciling or tagging on new storm inlets within the Township. Maintain signage at strategic crossing locations along all streams throughout the Township, inspecting each crossing once each program year.

The DRSWD inspects and maintains stream signage throughout the Township.

The DRSWD partners with WCSWCD to facilitate storm drain labeling.

BMP 1.4: Evaluate Public Education and Outreach BMPs
Measurable Goals: Confirm whether the measurable goals associated with Public Education and Outreach BMPs are relevant, quantitative, and achievable at the end of each program year.

The DRSWD evaluates the SWMP BMPs and measurable goals while preparing the annual report each program year.

2. Public Participation/Involvement

Rationale Statement: The DRSWD continues to work in cooperation with the WCSWCD to support at least five public participation and involvement activities over the permit term. For DRSWD to capitalize on readily available resources, WCSWCD staff will serve as the lead agency on this MCM.

The DRSWD and WCSWCD will focus its public education and outreach efforts on the following target audiences:

- Township Residents
- Homeowners Associations
- Township Businesses

The DRSWD and WCSWCD will provide public participation and involvement opportunities utilizing the following mechanisms:

- hold regular WCSWCD and DRSWD meetings
- address private property storm water issues within the Township
- implement stream clean-up events with educational components
- advertise public involvement opportunities through outreach mechanisms

The DRSWD and WCSWCD will evaluate the Public Involvement and Participation BMPs annually during the development of the Township's Annual Report. This evaluation could include revisions or updates to the SWMP. WCSWCD will continue to track the number of residents attending public meetings and participating in involvement activities.

Minimum Measure Objective: Involve stake holder groups, including local governments, businesses, and citizens, in making decisions about storm water management priorities and programs.

BMP 2.1: Public Involvement Mechanisms
Measurable Goals: Hold monthly meetings to educate the public of local storm water issues and provide a forum for public input. Address private property storm water issues within the Township in accordance with new DRSWD Code of Regulations last modified in late 2017.

The DRSWD holds monthly meetings and administers a program to catalog, rank, and address private property storm water issues. Interested parties are notified of these meetings and of the opportunity to serve on the DRSWD board through information provided on the District website.

DRSWD has established a set of Criteria for Assistance outlining the types of projects eligible for District assistance including facilities in public-use easements or facilities which carry public storm water. Members of the public may fill out a Request for Assistance form, available through the DRSWD website, to request funding for capital improvement projects outlined in the Criteria.

BMP 2.2: Public Participation Mechanisms
Measurable Goals: Work with community groups to support one public participation activity each year. Advertise through at least one public education and outreach mechanism.

The DRSWD works with the WCSWCD to implement a public participation activity each year as well as advertise the event in one of the District's outreach mechanisms. The activities hosted for public participation include such things as stream clean-ups, rain barrel workshops, and other activities as requested.

BMP 2.3: Evaluate Public Participation and Involvement BMPs
Measurable Goals: Confirm whether the measurable goals associated with Public Participation and Involvement BMPs are relevant, quantitative, and achievable at the end of each program year.

The DRSWD evaluates the SWMP BMPs and measurable goals while preparing the annual report each program year.

The DRSWD evaluates the effectiveness of work performed under these BMPs at targeting a broad and diverse audience of Township residents, developers, industries, and businesses.

3. Illicit Discharge Detection and Elimination

Rationale Statement: The DRSWD continues to work to implement a storm water illicit discharge detection and elimination program including an initial dry-weather screening of all storm water outfalls over the permit term and establishing priorities and specific long-term system-wide surveillance of the Township's MS4. The DRSWD will work in cooperation with the Warren County Engineer's Office (WCEO) to maintain and annually update a comprehensive storm sewer system map. The DRSWD will serve as the lead agency on this MCM.

For each permit term, the DRSWD performs a dry weather outfall screening. In accordance with the District's Illicit Discharge Detection and Elimination Plan the field staff screen each outfall during dry weather conditions and use the District's MS4 map to trace flow observed at each outfall to determine its source. The DRSWD reports all identified illicit discharges to the Warren County Combined Health District (WCCHD), or other applicable enforcement agency.

The DRSWD works with WCCHD, which is the regulatory agency for illicit discharges in the Township, to regularly track and inspect HSTSs and storm water outfalls as part of their Environmental Health Program. The District will track complaints and forward information about illicit discharges as it becomes available.

The DRSWD will evaluate the Illicit Discharge Detection and Elimination BMPs annually during the development of the Township's Annual Report. This evaluation could include revisions or updates to the SWMP.

Minimum Measure Objective: Maintain a comprehensive map of the storm drain system, establish, and carry out procedures to identify and remove illicit discharges, establish legal authority for enforcement actions, and encourage public education and involvement in eliminating illicit discharges. (Illicit discharges are defined as any discharge not entirely composed of storm water and are considered "illicit" because MS4s are not designed to accept, process, or discharge such non-storm water waste.)

BMP 3.1: Ordinance or Other Regulatory Mechanism
Measurable Goal: Report all relevant illicit discharges to the WCCHD or other applicable enforcement agency.

If an illicit discharge is identified, as the regulatory agency, WCCHD will be notified to take any necessary enforcement actions on behalf of the District.

Illicit discharges are prohibited by the Ohio Revised Code Chapter 3718, Ohio Administrative Code Chapter 3701-29, and by the "Warren County Combined Health District Sewage Treatment System Regulations."

BMP 3.2: Develop a storm sewer system map
Measurable Goal: Maintain a storm sewer map showing all pipes, structures, outfalls, detention basins, and the names and locations of surface water of the state within the Township within the permit term. Develop and prioritize for inspection a list of outfalls for follow-up inspections for the permit period.

The storm sewer map of Deerfield Township is maintained and updated with support from WCEO. The map is used as a resource for ongoing illicit discharge detection and elimination efforts.

BMP 3.3: Create a map of the home sewage treatment systems
Measurable Goal: Maintain an up-to-date Home Sewage Treatment System (HSTS) map.

The HSTS map for the District has been completed and will be used as a resource for ongoing illicit discharge detection and elimination. Using the HSTS map, the District will be better able to identify problem areas and will work with the WCCHD, as the enforcing agency, on a case-by-case basis to correct these problems.

The DRSWD utilizes resources provided by WCEO and WCHD to update and maintain the HSTS mapping for Deerfield Township.

BMP 3.4: IDDE Plan
Measurable Goals: Confirm whether the measurable goals associated with Illicit Discharge Detection and Elimination BMPs are relevant, quantitative, and achievable at the end of each program year.

The DRSWD evaluates the SWMP BMPs and measurable goals while preparing the annual report each program year.

BMP 3.5: Dry-Weather Screening of Outfalls
Measurable Goal: Continue to identify non-storm discharges to the Township's MS4 throughout the five-year permit term. Cooperate with appropriate enforcing agencies to eliminate all identified illicit discharges. Maintain a hotline for citizens to report illegal dumping and suspicious discharges. Provide hotline phone number to residents in at least one education and outreach publication.

The DRSWD performs an initial dry-weather screening for each permit term and is responsible for performing follow-up inspections. The DRSWD also provides a hotline resource for citizens to report suspicious discharges, spills, or potential pollution. The DRSWD provides the hotline phone number on its website.

The DRSWD partners with WCCHD and other applicable enforcement agencies to take enforcement action against the sources of illicit discharges to the Township's MS4. If an illicit discharge is identified, as the regulatory agency, WCCHD will be notified to take any necessary enforcement actions on behalf of the District.

4. Construction Site Runoff Control

Rationale Statement: The DRSWD works in cooperation with WCSWCD to maintain a construction site storm water control program including a pre-construction storm water pollution plan review of all projects which include construction activities that result in a land disturbance of greater than or equal to one acre, initial site inspections, and monthly follow-up inspections. The WCSWCD will serve as the lead agency on this MCM – significant assistance from WCEO is also anticipated with regard to post-construction stormwater plan reviews.

Deerfield township, as a unit of Warren County, is subject to all Warren County rules and regulations for construction site runoff control measures. Therefore, enforcement occurs at a county level for this MCM. Warren County's Construction Site Runoff Control program comes directly from the "Warren County Erosion and Sediment Control Regulations" (Appendix D) adopted by the Warren County Commissioners February 5th, 2019. These regulations were written to comply with the Ohio EPA General Construction Permit in effect at the time of adoption. These regulations are enforced by the equivalent of two full-time staff people at the WCSWCD.

The DRSWD, WCSWCD and WCEO will perform reviews of all applicable site plans each program year. As the regulating and enforcing agencies for the Warren County Construction Site Runoff Control Program, WCSWCD reviews the storm water pollution prevention plans for erosion and sediment control on all applicable sites while the WCEO reviews storm water calculations and post-construction BMP plans as described in section five of this plan. Inspections are done monthly on active sites using a web-based inspection form (Appendix E) which generates a maintenance letter based on how the inspector fills out the form (Appendix F).

Minimum Measure Objective: Maintain, implement, and enforce a program to reduce pollutants in storm water runoff to the small MS4 from construction activities that result in a land disturbance of one (1) or more acres.

BMP 4.1: Ordinance or Other Regulatory Mechanism
Measurable Goal: Support and enforce regulations for all required projects.

The DRSWD relies on WCSWCD to support and enforce regulations on all required projects.

BMP 4.2: Sediment and Erosion Control Requirements
Measurable Goal: Review, support, and enforce sediment and erosion control requirements. Incorporate current version of Ohio EPA's Construction General Permit into local regulations.

The DRSWD partners with WCSWCD to review, support, and enforce sediment and erosion control requirements.

BMP 4.3: Complaint Process
Measurable Goal: Respond to all complaints within one week of receipt.

The DRSWD coordinates with WCSWCD to respond to all complaints.

BMP 4.4: Site Plan Review Procedures
Measurable Goal: Review all applicable site plans.

The DRSWD coordinates with WCEO and WCSWCD to review all applicable site plans each program year.

BMP 4.5: Site Inspections Procedures
Measurable Goal: Continue to comply with inspection procedures outlined within the Warren County Erosion and Sediment Control Regulations.

The DRSWD utilizes WCSWCD to perform erosion and sediment control site inspections.

BMP 4.6: Enforcement Procedures
Measurable Goal: Continue to implement escalating enforcement actions where projects violate the rules and regulations.

The DRSWD coordinates with WCSWCD to take enforcement actions against projects violating the rules and regulations.

5. Post Construction Runoff Control

Rationale Statement: The DRSWD will continue to work in cooperation with WCEO to maintain a post-construction runoff control program including a pre-construction storm water pollution prevention plan review of all projects which include post-construction controls, inspection of post-construction controls, and the development of ongoing long-term operation and maintenance plans. The WCEO will serve as the lead agency on this MCM.

As an enforcing agency for this regulation, WCEO currently administers the post-construction storm water management program for Deerfield Township. This program addresses storm water

runoff in new development and redevelopment by requiring storm water retention or detention in accordance with the standards set forth by the regulations, "Warren County, Ohio Rules and Regulations for the Design of Sewer and Stormwater Management Systems" (Appendix G).

Minimum Control Objective: Maintain, implement, and enforce a program to address storm water runoff from new development and re-development projects that disturb one (1) or more acres of land.

BMP 5.1: Ordinance or Other Regulatory Mechanism
Measurable Goal: Utilize the County's Stormwater Management Systems Regulations to require post-construction BMPs per the applicable design criteria set forth in those regulations.

The DRSWD cooperates with WCEO as an enforcing agency to implement and enforce these regulations.

BMP 5.2: Post-Construction Requirements
Measurable Goal: Maintain compliance with the Warren County Rules and Regulations for the Design of Sewer and Stormwater Management Systems.

The DRSWD has an agreement with WCEO and WCSWCD to implement and enforce these regulations.

BMP 5.3: Site Plan Review Procedures
Measurable Goal: Implement the newly developed pre- and post-development release rate tables and hydrographs during the site plan reviews of all applicable sites within the Township.

The DRSWD developed pre- and post-development release rate tables and hydrographs as part of the Township's storm water master plan for application in site plan reviews. These release rate tables are available in Appendix H.

The DRSWD cooperates with WCEO as an enforcing agency for this regulation, to perform site plan reviews. The post-construction BMPs that are approved for use come from the State's approved list and are described throughout the current Ohio EPA Construction General Permit. Further specifications are included in the Ohio Department of Natural Resources *Rainwater and Land Development* manual.

BMP 5.4: Site Inspection Procedures
Measurable Goal: Perform inspections on all applicable sites.

The DRSWD coordinates WCSWCD, as an enforcing agency for this regulation, to perform site inspections on post-construction BMPs and issue maintenance need letters. The WCSWCD in cooperation with the WCEO inspects all post-construction storm water BMPs on a biennial basis, or yearly if the BMP is designed to treat storm water quality. The inspection history and location of all BMPs in managed in a GIS database that includes photographs of the BMPs, as-built information, and recommended maintenance comments.

BMP 5.5: Enforcement Procedures
Measurable Goal: Enforce the Rules and Regulations as applicable.

The DRSWD cooperates with WCEO to enforce the rules and regulations for post-construction standards during the plan review stage, throughout construction, and prior to releasing a project's bond. WCSWCD, as the enforcing agency for these rules and regulations, is the designated authority to issue letters of enforcement after inspection of BMPs. Following the inspections letters are generated and sent to property owners for all BMPs that require maintenance (Appendix F).

BMP 5.6: Long-Term Operations and Maintenance (O&M) Plans and Agreements
Measurable Goal: Develop long-term O&M plans for all applicable sites.

The DRSWD cooperates with WCEO, as the enforcing agency for existing county regulations, to enforce the development of long-term O&M plans for applicable sites. Long term operation and maintenance of the storm water system is addressed in the Warren County Subdivision Regulations whereby, "The developer of any subdivision with a storm water system must provide the Regional Planning Commission with written evidence of a perpetual maintenance agreement and the manner in which it is to be funded" (pg. 60). In addition, as-builts are required for all components of the storm water system before the project's bond is released from the WCEO.

6. Pollution Prevention/Good Housekeeping

Rationale Statement: The DRSWD will continue to work in cooperation with Deerfield Township to maintain a pollution prevention and good housekeeping program including an annual employee training effort. The Township will serve as the lead agency on this MCM.

The DRSWD and the Township developed Storm Water Pollution Prevention Plans (SWPPPs) for Township facilities and implemented a training program to educate Township employees in good housekeeping practices. The DRSWD and the Township will continue to track waste disposal, road salt, pesticide and herbicide usage and fertilizer usage. The Township does not own or operate any facility subject to the Ohio EPA Industrial Storm Water Permit.

Minimum Measure Objective: Continue the ongoing development and implementation of an operation and maintenance program that includes a training component and has the ultimate goal of preventing pollutant runoff from municipal operations.

BMP 6.1: Training program for public employees of the Township
Measurable Goals: Provide storm water management education to 100% of Public Works Employees.

The DRSWD works with the Township to educate its employees.

BMP 6.2: Develop a pollution prevention plan for facilities subject to the program
Measurable Goals: Implement inspections procedures for Township facilities and track waste disposal.

The DRSWD works with the Township to inspect its facilities.

BMP 6.3: MS4 Maintenance
Measurable Goals: Maintain the Township's MS4 within the right-of-way.

The DRSWD partners with the Township and Warren County to maintain infrastructure within their respective right-of-way.

BMP 6.4: Incorporate the use of road salt storage control and implement road salt alternatives for roadway de-icing
Measurable Goals: Work to minimize salt usage while maintaining road safety.

The DRSWD works with the Township to identify appropriate alternative roadway de-icing approaches.

BMP 6.5: Pesticide and Herbicide Usage
Measurable Goals: Minimize pesticide and herbicide application.

The DRSWD works with the Township to apply pesticide and herbicide appropriately.

BMP 6.6: Fertilizer Usage
Measurable Goals: Minimize fertilizer usage at Township Parks.

The DRSWD works with the Township to apply fertilizer appropriately.

BMP 6.7: Street Sweeping
Measurable Goals: Track amount of material collected and disposed of for each street sweeping event.

The DRSWD conducts annual street sweeping.

BMP 6.8: Flood Management Projects
Measurable Goals: Undertake flood management projects within the purview of the Township's Public Works Department.

The DRSWD works with the Township to undertake flood management projects within the Township right-of-way.

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Section E

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel, properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, information submitted is, to the best of my knowledge, true, accurate and complete. I am aware that there are significant penalties for submitted false information including the possibility of fine and imprisonment for known violations.

Deerfield Administrator

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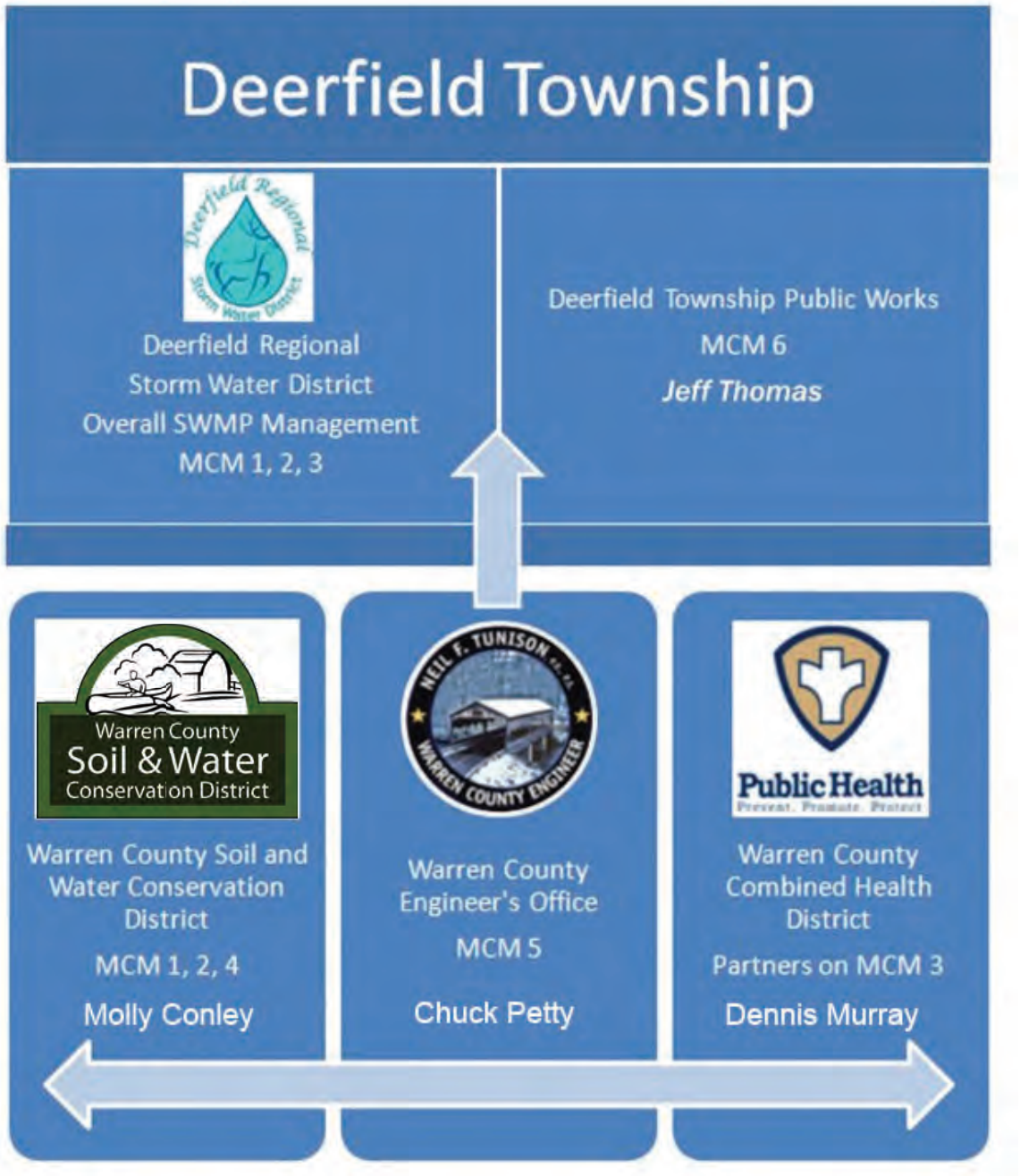
APPENDIX A

Deerfield Regional Storm Water District Organizational Chart

Include or attach a Table of Organization. Indicate who (name and contact information) is responsible for overall management and implementation of your program, and if different, each minimum control measure of your program. Identify how development and implementation across multiple positions, agencies and departments occur. Also, identify any Memorandum of Understandings (MOUs) or other such agreements that exist.



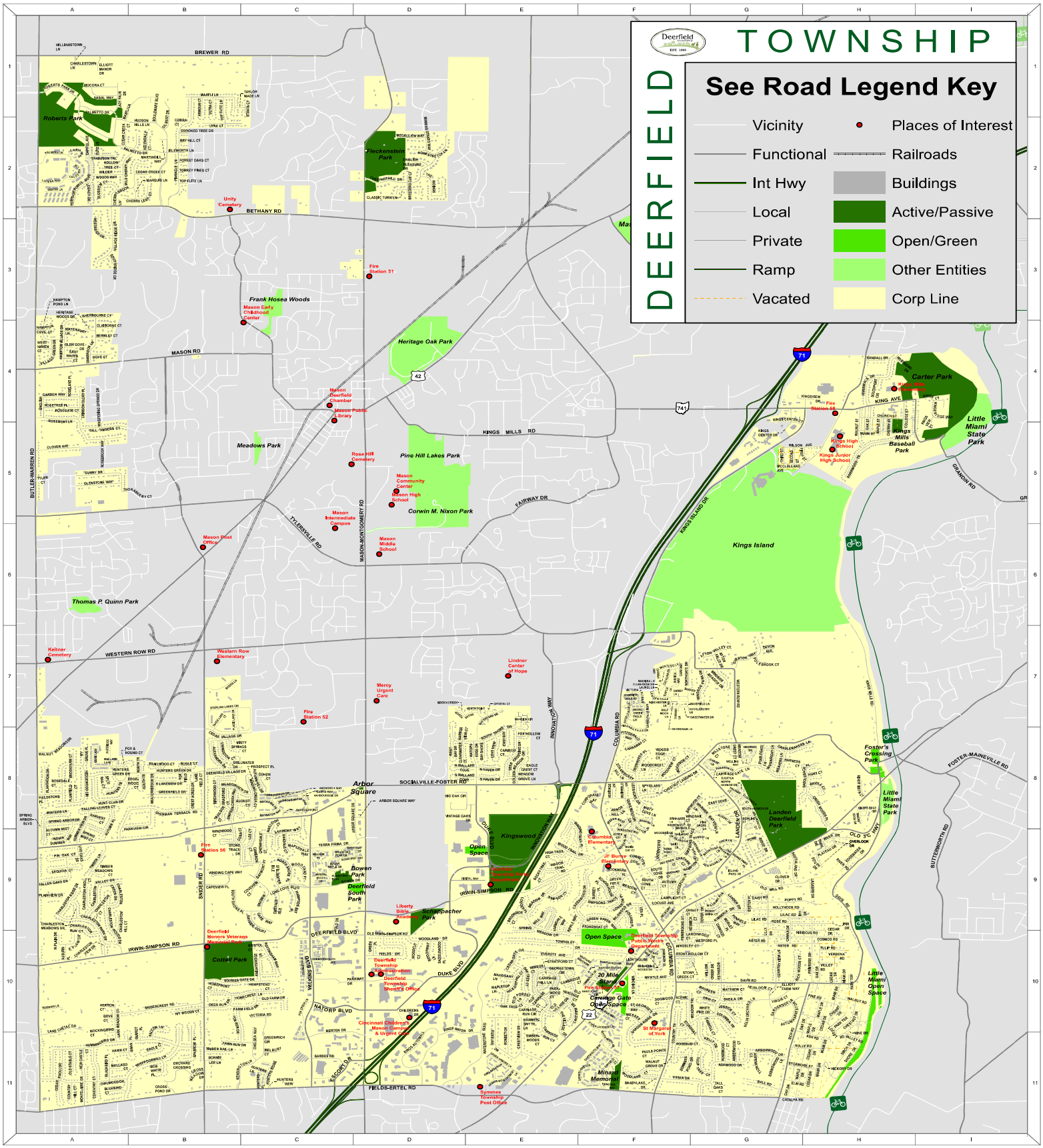
MS4 Table of Organization Deerfield Township, Ohio

Dennis Murray | WCCHD - 513-695-2941; dennis.murray@co.warren.oh.us
Chuck Petty | WCEO - 513-695-3301; pettce@co.warren.oh.us
Jeff Thomas | Deerfield Twp - 513-701-6958; jthomas@deerfieldtwp.com
Molly Conely WCSWCD - 513-695-3085; molly.conely@co.warren.oh.us

APPENDIX B

Map of Affected Township Roads

Street Guide



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The provider will not be liable for direct, indirect, incidental, or consequential damages resulting from any defect in the information.

The provider shall have no liability for any other information, programs or data used with or combined with the requested information, including the cost of recovering information, programs or data.

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Date of Last Revision: July 2019

Deerfield Township Street Guide

Deerfield Township Service Directory

Township Administration Office
4900 Parkway Dr. Suite 150, Mason OH 45040
Phone 513-701-6958, Fax 513-701-6996
www.choosedeerfield.com

Township Administration

Administrator, Eric Reiners	513-701-6973
Human Resource Specialist, Alicia Hamann	513-701-6968
Administrative Receptionist, Bobbi Kessler	513-701-6958
Administrative Services Clerk, Susan Secrist	513-701-6972
Fire Chief, Chris Eisele	513-701-6962
Deerfield Post WCSO, OIC, Lt. Todd Snelling	513-701-1801
Economic Development Director, Jim Flick	513-770-2386
Planning & Zoning Director, Sam Hill	513-701-6964
Planning Manager, Hayfaa Wadih	513-701-6976
Zoning Coordinator, Ronnie Caldwell	513-701-6970
GIS/IT Manager, Doug Adams	513-701-6967
Public Works Director, Billy Highfill	513-701-6974
Public Works Coordinator, Chip Cowan	513-701-6978
Stormwater Manager, Jeff Thomas	513-770-2387
Road Superintendent, Jim Houston	513-583-4793
Parks / Cemetery Supervisor, Mark Steiner	513-398-7871
Parks Director, Joel Smiddy	513-701-6975
Camps Director, Stephanie Gebele	513-701-6977
Assistant Camps Director, Maria Iannelli	513-770-2384
Finance Director, Jennifer Wagner	513-701-6969
Senior Finance Associate, Ana Ramanathan	513-701-6961
Finance Associate, Jim Ross	513-701-6960

Trustee Meeting Room
4900 Parkway Dr. Suite 180, Mason OH 45040

Township Elected Officials

Trustee, Lonnie Vestal	513-518-4190
Trustee, Kristin Malhotra	513-340-2250
Trustee, Lelle Lutts Hedding	513-833-0062
Fiscal Officer, Daniel J. Corey	513-774-0781

Regularly Scheduled Meetings
Township Trustees Meetings - First Tuesday at 6:00 PM
Township Trustees Work Sessions - Third Tuesday at 5:30 PM
Zoning Commission - Second Monday at 6:30 PM
Board of Zoning Appeals - Second Thursday at 6:30 PM
Deerfield Regional Stormwater - Second Tuesday at 6:00 PM

APPENDIX C

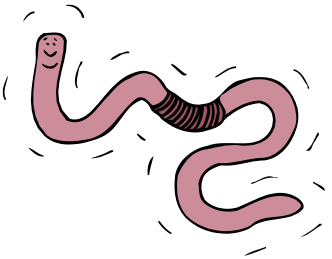
Brochure of Programs Offered by WCSWCD

Free Classroom Programs
Kindergarten

Fishing Fun
Learning Objective: Fish live in the stream and need clean water.
Activity: Listen to a story while observing how fish are affected by changes in stream water quality. Then have a chance to "fish" for types of fish found in Ohio.

Bob and Otto
Learning Objective: Worms are alive, live in the soil, eat decaying leaves, and help plants grow.
Activity: Students are read a book and then get to visit with some live worms.

Dress like a Beaver
Learning Objective: Students learn about busy beavers.
Activity: Learn about a beaver's habitat and adaptations by dressing like a beaver.



Warren County Soil & Water Conservation District

Email:
melissa.proffitt@co.warren.oh.us
Website: www.WarrenSWCD.com

Free Classroom Programs- First Grade

How Many Bears Can live in this Forest? **Learning Objective:** Living things have basic needs; humans and seasonal change can impact the availability of resources.
Activity: Learn about bears by playing a game where students must find their food!

Ohio Habitats **Learning Objective:** Living things interact with their physical environment.
Activity: Students will learn Ohio's habitats and will place animals in their rightful habitat.

Gobble Gobble **Learning Objective:** Living things have certain characteristics and use body parts to seek resources.
Activity: Students learn about a turkey's habitat, predators, and make a turkey call.

Henry the Great Blue Heron **Learning Objective:** Living things have certain characteristics and use body parts to seek resources.
Activity: Henry the Impatient Heron is read and students learn about beak adaptations in birds.

Warren County Soil & Water Conservation District

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Free Classroom Programs– Second Grade

Water Cycle Game (*Large space recommended)*

Learning Objective: Water moves in a continuous cycle; students relate terms with properties of water.
Activity: Students map their journey in the water cycle with beads.

Fossils **Learning Objective:** Some kinds of individuals that once lived on Earth have completely disappeared.
Activity: Observe fossils from rock layers and make a fossil imprint to take home.

Wiggling Worms **Learning Objective:** Earthworms cause changes to the soil which impacts other living things.
Activity: Students make observations about live earthworms.

Beaver Builders **Learning Objective:** Students learn about nature's best engineer, the American beaver.
Activity: Learn about physical and behavioral adaptations of beavers, and how they change their environment.

Miranda the Fish **Learning Objective:** Human activity can change environments and affect other living organisms.
Activity: Journey with Miranda down the river and see how pollution can harm her home.

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Free Classroom Programs – Third Grade

Soil Particles **Learning Objective:** Students learn that Earth's non-living resources have specific properties.
Activity: Students investigate soil particles and learn about the composition of soil through a story and hands-on activities.

Geology Stations **Learning Objective:** Rocks have unique characteristics.
Activity: Students are given rocks and must determine which type of rocks they have.

Toil for Oil **Learning Objective:** Explore Ohio's renewable vs. nonrenewable resources and relate to conserving our limited resources that are used for energy.
Activity: Students experience the increasing difficulty of extracting a limited, nonrenewable resource over several years and will consider and discuss renewable energy sources.

No Water off a Duck's Back **Learning Objective:** Oil is a non-renewable natural resource. Oil spills can occur with the transportation and drilling for this natural resource, and have negative environmental consequences.
Activity: Students learn about how oil spills affect ecosystems and wildlife. They investigate different techniques to clean up waterfowl affected by an oil spill.

Buzzy, Buzzy Bee **Learning Objective:** Learn about life cycles as well as physical and behavioral traits of organisms.
Activity: Be reacquainted with a famous pollinator, why we need them, and play a bee game.

Animal and Plant Addresses
Learning Objective: Plants and animals have physical features that they associate with the environments in which they live.
Activity: Students compete by guessing an animal based on life cycle and adaptations clues.

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Free Classroom Programs– Fourth Grade

Stream Ecosystem **Learning Objective:** Insects found or not found in the stream are water quality indicators. **Activity:** Students learn about how they impact water quality by finding insects in a simulated stream.

Erosion/Stream Table (needs lab space) **Learning Objective:** Geologic processes affect change on the Earth's surface.
Activity: A ***Riverlab*** stream model is used to illustrate different erosion and deposition processes on a natural landscape. ***This may also be borrowed.***

Earth Formations **Learning Objective:** Environmental changes, like weathering or erosion, can be constructive, destructive or even neutral.
Activity: Students visit five stations and conduct erosion, weathering, physical and/or chemical change experiments.

Topographic Maps **Learning Objective:** Learn about geologic history, including processes like glacial movement that changed the Earth's surface.
Activity: Students analyze a topographic map of their school's location and conduct an activity with contour lines.

Fossils **Learning Objective:** Fossils provide a point of comparison between the types of organisms that lived long ago and those that exist today.
Activity: Observe fossils from rock layers and compare structures on different fossils through a "mystery" game based on scientific observation!

Here Today Gone Tomorrow
Learning Objective: Learn about the life of Ohio animals that have disappeared, are endangered or threatened. **Activity:** Students will learn about animals that are in trouble and get to touch some animal skins. (In the fall, we can focus on bats.)

Warren County Soil & Water Conservation District

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Free Classroom Programs– Fifth and Sixth Grade

Grade 5

Decomposers **Learning Objective:** Students learn about the decomposer food chain. **Activity:** Students discover nature's sanitation crews and why they are important. Students will also get to take a look at some composting worms that are hard at work.

Energy Pipeline **Learning Objective:** Energy flows through the ecosystem in one direction from plants to decomposers. **Activity:** Students play a game that demonstrates the interactions of organisms resulting in the flow of energy throughout ecosystems.

Shop Till You Drop! **Learning Objective:** Choices people make have both present and future consequences.
Activity: Students experience how resources are distributed and used by different people based on access to wealth. Then, they will discuss solutions to address the environmental impacts and to help alleviate poverty.

Links in a Chain **Learning Objective:** Discover that a stream ecosystem is diverse and supports many different species. Stream life is linked together in a food chain. **Activity:** Teams of students compete in a relay race to build a stream food chain with links of different species.

Grade 6

Soil Computer Lab **Learning Objective:** Students learn about mapping soils by using the Web Soil Survey to access geological and properties of soil types.
Activity: Students learn about soil types around them, reasons to study soil, and become scientists by mapping soil with the on-line Web Soil Survey.

Soil Testing **Learning Objective:** Students use a dichotomous key to test soil.
Activity: Students become soil scientists by investigating and testing soil properties with a dichotomous key.

Soil Layers **Learning Objective:** Investigate the different soil horizons while comparing the mineral composition; realize our need for soil conservation.
Activity: Students focus on the layers found in soil and glue soil horizons on a card to take home.

Rock Cycle Game **Learning Objective:** Rocks form in different ways and have specific properties. **Activity**: Students become minerals in the rock cycle and learn about everyday uses of rocks and minerals.

Warren County Soil & Water Conservation District

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Free Classroom Programs– Seventh and Eighth Grade

Grade 7

Hydrological Cycle Game **Learning Objective:** Students learn about the hydraulic cycle, pollution, and problems as pollution can move through the water cycle. **Activity:** Students map their journey in the water cycle with beads and learn about water quality issues that are happening around Ohio.

Groundwater Model **Learning Objective:** Water is collected, stored and removed in groundwater as well as pollution that can contaminate water. **Activity:** A groundwater model is used to show how water flows through rock and what can contaminate the water.

Stream Field Trip **Learning Objective:** Students learn about water quality by doing the following tests: pH, phosphate, nitrate, and macroinvertebrate collecting. **Activity:** Students walk (or are bused) to a local stream to do water quality testing.

Grade 8

Topographic Maps **Learning Objective:** Learn about geologic history, including processes like glacial movement that changed the Earth's surface. **Activity:** Students analyze a topographic map of their school's location and conduct an activity with contour lines.

Sink Hole in a Cup **Learning Objective:** Students learn about karst formations and sinkholes. **Activity:** Students make sinkholes and monitor changes.

Geology Table **Learning Objective:** Students learn about different geological process and how a combination of constructive and destructive processes shape Earth's surface. **Activity:** Students observe geological formations through an interactive sand table.

Bottleneck Genes **Learning Objective:** Students learn about genetic diversity within a population. **Activity:** Students do an activity calculating genetic diversity in a population and track changes in that population.

Warren County Soil & Water Conservation District

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Website: www.WarrenSWCD.com

High School Envirothon Competition

The **ENVIROTHON** is designed to stimulate, reinforce and enhance interest in the environment and natural resources among high school students. Students use critical thinking skills and compete against other schools on the following subjects: **soils, forestry, wildlife, aquatic ecology** and **current environmental issues (CEI)**. In addition, the Envirothon encourages cooperative decision-making and team building.

www.areaivenvirothon.org

Scholarships

Every year the Warren County Soil and Water Conservation District Board of Supervisors sponsor two scholarship programs for high school seniors. High school students can also apply to receive a Forestry and Wildlife Camp Scholarship.

Community Service Hours

Students can earn community service hours in the following projects:

- Storm drain Tagging
- Stream Clean-Ups
- Environmental Education Volunteer –assist staff with local events /programs/and booths

For more information on the Envirothon, scholarship programs or scheduling a speaker contact:

Email: melissa.proffitt@co.warren.oh.us
Website: www.WarrenSWCD.com

Warren County Soil & Water Conservation District

Free High School Programs

Are you looking for a natural resource presenter or project?

We can come to your classroom to present the following:

- Water quality /stream monitoring/macroinvertebrates
- Watershed Protection
- Ground Water
- Soil/Erosion
- Ohio Wildlife and Biodiversity
- Sustainability
- Topographic Maps
- Composting

Sediment Core Lab **Learning Objective:** To understand how scientists use properties observed from sediment cores to recreate Earth's history.
Activity: Students discuss current and historic climate changes; make sediment core samples with sand, clay slurry, and carbonate; practice interpreting different core samples.

Conscientious Consumers **Learning Objective:** Explore how consumer choices can influence various global environmental problems and issues such as climate change, water quality and use, sustainability, air quality, food production and availability, deforestation, and loss of biodiversity. **Activity:** Students practice how to research companies and labeling requirements; calculate ecological footprints based on lifestyle choices.

Ecosystem IQ **Learning Objective:** Investigate physical/chemical restraints on all biological relationships and systems. Discuss cyclic fluctuations around a state of rough equilibrium. Address misconceptions of population growth capacity, interspecies and intra-species competition for resources.
Activity: Play a "challenge" game where students listen to others' answers then try to form a more concise answer addressing common ecological misconceptions.

Warren County Soil and Water Conservation District
320 E. Silver Street,
Lebanon, Ohio 45036
513-695-1337

Email: melissa.proffitt@co.warren.oh.us
Website: www.WarrenSWCD.com

We like you!
Like us on Facebook.

Thomas C. Spellmire Water Conservation Education Exhibit

Explore the following Topics Inside the Exhibit

- **Non Point Source, Point Source Pollution**
- **Topographic Maps**
- **Watersheds**
- **Hypoxia, Eutrophication**
- **Ground Water**
- **Erosion**
- **Land use and Land Management**

All programs and services are offered on a non-discriminatory basis without regard to race, color, national origin, religion, sex, age, disability, marital or family status, or political beliefs. Warren County Soil and Water Conservation District is not responsible for rescheduling any canceled programs.

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Ohio Science Standards and Model Curriculum Content Statement - Kindergarten

	Earth and Space Science (ESS)	**Physical Science (PS)**	**Life Science (LS)**
Program	• Weather changes are long-term and short-term. • The moon, sun, and stars are visible at different times of the day.	• Objects and materials can be sorted and described by their properties. • Some objects and materials can be made to vibrate to produce sound.	• Living things are different from nonliving things. • Living things have physical traits and behaviors, which influence their survival.
Fishing Fun			X
Bob and Otto			X
Dress Like A Beaver			X

Ohio Science Standards and Model Curriculum Content Statement - Grade 1

	Earth and Space Science (ESS)	**Physical Science (PS)**	**Life Science (LS)**
Program	• The sun is the principal source of energy. • The physical properties of water change.	• Properties of objects and materials can change. • Objects can be moved in a variety of ways, such as straight, zigzag, circular and back and forth.	• Living things have basic needs, which are met by obtaining materials from the physical environment. • Living things survive only in environments that meet their needs.
How Many Bears Can Live in this Forest?			X
Ohio Habitats			X
Gobble Gobble			X
Henry the Great Blue Heron			X

Ohio Science Standards and Model Curriculum Content Statement - Grade 2

	Earth and Space Science (ESS)	**Physical Science (PS)**	**Life Science (LS)**
Program	• The atmosphere is made up of air. • Water is present in the air. • Long and short-term weather changes occur due to changes in energy.	• Forces change the motion of an object.	• Living things cause changes on Earth. • Some kinds of individuals that once lived on Earth have completely disappeared, although they were something like others that are alive today.
Water Cycle Game	X		
Fossils			X
Beaver Builders			X
Wiggling Worms			X
Miranda the Fish			X

Ohio Science Standards and Model Curriculum Content Statement - Grade 3

	Earth and Space Science (ESS)	Physical Science (PS)	Life Science (LS)
Program	• Earth's nonliving resources have specific properties. • Earth's resources can be used for energy. • Some of Earth's resources are limited.	• All objects and substances in the natural world are composed of matter. • Matter exists in different states, each of which has different properties.	• Offspring resemble their parents. • Individuals of the same kind differ in their traits and sometimes the differences give individuals an advantage in surviving and reproducing. • Plants and animals have life cycles that are part of their adaptations for survival in
Animal and Plant Addresses			X
Geology Station	X		
Toil for Oil	X		
No Water Off a Duck's Back	X		
Buzzy, Buzzy Bee			X
Soil Particles	X		
Monarch Marathon			X

Ohio Science Standards and Model Curriculum Content Statement - Grade 3

	Earth and Space Science (ESS)	Physical Science (PS)	Life Science (LS)
Program	• Earth's nonliving resources have specific properties. • Earth's resources can be used for energy. • Some of Earth's resources are limited.	• All objects and substances in the natural world are composed of matter. • Matter exists in different states, each of which has different properties.	• Offspring resemble their parents. • Individuals of the same kind differ in their traits and sometimes the differences give individuals an advantage in surviving and reproducing. • Plants and animals have life cycles that are part of their adaptations for survival in
Animal and Plant Addresses			X
Geology Station	X		
Toil for Oil	X		
No Water Off a Duck's Back	X		
Buzzy, Buzzy Bee			X
Soil Particles	X		
Monarch Marathon			X

Ohio Science Standards and Model Curriculum Content Statement - Grade 5

	Earth and Space Science (ESS)	Physical Science (PS)	Life Science (LS)
Program	• The solar system includes the sun and all celestial bodies that orbit the sun. Each planet in the solar system has unique characteristics. • The sun is one of many stars that exist in the universe.	• The amount of change in movement of an object is based on the mass of the object and the amount of force exerted. • Light and sound are forms of energy that behave in predictable ways.	• Organisms perform a variety of roles in an ecosystem. • All of the processes that take place within organisms require energy.
Decomposers			X
Energy Pipeline			X
Shop Till You Drop!			X
Links in a Chain			X

Ohio Science Standards and Model Curriculum Content Statement - Grade 5

	Earth and Space Science (ESS)	Physical Science (PS)	Life Science (LS)
Program	• The solar system includes the sun and all celestial bodies that orbit the sun. Each planet in the solar system has unique characteristics. • The sun is one of many stars that exist in the universe.	• The amount of change in movement of an object is based on the mass of the object and the amount of force exerted. • Light and sound are forms of energy that behave in predictable ways.	• Organisms perform a variety of roles in an ecosystem. • All of the processes that take place within organisms require energy.
Decomposers			X
Energy Pipeline			X
Shop Till You Drop!			X
Links in a Chain			X

Ohio Science Standards and Model Curriculum Content Statement - Grade 7

	Earth and Space Science (ESS)	Physical Science (PS)	Life Science (LS)
Program	• The hydrologic cycle illustrates the changing states of water as it moves through the lithosphere, biosphere, hydrosphere, and atmosphere. • Thermal-energy transfers in the ocean and the atmosphere contribute to the formation of currents, which influence global climate patterns. • The atmosphere has different properties at different elevations and contains a mixture of gases that cycle through the lithosphere, biosphere, hydrosphere, and atmosphere.	• The properties of matter are determined by the arrangement of atoms. • Energy can be transformed or transferred but is never lost. • Energy can be transferred through a variety of ways.	• Matter is transferred continuously between one organism to another and between organisms and their physical environments. • In any particular biome, the number, growth, and survival of organisms and populations depend on biotic and abiotic factors.
The Hydrologic Cycle	X	X	X
Groundwater Model	X		X
Stream Field Trip			X
Macro-Invertebrate Mayhem			X

Ohio Science Standards and Model Curriculum Content Statement - Grade 8

	Earth and Space Science (ESS)	Physical Science (PS)	Life Science (LS)
Program	• The composition and properties of Earth's interior are identified by behavior of seismic waves. • Earth's crust consists of major and minor tectonic plates that move relative to each other. • A combination of constructive and destructive geological processes formed Earth's surface. • Evidence of the dynamic changes of Earth's surface through time is found in the geological record.	• Forces between objects act when the objects are in direct contact or when they are not touching. • Forces have magnitude and direction. • There are different types of potential energy.	• Diversity of species occurs through gradual processes over many generations. Fossil records provide evidence that changes have occurred in number and types of species. • Reproduction is necessary for the continuation of every species. • The characteristics of an organism are a result of inherited traits received from the parent(s).
Topographic Maps	X		
Geology Table	X		
Bottleneck Genes			X

Ohio Science Standards and
Model Curriculum Content Statement -
High School

	Environmental Science	Physical Geology	Biology
	• Earth Systems: Interconnected spheres of Earth • Earth's Resources • Global environmental problems and issues	• .Minerals • Igneous, metamorphic, and sedimentary rocks • Earth's history • Glacial geology	• Heredity • Evolution • Diversity and interdependence on life • Cells

APPENDIX D

Deerfield Township Stormwater Managment Program Regulations

First Reading: June 1, 2021
Second Reading: Dispensed

RESOLUTION NUMBER 2021-36

RESOLUTION ADOPTING STORMWATER MANAGEMENT PROGRAM REGULATIONS, DISPENSING WITH THE SECOND READING, AND DECLARING AN EMERGENCY

WHEREAS, Deerfield Township, Warren County, Ohio (the "Township") is an Ohio limited home rule township organized under Ohio Revised Code Chapter 504;

WHEREAS, the Township is empowered under R.C. 504.21 to adopt rules pertaining to management and conservation practices that will abate wind or water erosion of the soil or abate the degradation of the waters of the state by soil sediment in conjunction with land grading, excavating, filling, or other soil disturbing activities on land used or being developed in the Township for nonfarm commercial, industrial, residential, or other nonfarm purposes;

WHEREAS, in accordance with the authority granted to the Township under Ohio law, the Deerfield Township Board of Trustees created the Deerfield Regional Stormwater District to address and improve stormwater quality and quantity issues within the Township;

WHEREAS, the Ohio Environmental Protection Agency (the "OEPA") has developed and enforces certain stormwater management program requirements with which stormwater regulations implemented and enforced within the Township must comply;

WHEREAS, Warren County, Ohio has adopted its own stormwater regulations and has created two (2) manuals which provide guidance on their administration, entitled *Storm Water Design Manual* and *Warren County Illicit Discharge Detection and Elimination Manual* (collectively, the "County Stormwater Management Program Manuals");

WHEREAS, the Township, in conjunction with the Warren County Engineer's Office, hired professional engineering consultants to develop stormwater regulations which meet all applicable OEPA requirements and are consistent with Warren County stormwater regulations;

WHEREAS, the Township's cooperative stormwater regulation development efforts culminated in the creation of three (3) sets of regulations, attached as "Exhibit A" to this Resolution, governing the following components of the Township's stormwater management program: (i) erosion prevention and sediment control; (ii) post-construction storm water runoff control; and (iii) illicit discharge detection and elimination (collectively, the "Stormwater Regulations");

WHEREAS, upon recommendation of Township staff, the Township desires to adopt OEPA stormwater management program requirements, the County Stormwater Management Program Manuals, and the Stormwater Regulations in order to bring the Township's stormwater

management practices into compliance with OEPA requirements and parallel County stormwater regulations, and promote the health, safety, and general welfare of the public.

NOW, THEREFORE, BE IT RESOLVED, by the Board of Township Trustees of Deerfield Township, Warren County, Ohio:

SECTION 1. The Township hereby adopts: (i) OEPA stormwater management program requirements now in effect and as they may be amended from time to time; (ii) the current version of the County Stormwater Management Program Manuals; and (iii) the Stormwater Regulations in the same form as set forth in Exhibit A to this Resolution.

SECTION 2. The stormwater management program regulations adopted pursuant to this Resolution shall apply to and be administered by the Deerfield Regional Stormwater District within the jurisdictional boundaries of Deerfield Township.

SECTION 3. Upon the unanimous vote of the Board of Trustees, this Resolution is hereby declared to be an emergency measure which shall take effect immediately upon passage. The reason for the emergency is to immediately bring the Township's stormwater management practices into compliance with OEPA requirements and parallel Warren County regulations, and to promote the health, safety, and general welfare of the public by, among other things, protecting and maintaining the valuable natural resources of the Township.

VOTE RECORD:

Ms. Malhotra Y Mr. Siciliano Y Mrs. Hedding Y

PASSED at the meeting of the Board of Trustees this 1st day of June, 2021.

Kristin Malhotra, President

James Siciliano IV, Vice President

Lelle Lutts Hedding, Trustee

This is to certify that this Resolution as duly passed and filed with the Deerfield Township Fiscal Officer, this 1st day of June, 2021.

Dan Corey, Fiscal Officer

APPROVED AS TO FORM:

Benjamin J. Yoder, Law Director

EXHIBIT A
to Resolution 2021-36

Erosion Prevention and Sediment Control

SECTION 100 TITLE

These regulations and amendments thereto, shall be cited as the Deerfield Township (Township) Erosion Prevention and Sediment Control regulations and may hereinafter be referred to as "these regulations".

SECTION 101 STATUTORY AUTHORITY

These regulations are promulgated in accordance with the Ohio Revised Code section 504.21, and chapter 3745-39 of the Ohio Administrative code to implement phase II of the storm water program of the national pollutant discharge elimination system established in 40 C.F.R. Part 122.

These regulations shall require persons to file plans governing erosion control, sediment control, and water management before clearing, grading, excavating, filling, or otherwise wholly or partially disturbing one or more contiguous acres of land owned by one person or operated as one development unit for the construction of nonfarm buildings, structures, utilities, recreational areas, or other similar nonfarm uses.

SECTION 102 PURPOSE

The purpose of these regulations is to establish technically feasible and economically reasonable standards to achieve a level of management and conservation practices that will abate wind or water erosion of the soil or abate the degradation of the waters within the state by soil sediment in conjunction with land grading, excavating, filling, or other soil disturbing activities on land used or being developed for non-agriculture, commercial, industrial, residential, or other non-agriculture purposes, and establish criteria for determination of the acceptability of those management and conservation practices.

The purposes of these regulations include, without limitation, the following:

1. Permitting development while minimizing erosion and sedimentation.
2. Reducing impairment of receiving streams which may be caused by erosion and sedimentation from construction and other earth disturbing activities.
3. Encouraging innovative design which will enhance the control of erosion and sedimentation in a manner consistent with the intent of these regulations.

SECTION 103 APPLICABILITY

These regulations are intended to conform to the requirements found in the Ohio Environmental Protection Agency (Ohio EPA) Phase II General Permit for Municipal Separate Storm Sewer Systems (MS4) and the associated OEPA Construction General Permit. As the OEPA permits are routinely updated, any inconsistencies in the requirements, definitions, or verbiage between these regulations as compared to the OEPA permits shall assume the current permit language prevails.

These regulations shall apply to all earth disturbing activities covered in the Construction General

Permit except for the following activities:

A. Strip mining operations regulated under Section 1513.01 of the Ohio Revised Code;

B. Surface mining operations regulated by Section 1514.01 of the Ohio Revised Code;

C. Public highways, transportation, and drainage improvement or maintenance project undertaken by a government agency or political subdivision in accordance with a statement of its standard sediment control policies that is approved by the board or the chief of the division of soil and water conservation in the Ohio department of agriculture.

D. Any emergency activity that is immediately necessary for the protection of life, property, or natural resources.

E. Agricultural operations as defined in Section 106 of this regulation.

SECTION 104 DISCLAIMER OF LIABILITY

Compliance with the provisions of these regulations shall not relieve any person from responsibility for damage to any person otherwise imposed by law. The provisions of these regulations are promulgated to promote the health, safety, and welfare of the public and are not designed for the benefit of any individual or any particular parcel of property. By approving a Storm Water Pollution Prevention Plan (SWP3) under these regulations, the Township does not accept responsibility for the design, installation, and operation and maintenance of erosion control practices or facilities.

SECTION 105 CONFLICTS, SEVERABILITY, NUISANCES, AND RESPONSIBILITY

These regulations are not intended to interfere with, abrogate, or annul any other ordinance, rule or regulation, stature, or other provision of law. The requirements of these regulations should be considered minimum requirements, and where any provision of these regulations imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, whichever provisions are more restrictive or impose higher protective standards for human health or the environment shall be considered to take precedence.

If any clause, section, or provision of these regulations is declared invalid or unconstitutional by a court of competent jurisdiction, the validity of the remainder shall not be affected thereby.

These regulations shall not be construed as authorizing any person to maintain a nuisance on their property, and compliance with the provisions of these regulations shall not be a defense in any action to abate such a nuisance.

Failure of the Township or its designated agent to observe or recognize hazardous or unsightly conditions or to recommend corrective measures shall not relieve the site owner from the responsibility for the condition or damage resulting therefrom, and shall not result in the Township, its officers, employees, or agents being responsible for any condition or damage resulting therefrom.

SECTION 106 DEFINITIONS

For the purposes of these regulations, the following terms shall have the meaning herein indicated;

otherwise, words or terms not defined, or interpreted by these regulations or statutory or administrative law, shall have their customary meaning as interpreted by Ohio common law, or in the event no common law exists then as found in the most recent editions of published dictionaries.

Applicant - A property owner or agent of a property owner who has filed an application for an Earth Disturbing Permit.

Agriculture - Agriculture includes agricultureing; ranching; aquaculture; algaculture meaning the agricultureing of algae; apiculture and related apicultural activities, production of honey, beeswax, honeycomb, and other related products; horticulture; viticulture, winemaking, and related activities; animal husbandry, including, but not limited to, the care and raising of livestock, equine, and fur-bearing animals; poultry husbandry and the production of poultry and poultry products; dairy production; the production of field crops, tobacco, fruits, vegetables, nursery stock, ornamental shrubs, ornamental trees, flowers, sod, or mushrooms; timber; pasturage; any combination of the foregoing; the processing, drying, storage, and marketing of agricultural products when those activities are conducted in conjunction with, but are secondary to, such husbandry or production; and any additions or modifications to the foregoing made by the director of agriculture by rule adopted in accordance with Chapter 119 of the Revised Code.

Clean Water Act - The federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.

Construction General Permit - Ohio Environmental Protection Agency's General Permit Authorization for Storm Water Discharges Associated with Construction Activity Under the National Pollution Discharge Elimination System.

Construction Site - Any parcel of land on which land has been disturbed for non-farming activity in the efforts to construct a new land or building feature.

Developer - Any individual, sub-divider, firm, association, syndicate, partnership, corporation, trust, or any other legal entity commencing land disturbance activities subject to these regulations.

Development/Construction Area - Any tract, lot, parcel of land or combination of such which are part of a larger common plan of development, upon which more than one acre of earth disturbing activity is to be performed.

Drainage – The removal of surface water or groundwater from land by surface or subsurface drains.

Earth Disturbing Activity - Any clearing, grading, excavating, grubbing, and/ or filling or other alteration of the earth's surface where natural or man-made ground cover is destroyed, and which may result in or contribute to erosion and sediment pollution.

Earth Disturbing Permit - A permit to perform earth disturbing activities provided by the Township or its designated agent once a developer/owner meets specific criteria as outlined in these regulations.

Environmental Protection Agency - The United States Environmental Protection Agency, including but not limited to the Ohio Environmental Protection Agency (Ohio EPA), or any duly authorized official of said agency.

Erosion – The process by which the land surface is worn away by the action of water, wind ice, or gravity.

Erosion and Sediment Control Plan - A strategy or plan to minimize erosion and prevent off-site sedimentation by passing sediment laden runoff through a sediment control measure, which has been prepared and approved in accordance these regulations and those requirements of the Construction General Permit. The erosion and sediment control plan is most often part of a larger set of construction drawings.

Grading – Earth disturbing activity such as excavation, stripping cutting, filling stockpiling, or any combination thereof.

NPDES – National Pollutant Discharge Elimination System. A regulatory program in the Federal Clean Water Act that prohibits the discharge of pollutants into surface waters of the United States without a permit.

Owner - Someone who holds the right of possession and title to a parcel or tract of land.

Phasing - Clearing a parcel of land in distinct phases, with the stabilization of each phase completed before the clearing of the next.

Redevelopment – A construction project on land where impervious surface has previously been installed and where the new land use will not increase the runoff coefficient. If the new land use will increase the runoff coefficient, then the project is considered to be a new development project rather than a redevelopment project.

Runoff – The portion of precipitation in excess of the infiltration capacity of underlying soils to absorb and contain which drains away from and runs of the surface of land.

Sediment – Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by wind, water, gravity, or ice, and has come to rest on the earth's surface.

Site owner or property owner – Any individual, corporation, firm, trust, commission, board, public or private partnership, joint venture, agency, unincorporated association, municipal corporation, county or state agency, the federal government, other legal entity, or an agent thereof that is responsible for the overall construction site.

Soil disturbing activity or earth disturbing activity – Clearing, grading, excavating, filling, or other alteration of the earth's surface where natural or human made ground cover is destroyed and that may result in, or contribute to, increased storm water quantity and/or decreased storm water quality.

Stop Work Order - An order issued which requires that all construction activity on a site be stopped.

Storm Water Pollution Prevention Plan (SWP3) - The SWP3 is a stand-alone document required by these regulations and the Construction General Permit for all construction sites disturbing one acre or more of land. The SWP3 describes all the construction site operator's activities to prevent storm water contamination, control sedimentation and erosion, manage post construction storm water runoff and comply with the requirements of the Clean Water Act.

SECTION 107 ADMINISTRATION

The Township may designate specific duties and responsibilities to a designated agent through the execution of a memorandum of understanding or contractual agreement. The Township or its designated agent may furnish additional policy, criteria, and information including specifications and standards, for the proper implementation of the requirements of these regulations and may provide such information in the form of a Storm Water Design Manual. The manual may be updated and expanded from time to time, at the discretion of the Township or its designated agent, based on improvements in engineering, science, monitoring and local maintenance experience.

SECTION 108 COMPLIANCE WITH STATE AND FEDERAL REGULATIONS

Approvals issued in accordance with these regulations do not relieve the applicant of responsibility for obtaining all other necessary permits and/or approvals from other federal, state, and/or county agencies and other public entities having regulatory jurisdiction. Applicants may be required to show compliance with all applicable regulatory requirements.

SECTION 200 PERMIT REQUIREMENTS

No person shall begin land clearing and/or soil disturbing activities greater than 1 acre until first obtaining an earth disturbing permit from the Township or its designated agent.

Unless specifically excluded by these regulations, any landowner or operator desiring a permit for an earth disturbance activity shall submit a permit application. Unless otherwise excepted by these regulations, a permit application must be accompanied by the following in order that the permit application be considered: a SWP3, Operation and Maintenance documents, and a non-refundable permit review fee, if applicable.

Approvals issued in accordance with these regulations shall be void two years from the date of permit issuance unless soil disturbing activities have commenced. Appropriate and timely progress toward completion of work must occur, or the permit will be void.

An expired permit may be renewed by resubmitting all of the necessary requirements found in these regulations and the Storm Water Design Manual.

SECTION 201 INSPECTION

The Township or its designated agent may complete routine site inspections of land disturbance activities to evaluate compliance with the approved SWP3 and shall notify the permittee wherein the work fails to comply with the SWP3 as approved. The inspections may be performed monthly or more frequently. The inspector may enter the property of the applicant as deemed necessary to make regular inspections.

Plans for grading, stripping, excavating, and filling work which have been approved by the Township or its designated agent shall be maintained at the site.

SECTION 300 MAINTENANCE NEEDS, VIOLATIONS, ENFORCEMENT, AND PENALTIES

No person shall violate or cause or knowingly permit to be violated any of the provisions of these

regulations, or fail to comply with any of such provisions or with any lawful requirements of any public authority made pursuant to these regulations, or knowingly use or cause or permit the use of any lands in violation of these regulations or in violation of any permit granted under these regulations. All temporary erosion and sediment control practices shall be installed according to the timeline set forth in the approved SWP3 and in accordance with the Construction General Permit. These practices shall be maintained and repaired as needed to assure continued performance of their intended function. The developer/owner shall be responsible for such maintenance and repairs until the receipt of a notice of termination.

A. If a deficiency or lack of installation of an erosion and sediment control practice is found, the inspector will communicate the need to the developer/owner, develop a timeline for compliance, and will afford the developer/owner an opportunity to bring the project back into compliance before moving the deficiency to a violation. Over the course of construction and through deterioration by use and weather, erosion and sediment control practices often need maintenance, repair, or re-installation.

The developer/owner shall assign qualified inspection personnel to inspect all sediment and erosion control practices at a frequency set forth in the latest Construction General Permit. If any erosion and sediment control practice needs maintenance, repair or reinstall, the developer/owner shall comply with the timeline set forth in the Construction General Permit.

If the developer/owner is unresponsive or if the owner/developer does not comply with the inspector's requests or timeline to remediate the maintenance needs, deficiencies or lack of installed practices, the Township or its designated agent can upgrade the maintenance need, deficiency or lack of installation to a violation.

B. If the Township or its designated agent determines that a violation of these regulations exists, the following actions may be taken.

1. An immediate stop work order may be issued if the violator failed to obtain any federal, state, or local permit necessary for sediment and erosion control, earth movement, clearing, or cut and fill activity. Persons receiving a stop work order will be required to halt all construction activities. This stop work order will be in effect until the Township or its designated agent confirms that the development activity is in compliance and the violation has been satisfactorily addressed.
2. If the violator has obtained proper permits, but an activity is not being carried out in accordance with the requirements of these regulations, the Township or its designated agent may issue a written notice of violation.
3. If after a period of not less than thirty days following the issuance of the notice of violation, the violation continues, the Township or its designated agent may issue a second notice of violation.
4. If after a period of not less than fifteen days following the issuance of the notice of violation, the violation continues, the Township may issue a stop work order.
5. Once a stop work order is issued, the Township may petition the court for the issuance of a preliminary or permanent injunction or both (as may be appropriate) to abate the violation and secure compliance with these regulations. If the prosecuting attorney seeks an injunction or other appropriate relief, then, in granting relief, the court of common pleas may order strict compliance with these regulations and may assess a civil fine of not less

than one hundred or more than five hundred dollars for civil contempt by failing to comply with the court's order. Each day of violation shall be considered a separate violation subject to a civil fine. Once an injunction or other appropriate relief is issued, an expedited motion may be filed by the prosecuting attorney for future violations by the developer/owner requesting the Court to order the developer/owner to appear and show cause why the developer/owner should not be held in further contempt of the injunction or other appropriate relief ordered by the court.

6. The person to whom a stop work order is issued under this section may appeal the order to the court, seeking any equitable or other appropriate relief from that order.

C. No stop work order shall be issued under this section against any public highway, transportation, or drainage improvement or maintenance project undertaken be a government agency or political subdivision in accordance with a statement of its standard sediment control policies that is approved by the Township.

D. No person shall violate these regulations. Notwithstanding division (B) of this section, if the Township or its designated agent determines that a violation of these regulations or administrative order issued relating thereto, the Township or its' designated agent may request, in writing, the prosecuting attorney to seek an injunction or other appropriate relief in the court of common pleas to abate the violations of these regulations and secure compliance with these regulations or an administrative order. In granting relief, the court of common pleas may order strict compliance with these regulations or implementation of other control measures and may assess a civil fine of not less than one hundred or more than five hundred dollars for civil contempt by failing to comply with the court's order. Each day of violation shall be considered a separate violation subject to a civil fine. Once an injunction or other appropriate relief is issued, an expedited motion may be filed by the prosecuting attorney for future violations by the developer/owner requesting the Court to order the developer/owner to appear and show cause why the developer/owner should not be held in further contempt of the injunction or other appropriate relief ordered by the court.

SECTION 301 APPEALS

Any person aggrieved by requirement, determination, or any other action or inaction by the Township or it's designated agent in relation to these regulations may appeal to the court of common pleas. Such an appeal shall be made in conformity with Chapters 2505 and 2506 the Ohio Revised Code.

Post-Construction Storm Water Runoff Control

SECTION 100 TITLE

These regulations and amendments thereto, shall be cited as the Deerfield Township (Township) Post-Construction Storm Water Runoff Control regulations and may hereinafter be referred to as "these regulations".

SECTION 101 STATUTORY AUTHORITY

These regulations are promulgated in accordance with the Ohio Revised Code section 504.21, and chapter 3745-39 of the Ohio Administrative code to implement phase II of the storm water program of the national pollutant discharge elimination system established in 40 C.F.R. Part 122.

These regulations shall require persons to file plans governing erosion control, sediment control, and water management before clearing, grading, excavating, filling, or otherwise wholly or partially disturbing one or more contiguous acres of land owned by one person or operated as one development unit for the construction of nonfarm buildings, structures, utilities, recreational areas, or other similar nonfarm uses.

SECTION 102 PURPOSE

The purpose of these regulations is to establish technically feasible and economically reasonable storm water management standards to achieve a level of storm water quality and quantity control that will minimize damage to property and degradation of water resources and will promote and maintain the health, safety, and welfare of the citizens within this jurisdiction. These regulations seek to meet that purpose through the following objectives:

1. Control increases in storm water runoff from any new or redevelopment project in order to reduce flooding, siltation, increases in stream temperature and maintain the integrity of stream channels.
2. Control increases in nonpoint source pollution caused by storm water runoff from development which would otherwise degrade local water quality.
3. Reduce storm water runoff rates and volumes, soil erosion and nonpoint source pollution, where possible, through storm water management controls and to ensure that these management controls are properly maintained and pose no threat to public safety.

SECTION 103 APPLICABILITY

These regulations are intended to conform to the requirements found in the Ohio Environmental Protection Agency (Ohio EPA) Phase II General Permit for Municipal Separate Storm Sewer Systems (MS4) and the associated OEPA Construction General Permit. As the OEPA permits are routinely updated, any inconsistencies in the requirements, definitions or verbiage between these regulations as compared to the OEPA permits shall assume the current permit language prevails.

These regulations shall apply to all earth disturbing activities covered in the current version of the

Ohio EPA Construction General Permit. The ordinance also applies to land development activities that are smaller than the minimum applicability criteria if such activities are part of a larger common plan of development that meets the following applicability criteria, even though multiple separate and distinct land development activities may take place at different times on different schedules. The following activities may be exempt from these requirements:

1. Any logging and agricultural activity which is consistent with an approved soil conservation plan.
2. Additions or modifications to existing single family structures.
3. Linear construction projects such as pipeline or utility line installation that does not result in the installation of additional impervious surfaces.

SECTION 104 DISCLAIMER OF LIABILITY

Compliance with the provisions of these regulations shall not relieve any person from responsibility for damage to any person otherwise imposed by law. The provisions of these regulations are promulgated to promote the health, safety, and welfare of the public and are not designed for the benefit of any individual or any particular parcel of property. By approving a Storm Water Pollution Prevention Plan (SWP3) under these regulations, the Township does not accept responsibility for the design, installation, and operation and maintenance of storm water management practices, facilities and improvements.

SECTION 105 CONFLICTS, SEVERABILITY, NUISANCES AND RESPONSIBILITY

These regulations are not intended to interfere with, abrogate, or annul any other ordinance, rule or regulation, stature, or other provision of law. The requirements of these regulations should be considered minimum requirements, and where any provision of these regulations imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, whichever provisions are more restrictive or impose higher protective standards for human health or the environment shall be considered to take precedence.

If any clause, section, or provision of these regulations is declared invalid or unconstitutional by a court of competent jurisdiction, the validity of the remainder shall not be affected thereby.

These regulations shall not be construed as authorizing any person to maintain a nuisance on their property, and compliance with the provisions of these regulations shall not be a defense in any action to abate such a nuisance.

Failure of the Township or its designated agent to observe or recognize hazardous or unsightly conditions or to recommend corrective measures shall not relieve the site owner from the responsibility for the condition or damage resulting therefrom, and shall not result in the Township, its officers, employees, or agents being responsible for any condition or damage resulting therefrom.

SECTION 106 DEFINITIONS

For the purposes of these regulations, the following terms shall have the meaning herein indicated;

otherwise, words or terms not defined, or interpreted by these regulations or statutory or administrative law, shall have their customary meaning as interpreted by Ohio common law, or in the event no common law exists then as found in the most recent editions of published dictionaries.

Applicant - A property owner or agent of a property owner who has filed an application for an Earth Disturbing Permit.

Channel – A natural or artificial watercourse with a definite bed and banks that conducts continuously or periodically flowing water.

Clean Water Act - The federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.

Developer - Any individual, sub-divider, firm, association, syndicate, partnership, corporation, trust, or any other legal entity commencing earth disturbance activities subject to these regulations.

Drainage – The removal of surface water or groundwater from land by surface or subsurface drains.

Environmental Protection Agency - The United States Environmental Protection Agency, including but not limited to the Ohio Environmental Protection Agency (Ohio EPA), or any duly authorized official of said agency.

Erosion – The process by which the land surface is worn away by the action of water, wind ice or gravity.

Grading – Earth disturbing activity such as excavation, stripping cutting, filling stockpiling, or any combination thereof.

Impervious surface – Any material that prevents, impedes or slows the infiltration or absorption of stormwater into the ground, including building roofs and concrete or asphalt pavement.

Infiltration – A stormwater management practice that reduces discharge during the precipitation event, requiring collected runoff to either infiltrate into the groundwater and/or be consumed by evapotranspiration, thereby retaining stormwater pollutants in the facility.

Larger common plan of development – A contiguous area where multiple separate and distinct construction activities may be taking place at different times.

Nonpoint Source Pollution - Pollution from any source other than from any discernible, confined, and discrete conveyances, and shall include, but not be limited to, pollutants from agricultural, silvicultural, mining, construction, subsurface disposal and urban runoff sources.

NPDES – National Pollutant Discharge Elimination System. A regulatory program in the Federal Clean Water Act that prohibits the discharge of pollutants into surface waters of the United States without a permit.

Post-development – The conditions that exist following the completion of soil disturbing activity in terms of topography, vegetation, land use, and the rate, volume, quality, or direction of stormwater runoff.

Pre-development – The conditions that exist prior to the initiation of soil disturbing activity in terms of topography, vegetation, land use, and the rate, volume, quality, or direction of stormwater runoff.

Professional Engineer – A professional engineer registered in the State of Ohio.

Redevelopment – A construction project on land where impervious surface has previously been developed and where the new land use will not increase the runoff coefficient. If the new land use will increase the runoff coefficient, then the project is considered to be a new development project rather than a redevelopment project.

Runoff – The portion of precipitation in excess of the infiltration capacity of underlying soils to absorb and contain which drains away from and runs of the surface of land.

Sediment – Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by wind, water, gravity, or ice, and has come to rest on the earth's surface.

Site owner, property owner or owner – Any individual, corporation, firm, trust, commission, board, public or private partnership, joint venture, agency, unincorporated association, municipal corporation, county or state agency, the federal government, other legal entity, or an agent thereof that is responsible for the overall construction site.

Soil disturbing activity or Earth disturbing activity – Clearing, grading, excavating, filling, or other alteration of the earth's surface where natural or human made ground cover is destroyed and that may result in, or contribute to, increased stormwater quantity and/or decreased stormwater quality.

Stop Work Order - An order issued which requires that all construction activity on a site be stopped.

Storm Water management facility – A structural or non-structural device, basin, infiltration cell, or other system approved by the Township to collect, convey, and/or manage surface runoff.

Storm Water Pollution Prevention Plan (SWP3) - The SWP3 is a stand-alone document required by these regulations and the Construction General Permit for all construction sites disturbing one acre or more of land. The SWP3 describes all the construction site operator's activities to prevent storm water contamination, control sedimentation and erosion, manage post construction storm water runoff and comply with the requirements of the Clean Water Act.

Storm Water system – The system or network of storm and surface water management facilities.

Watershed – The drainage area in which a subdivision is located.

Wetland – Surface areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (1987 Corp of Engineers Wetland Delineation Manual.)

SECTION 107 ADMINISTRATION

The Township may designate specific duties and responsibilities to a designated agent through the execution of a memorandum of understanding or contractual agreement. The Township or it's designated agent may furnish additional policy, criteria and information including specifications and standards, for the proper implementation of the requirements of these regulations and may provide such information in the form of a Storm Water Design Manual. The manual may be

updated and expanded from time to time, at the discretion of the Township, based on improvements in engineering, science, monitoring and local maintenance experience.

SECTION 108 COMPLIANCE WITH STATE AND FEDERAL REGULATIONS

Approvals issued in accordance with these regulations do not relieve the applicant of responsibility for obtaining all other necessary permits and/or approvals from other federal, state, and/or county agencies and other public entities having regulatory jurisdiction. Applicants may be required to show compliance with all applicable regulatory requirements

SECTION 200 PERMIT REQUIREMENTS

No landowner or land operator shall receive an Earth Disturbing Permit required for earth disturbance activities without first meeting the requirements of these regulations prior to commencing the proposed activity.

Unless specifically excluded by these regulations, any landowner or operator desiring a permit for an earth disturbance activity shall submit a permit application. Unless otherwise excepted by these regulations, a permit application must be accompanied by the following in order that the permit application be considered: a SWP3; Operation and Maintenance documents; and a non-refundable permit review fee, if applicable.

SECTION 201 STORMWATER QUANTITY CONTROL

The Stormwater Pollution Prevention Plan shall describe how stormwater quantity control is achieved for each watershed in the development. Calculations shall follow the Critical Storm Methodology.

SECTION 202 FINAL INSPECTION AND APPROVAL

To receive final inspection and a determination by the Township or its designated agent that the approved SWP3 and the requirements of these regulations have been complied with in performing a construction project, the following must be completed.

A. All permanent storm water management facilities must be installed, free of debris, and made functional per the approved SWP3.

B. An as-built survey, sealed, signed and dated by a Professional Surveyor and a written certification by a Professional Engineer certifying that permanent storm water management facilities, as designed and installed, meet the requirements of the approved SWP3 shall be delivered to and accepted by the Township or its designated agent. The as-built survey must provide the location, dimensions, details, volume, and bearing of such facilities. In evaluating this certification, the Township or its designated agent may require the submission of a new set of storm water calculations if he/she determines that the design was altered materially from the approved SWP3.

C. A Post-Construction Storm Water Management Requirements form must be completed and

submitted to the Township or its designated agent for each postconstruction storm water control feature contained in the approved SWP3.

SECTION 203 MAINTENANCE

All storm water treatment practices shall have an enforceable operation and maintenance agreement to ensure the system functions as designed. This agreement will include any and all maintenance easements required to access and inspect the storm water treatment practices, and to perform routine maintenance as necessary to ensure proper functioning of the storm water treatment practice. In addition, a legally binding covenant specifying the parties responsible for the proper maintenance of all storm water treatment practices shall be secured. The maintenance easement agreement that shall be binding on all subsequent owners of land served by the storm water management facility. The agreement shall provide for access to the facility at reasonable times for periodic inspection by Township or its designated agent to ensure that the facility is maintained in proper working condition to meet design standards and any other provisions established by these regulations.

All storm water management facilities shall be maintained in accordance with the approved Maintenance Plans. The owners of all storm water management facilities required by this ordinance shall be maintained in accordance with standard best practices or may be declared a public nuisance.

If a responsible party fails or refuses to meet the requirements of maintenance, the Township or its designated agent shall notify the party responsible for maintenance of the storm water management facility in writing. If after proper notice, remedial activities are not performed, the Township may seek an injunction or other appropriate relief in the court of common pleas to abate the violations of these regulations and secure compliance with these regulations or an administrative order. In granting relief, the court of common pleas may order strict compliance with these regulations or implementation of other control measures and may assess a civil fine of not less than one hundred or more than five hundred dollars for civil contempt by failing to comply with the court's order. Each day of violation shall be considered a separate violation subject to a civil fine. Once an injunction or other appropriate relief is issued, an expedited motion may be filed by the prosecuting attorney for future violations by the developer/owner requesting the Court to order the developer/owner to appear and show cause why the developer/owner should not be held in further contempt of the injunction or other appropriate relief ordered by the court.

SECTION 300 MAINTENANCE NEEDS, VIOLATIONS, ENFORCEMENT AND PENALTIES

No person shall violate or cause or knowingly permit to be violated any of the provisions of these regulations, or fail to comply with any of such provisions or with any lawful requirements of any public authority made pursuant to these regulations, or knowingly use or cause or permit the use of any lands in violation of these regulations or in violation of any permit granted under these regulations.

A. If the Township or its designated agent determines that a violation of these regulations exists, the following actions may be taken.

1. An immediate stop work order may be issued if the violator failed to obtain any federal,

state, or local permit necessary for sediment and erosion control, earth movement, clearing, or cut and fill activity. Persons receiving a stop work order will be required to halt all construction activities. This stop work order will be in effect until the Township or its designated agent confirms that the development activity is in compliance and the violation has been satisfactorily addressed.

2. If the violator has obtained proper permits, but an activity is not being carried out in accordance with the requirements of these regulations, the Township or its designated agent may issue a written notice of violation.
3. If after a period of not less than thirty days following the issuance of the notice of violation, the violation continues, the Township or its designated agent may issue a second notice of violation.
4. If after a period of not less than fifteen days following the issuance of the notice of violation, the violation continues, the Township may issue a stop work order.
5. Once a stop work order is issued, the Township may petition the court for the issuance of a preliminary or permanent injunction or both (as may be appropriate) to abate the violation and secure compliance with these regulations. If the prosecuting attorney seeks an injunction or other appropriate relief, then, in granting relief, the court of common pleas may order strict compliance with these regulations and may assess a civil fine of not less than one hundred or more than five hundred dollars for civil contempt by failing to comply with the court's order. Each day of violation shall be considered a separate violation subject to a civil fine. Once an injunction or other appropriate relief is issued, an expedited motion may be filed by the prosecuting attorney for future violations by the developer/owner requesting the Court to order the developer/owner to appear and show cause why the developer/owner should not be held in further contempt of the injunction or other appropriate relief ordered by the court.
6. The person to whom a stop work order is issued under this section may appeal the order to the court, seeking any equitable or other appropriate relief from that order.

B. No stop work order shall be issued under this section against any public highway, transportation, or drainage improvement or maintenance project undertaken be a government agency or political subdivision in accordance with a statement of its standard sediment control policies that is approved by the Township.

C. No person shall violate these regulations. Notwithstanding division (B) of this section, if the Township or its designated agent determines that a violation of these regulations or administrative order issued relating thereto, the Township or its' designated agent may request, in writing, the prosecuting attorney to seek an injunction or other appropriate relief in the court of common pleas to abate the violations of these regulations and secure compliance with these regulations or an administrative order. In granting relief, the court of common pleas may order strict compliance with these regulations or implementation of other control measures and may assess a civil fine of not less than one hundred or more than five hundred dollars for civil contempt by failing to comply with the court's order. Each day of violation shall be considered a separate violation subject to a civil fine. Once an injunction or other appropriate relief is issued, an expedited motion may be filed by the prosecuting attorney for future violations by the developer/owner requesting the Court to order the developer/owner to appear and show cause why the developer/owner should not be

held in further contempt of the injunction or other appropriate relief ordered by the court.

SECTION 301 APPEALS

Any person aggrieved by requirement, determination, or any other action or inaction by the Township or it's designated agent in relation to these regulations may appeal to the court of common pleas. Such an appeal shall be made in conformity with Chapters 2505 and 2506 the Ohio Revised Code.

Illicit Discharge Detection and Elimination

SECTION 100 TITLE

These regulations and amendments thereto, shall be cited as the Deerfield Township (Township) Illicit Discharge Detection and Elimination regulations and may hereinafter be referred to as "these regulations".

SECTION 101 STATUTORY AUTHORITY

These regulations are promulgated in accordance with the Ohio Revised Code section 504.21, and chapter 3745-39 of the Ohio Administrative code to implement phase II of the storm water program of the national pollutant discharge elimination system established in 40 C.F.R. Part 122.

SECTION 102 PURPOSE

The purpose of this ordinance is to provide for the health, safety, and general welfare of the citizens of the Township through the regulation of non-storm water discharges to the Township's municipal separate storm sewer system (MS4) to the maximum extent practicable as required by federal and state law. This ordinance establishes methods for controlling the introduction of pollutants into the MS4 in order to comply with requirements of the NPDES permit process. The objectives of this ordinance are:

a) To regulate the contribution of pollutants to the MS4 by storm water discharges by any user;

b) To prohibit illicit connections and discharges to the MS4;

c) To establish legal authority to carry out inspections, monitoring procedures, and enforcement actions necessary to ensure compliance with this ordinance.

SECTION 103 APPLICABILITY

These regulations are intended to conform to the requirements found in the Ohio Environmental Protection Agency (Ohio EPA) Phase II General Permit for Municipal Separate Storm Sewer Systems (MS4) and the associated OEPA Construction General Permit. As the OEPA permits are routinely updated, any inconsistencies in the requirements, definitions, or verbiage between these regulations as compared to the OEPA permits shall assume the current permit language prevails.

This ordinance shall apply to all residential, commercial, industrial, or institutional facilities responsible for discharges to the MS4 and on any lands in the Township, except for those discharges generated by the activities detailed in Section 200 (a) to (c) of this ordinance.

SECTION 104 DISCLAIMER OF LIABILITY

Compliance with the provisions of these regulations shall not relieve any person from responsibility for damage to any person otherwise imposed by law. The provisions of these regulations are

promulgated to promote the health, safety, and welfare of the public and are not designed for the benefit of any individual or any particular parcel of property.

SECTION 105 CONFLICTS, SEVERABILITY, NUISANCES, AND RESPONSIBILITY

These regulations are not intended to interfere with, abrogate, or annul any other ordinance, rule or regulation, stature, or other provision of law. The requirements of these regulations should be considered minimum requirements, and where any provision of these regulations imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, whichever provisions are more restrictive or impose higher protective standards for human health or the environment shall be considered to take precedence.

If any clause, section, or provision of these regulations is declared invalid or unconstitutional by a court of competent jurisdiction, the validity of the remainder shall not be affected thereby.

These regulations shall not be construed as authorizing any person to maintain a nuisance on their property, and compliance with the provisions of these regulations shall not be a defense in any action to abate such a nuisance.

Failure of the Township or its designated agent to observe or recognize hazardous or unsightly conditions or to recommend corrective measures shall not relieve the site owner from the responsibility for the condition or damage resulting therefrom, and shall not result in the Township, its officers, employees, or agents being responsible for any condition or damage resulting therefrom.

SECTION 106 DEFINITIONS

For the purposes of these regulations, the following terms shall have the meaning herein indicated; otherwise, words or terms not defined, or interpreted by these regulations or statutory or administrative law, shall have their customary meaning as interpreted by Ohio common law, or in the event no common law exists then as found in the most recent editions of published dictionaries.

Best Management Practices (BMPs) - Schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to storm water, receiving waters, or storm water conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

Clean Water Act - The federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.

Environmental Protection Agency - The United States Environmental Protection Agency, including but not limited to the Ohio Environmental Protection Agency (Ohio EPA) or any duly authorized official of said agency.

Floatable Materials - Any foreign matter that may float or remain suspended in the water column, and includes but is not limited to, plastic, aluminum cans, wood products, bottles, and paper products.

Hazardous Materials - Any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Household Sewage Treatment System (HSTS) - A system designed to treat household sewage on-site and discharges treated wastewater effluent off the property into a storm water or surface water conveyance or system.

Illicit Connection -Any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the MS4 including but not limited to any conveyances which allow any non-storm water discharge including sewage, process wastewater, and wash water to enter the MS4.

Illicit discharge - Any discharge to the Stormwater System not composed entirely of stormwater except the following: water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated ground water infiltration [as defined at 40 CFR 35.2005(b)(20)], uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual car washing, charity car wash events, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, street wash water, home sewer treatment systems that discharge in accordance with Warren County Combined Health District Codes and permits, and discharges or flows from fire-fighting activities.

Industrial Activity - Activities subject to NPDES Industrial Permits as defined in 40 CFR, Section 122.26 (b)(14).

Municipal Separate Storm Sewer System (MS4) - As defined at 40 C.F.R. 122.26 (b)(8), means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that is:

Owned or operated by a State, County, town, borough, parish, Township, municipality, township, Township, association, or other public body (created by or pursuant to State law) having jurisdiction over sewage, industrial wastes, including special Townships under State law such as a sewer Township, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Clean Water Act that discharges to waters of the United States; designed or used for collecting or conveying storm water; Which is not a combined sewer; and which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 C.F.R. 122.2.

Non-Storm Water Discharge - Any discharge to the storm drain system that is not composed entirely of storm water.

NPDES – National Pollutant Discharge Elimination System. A regulatory program in the Federal Clean Water Act that prohibits the discharge of pollutants into surface waters of the United States without a permit.

Site owner, property owner or owner – Any individual, corporation, firm, trust, commission, board, public, or private partnership, joint venture, agency, unincorporated association, municipal corporation, county or state agency, the federal government, other legal entity, or an agent thereof that is responsible for the overall construction site.

Pollutant - Anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordinances, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

Premises - Any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

Storm Water - Any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation and resulting from such precipitation.

Wastewater - Any water or other liquid, other than uncontaminated storm water, discharged from a facility.

SECTION 107 ADMINISTRATION

The Township will follow the Warren County Illicit Discharge Detection and Elimination Manual (IDDE Manual) that outlines the County's approach to identify and addressing illicit discharges from the MS4.

SECTION 200 PROHIBITION OF ILLICIT DISCHARGES

No person shall discharge, or cause to be discharged, an illicit discharge into the MS4. The commencement, conduct, or continuance of any illicit discharge to the MS4 is prohibited except as described as follows:

a) Water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated ground water infiltration; uncontaminated pumped ground water; discharges from potable water sources; foundation drains; air conditioning condensate; irrigation water; springs; water from crawl space pumps; footing drains; lawn watering; individual residential car washing; flows from riparian habitats and wetlands; dechlorinated swimming pool discharges; street wash water; and discharges or flows from firefighting activities. These discharges are exempt until such time as they are determined by the Township to be significant contributors of pollutants to the MS4.

b) Discharges specified in writing to the Township, or it's designated agent, as being necessary to protect public health and safety.

c) Dye testing is an allowable discharge but requires a notification to the Township, or its designated agent, prior to the time of the test.

d) The prohibition shall not apply to any non-storm water discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for any

discharge to the MS4.

SECTION 201 PROHIBITION OF ILLICIT CONNECTIONS

The construction, use, maintenance, or continued existence of illicit connections to the MS4 is prohibited. A person is considered to be in violation of this ordinance if the person connects a line conveying illicit discharges to the MS4 or allows such a connection to continue.

SECTION 202 SUSPENSION OF MS4 ACCESS

The Township or its designated agent may, without prior notice, suspend MS4 discharge access to a person when such suspension is necessary to stop an actual or threatened discharge which presents or may present imminent and substantial danger to the environment, or to the health or welfare of persons, or to the MS4. If the violator fails to comply with a suspension order issued in an emergency, the Township or it's designated agent may take such steps as deemed necessary to prevent or minimize damage to the MS4, or to minimize danger to persons.

Any person discharging to the MS4 in violation of this ordinance may have their MS4 access terminated if such termination would abate or reduce an illicit discharge. The Township, or its designated agent, will notify a violator of the proposed termination of its MS4 access. The violator may petition the Township or its designated agent for a reconsideration and hearing. A person commits an offense if the person reinstates MS4 access to premises terminated pursuant to this Section, without the prior approval of the Township or its designated agent.

SECTION 203 INDUSTRIAL OR CONSTRUCTION ACTIVITY DISCHARGES

Any person subject to an industrial or construction activity NPDES storm water discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the Township prior to the allowing of discharges to the MS4.

SECTION 204 MONITORING FOR ILLICIT DISCHARGES AND ILLICIT CONNECTIONS

The Township has established a program to detect and eliminate illicit discharges and illicit connections to the MS4. This program includes the mapping of the MS4, including MS4 outfalls and receiving waters and household sewage treatment systems connected to the MS4; the routine inspection of storm water outfalls to the MS4, and a process to identify and eliminate any discovered illicit discharges.

a) The Township, or its designated agent, shall be permitted to enter and inspect facilities subject to this regulation as often as may be necessary to determine compliance with this regulation.

b) The Township, or it's designated agent, shall have the right to set up at facilities subject to this regulation such devices as are necessary to conduct monitoring and/or sampling of the facility's storm water discharge, as determined by the Township.

c) The Township, or its designated agent, shall have the right to require the facility owner/operator to install monitoring equipment as necessary. This sampling and

monitoring equipment shall be maintained at all times in safe and proper operating condition by the facility owner/operator at the owner/operator's expense. All devices used to measure storm water flow and quality shall be calibrated to ensure their accuracy.

d) Any temporary or permanent obstruction to safe and reasonable access to the facility to be inspected and/or sampled shall be promptly removed by the facility's owner/operator at the written or oral request of the Township or its designated agent and shall not be replaced. The costs of clearing such access shall be borne by the facility owner/operator.

e) Unreasonable delays in allowing the Township, or it's designated agent, access to a facility subject to this regulation for the purposes of illicit discharge inspection is a violation of this regulation.

f) If the Township, or it's designated agent, is refused access to any part of the facility from which storm water is discharged, and the Township demonstrates probable cause to believe that there may be a violation of this regulation, or that there is a need to inspect and/or sample as part of an inspection and sampling program designed to verify compliance with this regulation or any order issued hereunder, or to protect the public health, safety, and welfare, the Township may seek issuance of a search warrant, civil remedies including but not limited to injunctive relief from any court of appropriate jurisdiction.

SECTION 205 NOTIFICATION OF SPILLS

Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials which are resulting or may result in illicit discharges or pollutants discharging into the MS4 said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials said person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, said person shall notify the Township or its designated agent in person or by phone no later than the next business day. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the Township or its designated agent within three business days of the phone notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

SECTION 300 ENFORCEMENT

a) Notice of Violation. When the Township, or its designated agent, finds that a person has violated a prohibition or failed to meet a requirement of this regulation, the Township or its designated agent may order compliance by written Notice of Violation. Such notice must specify the violation and shall be hand delivered, and/or sent by registered mail, to the owner/operator of the facility. Such notice may require the following actions:

    1) The performance of monitoring, analyses, and reporting;

    2) The elimination of illicit discharges or illicit connections;

3) That violating discharges, practices, or operations cease and desist;

4) The abatement or remediation of storm water pollution or contamination hazards and the restoration of any affected property; or

5) The implementation of source control or treatment BMPs.

b) If abatement of a violation and/or restoration of affected property is required, the Notice of Violation shall set forth a deadline, determined at the discretion of the enforcing agent, within which such remediation or restoration must be completed. Said Notice shall further advise that, should the facility owner/operator fail to remediate or restore within the established deadline, a legal action for enforcement may be initiated.

c) Any person receiving a Notice of Violation must meet compliance standards within the time established at the discretion of the enforcing agent in the Notice of Violation.

d) Injunctive Relief: It shall be unlawful for any owner/operator to violate any provision or fail to comply with any of the requirements of this regulation. If an owner/operator has violated or continues to violate the provisions of this regulation, the Township or its designated agent may petition for a preliminary or permanent injunction restraining the owner/operator from activities that would create further violations or compelling the owner/operator to perform abatement or remediation of the violation or other appropriate relief. Pursuant to Section 307.79(F) the court of common pleas the court may order the implementation of control measures and may assess a civil fine of not less than one hundred or more than five hundred dollars. Each day of violation of a rule of this regulation or administrative order issued under these regulations shall be considered a separate violation subject to a civil fine.

SECTION 301 APPEAL OF NOTICE OF VIOLATION

Any person aggrieved by requirement, determination, or any other administrative action or inaction by the Township or it's designated agent in relation to these regulations may appeal to the court of common pleas. Such an appeal shall be made in conformity with the Ohio Revised Code Chapters 2505 and 2506.

SECTION 302 COST OF ABATEMENT OF THE VIOLATION

Within 30 days after the Township's, or its designated agent's, abatement of the violation, the owner of the property will be notified of the cost of abatement, including administrative costs. If the amount due is not paid within a timely manner as determined by the Township, or it's designated agent, or by the expiration of the time in which to file an appeal, the charges shall become a special assessment against the property and shall constitute a lien on the property for the amount of the assessment. Any person violating any of the provisions of this article shall become liable to the Township or its designated agent by reason of such violation.

SECTION 303 VIOLATIONS DEEMED A PUBLIC NUISANCE

In addition to the enforcement processes and penalties provided, any condition caused or

permitted to exist in violation of any of the provisions of this Ordinance is a threat to public health, safety, and welfare, and is declared and deemed a nuisance, and may be summarily abated or restored at the violator's expense, and/or a civil action to abate, enjoin, or otherwise compel the cessation of such nuisance may be taken.

SECTION 304 REMEDIES NOT EXCLUSIVE

The remedies listed in this ordinance are not exclusive of any other remedies available under any applicable federal, state, or local law and it is within the discretion of the authorized enforcement agency to seek cumulative remedies, including criminal penalties as authorized in section 6117.99 of the Ohio Revised Code where applicable.

APPENDIX E

Construction Site Inspection Form

Construction Site Erosion and Sediment Control Inspection		
Inspector:	Date:	Weather:
Project name:		Municipality:
Type of inspection: Pre-con ☐ Routine ☐ Follow up ☐		Photo(s): ☐

Inspection Checklist			
BMP/Activity	Maintenance Needed (Y/N)	N/A	Comments/Recommendations (ex: NOV, not installed,
Construction entrance			
Perimeter Protection			
Concrete Washout			
Inlet Protection			
Streets			
Basins			
• Skimmer			
Stabilization			
Fuel/Chemical Storage			
Stock Piles			
Dewatering			
Conservation Areas			
Tree Protection			
Other			

Additional comments:

	Description of Action Taken	Name or Date
	Verbal compliance with on-site contact	
	Written inspection sent to builder/owner	
	Follow-up inspection scheduled	
	Non-compliance resolved	
	Notice of Violation Sent	
	Second Notice of Violation Sent	
	Enforcement recommended (stop-work order)	
	Enforcement obtained/inspections suspended	

APPENDIX F

Example Maintenance Letter

Warren County
Soil & Water
Conservation District

Contractor/ SWP3 Contact
1234 Address here
City, State Zip Code

Date Sent

RE: **First/Second Notice of Violation**
Project Name
Project ###

Project Manager Name,

Warren County Soil and Water Conservation District (SWCD) conducted an erosion and sediment control inspection **of Site Name, on (Inspection Date)** per the working agreement between Warren County SWCD and Deerfield TWP Stormwater District. The goal of the inspection was to determine your site's compliance with Ohio's environmental laws and regulations found in Chapter 6111 of the Ohio Revised Code (ORC) and Warren County Stormwater Regulations; Erosion Prevention and Sediment control found in Deerfield Township Code of Regulations, Resolution No. 2006-42. At the time of inspection, we found that your site was in violation and requires action.

Site Violations, Deficiencies and Maintenance Needs:

- Violation- Describe what you observed, add photos. If it's a violation site when you sent a notice of inspection for said violation. Cite GCP and/or Rainwater and Land Development Manual if needed
    - Corrective action request- What they need to do to be in compliance and a timeline if necessary. IE if it's a general maintenance item they get 3 days, if it's something with a basin they have 10 days. Most of these timelines can be found in our active choice list.
- Maintenance needs- When it was found during this inspection but wasn't quite at violation level yet. Describe what you observed, add photos if you have them. Cite permit language or Rainwater and Land Development Manual as necessary.
    - Corrective action request- What they need to do to be in compliance and a timeline if necessary. IE if it's a general maintenance item they get 3 days, if it's something with a basin they have 10 days. Most of these timelines can be found in our active choice list.

Within 14 days of this letter, please provide documentation to Warren County SWCD of the actions taken, or a corrective action plan to resolve the violations cited above. Failure to comply with Chapter 6111 of the Ohio Revised Code and/or Warren County Stormwater Regulations may result in an administrative penalty or stop work order. If you have any questions regarding your violation, please call us at 513-695-1337.

Respectfully,

Inspectors name

Warren County Soil and Water Urban Program
513-695-1337

Attached: Photos
CC: Beth Wilson- Warren County SWCD Urban Program Coordinator
Jeff Thomas- Deerfield Township Storm Water Manager

APPENDIX G

Warren County Rules and Regulations for the Design of Sewer and Stormwater Management Systems

Storm Water Design Manual

Warren County Engineer
Neil F. Tunison, P.E., P.S.

Updated January 2021

Prepared By:
STRAND ASSOCIATES®

Warren County, Ohio
Storm Water Design Manual
Table of Contents

Section 1 - Introduction

Section 1.1: Purpose

This Storm Water Design Manual shall be used as a technical resource and to document Warren County's standards to meet the requirements of the County storm water and erosion and sediment control regulations. These should be considered minimum standards and certain conditions may require exceeding these standards. The Ohio Department of Natural Resources "Rainwater and Land Development" manual is a comprehensive source of general standards to use to avoid, minimize, or compensate for impacts to water resources.

This Manual:

1. Establishes design standards that have been authorized by the Warren County Engineer's Office to facilitate compliance with local, state, and federal regulations.

2. Serves as a reference document for professional consultants in the design of storm system infrastructure projects within Warren County.

3. Identifies standards to be used in the planning and design of storm water projects within Warren County.

The Manual is not intended to serve as a step-by-step design methodology nor can this Manual address every situation which may arise. The application of sound engineering/surveying principles and judgement combined with the information contained herein are necessary to complete the planning, design, and preparation of related construction documents for storm water projects.

Section 1.2: Applicability

Every development project within the County shall have an adequate drainage system to provide complete drainage for the entire development. Construction activities disturbing one or more acres of total land or will disturb less than one acre of land but are part of a larger common plan of development or sale that will ultimately disturb one or more acres of land, shall be required to implement erosion and sediment control Best Management Practices (BMPs). The threshold acreage includes the entire area disturbed in the larger common plan of development or sale. Construction activities that meet this threshold shall obtain coverage through the Ohio Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System General Storm Water Permit for Construction Activities (latest version) and will require an Earth Disturbing Permit through the Warren County Soil and Water Conservation District. Erosion and sediment controls shall comply with the Storm Water Pollution Prevention Plan (SWP3) Requirements prescribed in the Ohio EPA General Storm Water Permit for Construction Activities.

Additionally, construction activities disturbing one or more acres of total land, or will disturb less than one acre of land but are part of a larger common plan of development or sale that will ultimately disturb one or more acres of land, shall be required to implement post-construction storm water management facilities or BMPs. The threshold acreage includes the entire area disturbed in the larger common plan of development or sale. Construction activities that meet this threshold shall obtain coverage through the Ohio EPA National Pollutant Discharge Elimination System General Storm Water Permit for Construction Activities (latest version). Post-construction storm water management facilities or BMPs shall comply with the Post-Construction Storm Water

Management Requirements prescribed in the Ohio EPA General Storm Water Permit for Construction Activities.

The County Engineer's Office may grant a waiver to the individual design requirements herein at their discretion on a case by case basis where suitable justification is provided to support such action.

Section 1.3: Submittal Documents

All design calculations or storm water modeling results, design drawings, and technical specifications corresponding to the storm system improvements shall be submitted to the County Engineer for review.

At the completion of construction an acceptable record plan shall be prepared and submitted to the County Engineer for approval.

SECTION 2 - DESIGN CRITERIA AND METHODS

Section 2.1: Design Storm Criteria and Methods Overview

The storm drainage system shall be designed to adequately handle the runoff from storms having various frequencies of occurrence from different types of development in accordance with the following general categories. Each category has minimum design criteria and methods that shall be followed in order for approval of the storm drainage system by the Warren County Engineer's Office. The criteria and methods for the general categories are summarized below. The design criteria and methods are detailed in later sections.

Additional controls or localized restrictions may be placed on specific sites, as deemed necessary by the County. For example, sites where pre-existing downstream problems or hydrologic and hydraulic models developed for the area exist. Conditions for design in such cases shall be as required by the County.

1. **Closed Pipe Systems:** The 25-Year Storm shall be used for design.

    - **Design Criteria for 25-Year Design Storm**: Hydraulic Grade Line (HGL) shall not exceed the crown of the pipe.
    - **Method**: The Rational Method or Soil Conservation Service (SCS) Method may be used to calculate peak flow rates. The SCS Method shall be used for drainage areas greater than 20 acres. Manning's Equation shall be used to calculate pipe flow and velocity in order to design the pipe system.

2. **Open Channels:** The 10-Year Storm shall be used for design. The 100-Year Storm shall be used as a Check Storm:

    - **Design Criteria for 10-Year Design Storm**: The peak flow rate resulting from the 10-Year Storm shall be confined within the open channel's banks.
    - **Design Criteria for 100-Year Check Storm:** The peak flow rate resulting from the 100-Year Storm shall be confined within the defined easement of the open channel.
    - **Method**: The Rational Method or SCS Method may be used to calculate runoff rates. The SCS Method shall be used for drainage areas greater than 20 acres. Manning's Equation shall be used to calculate channel flow and velocity in order to design the open channel.

3. **Inlets:** Design methodology utilized shall be consistent with requirements listed in Sections 1103.4 through 1103.7 of the Ohio Department of Transportation (ODOT) Location and Design (L&D) Manual Volume Two Drainage Design, latest version.

4. **Culverts:** The 100-Year Storm shall be used to check roadway over topping;

    - **Design Criteria and Method**: Culverts shall be designed in accordance with Section 1006.2 and Section 1105 of the ODOT L&D Manual Volume Two Drainage Design, latest version.

5. **Storm Water Management Systems/Detention Basins:** The methodology and calculations used for the design and sizing of storm water management facilities for detention or retention shall be based on the Critical Storm Method as described below.

- **Design Criteria**: If the post-development storm water runoff volume from a site will be greater than the pre-development storm water runoff volume from the same site, the peak flow rate from the Critical Storm and all more frequent storms shall be less than or equal to the peak flow rate from a 1-Year 24-Hour storm occurring on the same site under pre-development conditions. The post-development peak flow rate from storms of less frequent occurrence (longer return periods) than the Critical Storm up to the 100-Year 24-Hour storm shall be less than or equal to the pre-development peak flow rates from equivalent size storms.

  The Critical Storm for a specific development area shall be determined as follows:

  a. Determine the total volume of storm water runoff from a 1-Year 24-Hour storm for both pre-development and post-development conditions.

  b. Determine the percent increase in the total volume of storm water runoff due to development and select the Critical Storm from Table 2.1.

Storm Water Runoff Volume Increase		Critical Storm
Equal to or Greater	And Less Than	
-	10%	1-Year
10%	20%	2-Year
20%	50%	5-Year
50%	100%	10-Year
100%	250%	25-Year
250%	500%	50-Year
500%	-	100-Year

Table 2.1 Critical Storm Method

- **Method**: The SCS Method shall be used for the purposes of sizing storm water management systems/detention basins.

6. **Emergency Spillways:** The 100-Year Storm shall be used in the design of emergency spillways for storm sewer systems and detention basins:

- **Design Criteria for Emergency Spillway - Storm Sewer Systems**: Inlets in sag shall have an overland flow path, where possible, such that the storm water resulting from the 100-Year Storm may pass downstream and not exceed the 12-foot spread limit.
- **Design Criteria for Emergency Spillway - Detention Basins:** Assuming the outlet control structure is clogged, the emergency spillway shall convey the 100-Year Storm flow. The 100-Year Storm flow may not overtop the embankment, and downstream impacts must be evaluated and taken into design consideration in order minimize erosion.
- **Method**: The Rational Method or SCS Method may be used to calculate the 100-Year Storm Event. The SCS Hydrograph method shall be used to analyze the HGL in order to meet design criteria.

7. **Channel linings:** The 10-Year Storm shall be used in the design of channel linings to adequately control the erosive flows. Erosive flows are defined as flows produced during the 10-Year Storm event such that the applied shear stress on the channel lining is greater than the permissible shear stress.

   - **Design Criteria for 10-Year Storm:** The calculated permissible shear stress must be less than the calculated applied shear stress.
   - **Method**: The Rational Method or SCS Method may be used to calculate and compare runoff rates. The SCS Method shall be used for drainage areas greater than 20 acres. The Applied Shear Stress equation may be used to calculate permissible and applied shear stress for the channel lining.

8. **Easements**: All storm water conveyance systems, including closed pipe systems / storm sewers and open channel systems, shall have a minimum easement width of 20 feet that extends at least 10 feet on both sides of the centerline of the conveyance system. Larger conveyances shall have an easement width determined by the following formula:

$$Ew = 120*(DA)^{0.43}$$

   Where:

   Ew = Easement width, feet
   DA = Drainage Area, square mile

9. **Stream buffers**: No development shall occur within stream buffers or riparian buffers (also known as stream setback areas) at the discretion of the County. Stream setback areas shall be defined and determined as summarized in Section 2.5 of the Ohio Department of Natural Resources (DNR) Rainwater and Land Development Manual, latest edition.

10. The 100-Year Storm shall be used in comparison with established flood elevations from property owners, observations, Federal Emergency Management Agency (FEMA) maps and other viable records to minimize the impacts of flooding and storm water.

Section 2.2: Runoff Computation Methods

Numerous methods of rainfall-runoff computation are available on which the design of storm management facilities may be based. The Rational Method and the Soil Conservation Service (SCS) hydrologic methods (available in TR-20, TR-55 and HEC-1) are accepted as adequate for determining peak runoff rates for drainage areas totaling 20 acres or less.

For drainage systems larger than 20 acres, the SCS hydrologic method shall be used to determine peak runoff rates. The method of analysis must remain consistent when drainage areas are combined. The method which applies to the largest combined drainage area shall be used. The engineer may use other methods with prior approval by the County.

The SCS hydrologic method shall be used for detention or retention basin routing calculations.

Section 2.3: Rational Method

The Rational Method may only be used to calculate peak discharge rates for drainage areas of 20 acres or less. The Rational Method shall not be used to calculate the volume of storm water runoff or develop runoff hydrographs. The Rational Method shall be performed as follows:

$$Q = C\ i\ A$$

Where:

Q = peak flow rate, cfs

C = runoff coefficient varying with the amount of imperviousness and other characteristics of the drainage area. Table 2.4 presents ranges for "C" values based on specific land use types.

i = average intensity of precipitation in inches per hour, varying with frequency of storm occurrence, duration or concentration time, and area of the tributary watershed. The rainfall intensity shall be obtained from Rainfall Intensity-Duration-Frequency (IDF) Curves provided in Section 2.6 for the appropriate design storm.

A = area in acres of the tributary watershed

Section 2.4: Rational Method Runoff Coefficients (C)

Runoff coefficients (C) for the land uses shown in Table 2.4 must be used unless actual impervious areas are calculated and composite (C) factors are determined and submitted.

	FLAT: Slope <2%	ROLLING: Slope 2%-10%	HILLY: Slope >10%
Pavement & Roofs	0.90	0.90	0.90
Earth Shoulders	0.50	0.50	0.50
Drives & Walks	0.75	0.80	0.85
Gravel Pavement	0.85	0.85	0.85
City Business Areas	0.80	0.85	0.85
Apartments	0.50	0.60	0.70
Light Residential:1-3 units/ac	0.35	0.40	0.45
Normal Residential: 3-6 units/ac	0.50	0.55	0.60
Dense Residential: 6-15 units/ac	0.70	0.75	0.80
Lawns	0.17	0.22	0.35
Grass Shoulders	0.25	0.25	0.25
Sides Slopes, Earth	0.60	0.60	0.60
Side Slopes, Turf	0.30	0.30	0.30
Median Areas, Turf	0.25	0.30	0.30
Cultivated Land, Clay & Loam	0.50	0.55	0.60
Cultivated Land, Sand & Gravel	0.25	0.30	0.35
Industrial Areas, Light	0.50	0.70	0.80
Industrial Areas, Heavy	0.60	0.80	0.90
Parks & Cemeteries	0.10	0.15	0.25
Playgrounds	0.20	0.25	0.30
Woodland & Forests	0.10	0.15	0.20
Meadows & Pasture Land	0.25	0.30	0.35
Unimproved Areas	0.10	0.20	0.30

Table 2.4 Rational Method Runoff Coefficients

Section 2.5: Time of Concentration

The time of concentration is the time associated with the travel of runoff from an outer point that best represents the shape of the contributing areas. Runoff from a drainage area usually reaches a peak at the time when the entire area is contributing, in which case the time of concentration is the time for a drop of water to flow from the hydraulically most remote point in the watershed to the point of interest. Runoff may reach a peak prior to the time the entire drainage area is contributing. Sound engineering judgment should be used to determine the time of concentration. The time of concentration to any point in a storm drainage system is a combination of the sheet flow (overland), the shallow concentrated flow and the channel flow, which includes storm sewers.

The Soil Conservation Service TR-55 method for calculating the time of concentration shall be used for all of pre-construction and post-construction runoff analyses. The minimum time of concentration for any area shall be 10 minutes. The maximum flow path for sheet flow (overland) shall be 100 feet in length.

Section 2.6: Average Intensity of Rainfall (i)

The average rainfall intensity for a particular storm occurrence frequency can be determined using the calculated time of concentration and the appropriate Intensity-Duration-Frequency (IDF) Curve. The Warren County IDF Curves provided in Figure 2.6, and/or intensity frequency table provided in Table 2.6, shall be utilized to determine intensities.

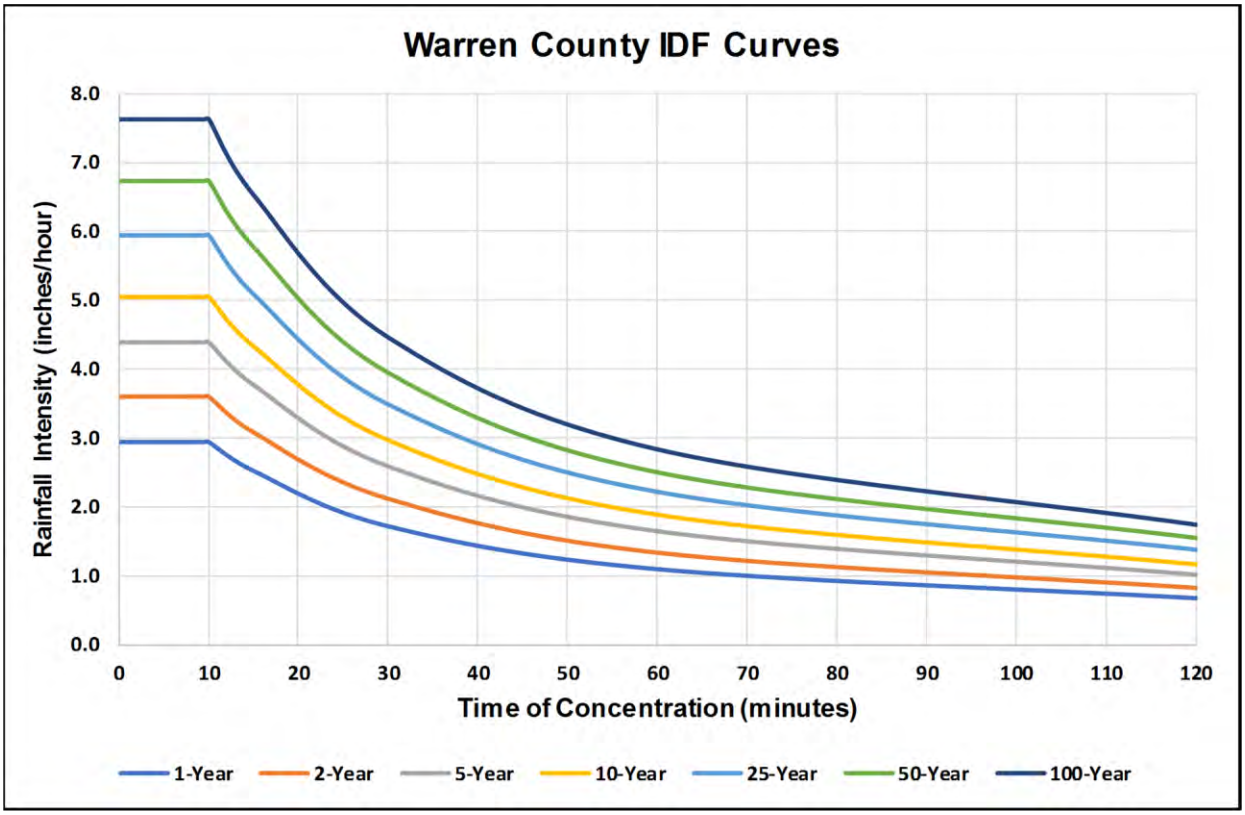


Figure 2.6 Warren County IDF Curves (Data from *Rainfall Frequency Atlas of the Midwest Bulletin 71*)

Duration	Average Recurrence Interval (years)						
	1	2	5	10	25	50	100
10-min:	2.94	3.60	4.38	5.04	5.94	6.72	7.62
15-min:	2.52	3.08	3.76	4.32	5.08	5.76	6.52
30-min:	1.72	2.12	2.58	2.96	3.48	3.94	4.46
60-min:	1.10	1.34	1.64	1.88	2.21	2.50	2.84
2-hr:	0.68	0.83	1.01	1.16	1.37	1.55	1.75
	Data from *Rainfall Frequency Atlas of the Midwest Bulletin 71*						

Table 2.6 Warren County Intensity Frequency Estimates (Inches per Hour)

Section 2.7: Soil Conservation Service (SCS) Method

The Soil Conservation Service (SCS) Method may be used to calculate the peak discharge rates; develop runoff hydrographs for basins and sub-basins; determine runoff volumes; and provide inflow information to determine the required storage volume for detention and retention basins. The SCS Method is the preferred method for performing hydrologic analysis. The SCS Method will utilize the formulas, constants, and data as currently provided by the U.S. Natural Resources Conservation Service. The SCS method utilizes a 24-hour storm duration. When SCS methods are used, the Type II rainfall distribution shall be used. The rainfall depths for the 24-Hour storm can be found in the Midwestern Regional Climate Center Bulletin 71 - Rainfall Frequency Atlas of the Midwest and are included in Table 2.7 below. The Curve Number (CN) needed for SCS computations is based on the surface conditions of the project site. The CN can be determined from tables in SCS TR-55. In general it shall be assumed that predevelopment runoff CN should not exceed the following for each hydrologic soil type: A=49, B=69, C=70 and D=84. Additionally, to account for site compaction, post-development CN shall assume type D soils for lot sizes 1/2 acre and smaller, and for lots larger than 1/2 acre the weighted CN shall include at least 1/4 acre of type D soils per lot.

Storm Frequency	24-Hour Rainfall Depth (in.)
1-Year	2.33
2-Year	2.86
5-Year	3.49
10-Year	3.99
25-Year	4.70
50-Year	5.32
100-Year	6.04

Table 2.7 Warren County 24-Hour Storm Rainfall Depths

Section 2.8: Channel Lining Hydraulic Method - Permissible Shear Stress

Permissible shear stress, T_d, indicates the stress that a lining material can withstand before erosion of the lining will occur. For a channel lining to be stable, the applied shear stress must be less than the permissible shear stress. Permissible shear stress of the most common linings can be found in Section 1102.3.2 of the ODOT L&D Manual Volume Two Drainage Design, latest version.

The Applied Shear Stress equation is below:

$$\mathbf{T_d = 62.4\ d\ S_o}$$

Where:

T_d = Shear stress in a channel at maximum depth, lb/ft^2

d= Maximum depth of flow in the channel for the design discharge, ft

S_o = Average bottom slope, ft/ft

Section 2.9: Channel and Pipe Hydraulic Method - Manning's Equation

Overland and/or shallow concentrated flow empties into channels or pipes where it is conveyed to the outlet point. The Manning's equation shall be used to estimate average flow velocity in the channel or pipe. A channel section typical of the entire channel length shall be used to estimate channel velocity.

Manning's Equation:

$$\mathbf{Q = (1.49/n)\ A\ R^{2/3}\ S^{1/2}}$$

Where:

Q = storm water flow, cubic feet per second

n = Manning's roughness coefficient (see Table 3.3)

A= cross-sectional area of flow, square feet

R = hydraulic radius (equal to A/P), feet

P = wetted perimeter in feet

S = channel slope, feet/feet

SECTION 3 - STORM SEWER SYSTEM DESIGN

Section 3.1: Purpose of Storm Sewer Systems

Storm sewer systems are designed to collect and convey storm water runoff from street inlets, storm water management facilities, and other locations where the accumulation of storm water is undesirable. The objective is to remove runoff from an area fast enough to avoid unacceptable amounts of ponding damage and inconvenience while preventing adverse off-site impacts.

Section 3.2: Peak Discharge Calculations

The method of runoff calculation for determining peak discharge (Q) for a drainage area shall be the methods described in Section 2.

Section 3.3: Design Methodology/Design Storm

Public storm sewer pipes shall be designed to carry peak flows as determined by methods previously described. All storm sewers shall be designed for the 10-Year Storm event, such that the HGL remains below the crown of pipe during peak flow. The 25-Year Storm shall be used as a check storm to confirm storm water containment at a minimum of 1 foot below the rim opening to prevent surcharging.

The Rational Method or SCS Method may be used to calculate runoff rates. The SCS Method shall be used for drainage areas greater than 20 acres. Manning's Equation shall be used to calculate pipe flow and velocity in order to design the pipe system.

Storm sewer pipe material may be reinforced concrete, HDPE, or PVC. PVC is not allowable under pavement. Corrugated metal pipe may only be allowed at the County's discretion. A listing of the Manning's Equation roughness coefficients for various pipe materials may be found in Table 3.3 below.

Storm Sewer Material	Roughness Coefficient
Concrete	0.013
PVC and HDPE	0.010
Corrugated Metal Pipe	0.024

Table 3.3 Storm Sewer Roughness Coefficients, "n"

Storm sewers shall have a minimum pipe cover of 12 inches between the top of the pipe and the pavement subgrade if under pavement and shall have a minimum pipe cover of 24 inches between the top of the pipe and the ground surface in unpaved areas. Storm sewers shall be designed to provide a minimum 10-foot horizontal clearance from other utilities and an 18-inch vertical clearance from other utilities.

Section 3.4 Hydraulic Grade Line (HGL) for Design Storm

The hydraulic design of a storm sewer system consists of determining the location, sizes, slopes, and elevations for a system of underground conduits necessary to transport surface runoff to a downstream location. Storm sewers shall be designed such that storm water flows by gravity in the pipe, rather than pressure. The crown line of the upstream pipe shall match the crown line of downstream pipe.

Section 3.5: Pipe Velocities

The minimum velocity in public storm sewer pipes shall be 3.0 feet per second at full flow. The maximum velocity in public storm sewer pipes shall be 15.0 feet per second. Excessive velocities shall be avoided to prevent hydraulic problems and to prevent erosion at system outfalls. Velocities shall be non-erosive at the re-entrance into the receiving channel. An outlet velocity of 5.0 feet per second or less is generally considered to be non-erosive. In cases where the outlet velocity is greater than 5.0 feet per second, the downstream receiving channel or stream must receive adequate protection against erosion through the use of erosion prevention practices or energy dissipation devices.

Section 3.6: Pipe Slopes

Storm sewers shall have a minimum slope of one-half percent (0.5%). A slope of less than one half percent may only be permitted upon prior review and approval by the County. Storm sewers shall have a maximum slope of 25 percent provided the maximum velocities are not exceeded. Storm sewers on slopes over 20 percent shall be anchored securely with concrete anchors. Drop manholes may be permitted to avoid excessive storm sewer slopes.

Section 3.7: Minimum Pipe Sizing

Minimum storm sewer pipe size shall be 12 inches in diameter. The only circumstance when smaller diameter pipes may be used are for flow attenuation purposes within a post-construction storm water management facility.

Section 3.8: Manhole Placing, Spacing and Sizing

Storm sewer manholes shall have a maximum spacing and sizing as follows:

1. Place manholes at the following locations:
    a. Where two storm sewers intersect.
    b. At changes in pipe size.
    c. Where slope changes.
    d. Where horizontal alignment changes.

2. The minimum diameter of manholes shall be 48 inches. Refer to the National Precast Concrete Associate (NPCA) manhole sizing standards and recommendations.

3. For storm sewers less than or equal to 48 inches in diameter, maximum spacing of manholes shall be 300 feet.

4. For storm sewers greater than 48 inches in diameter, maximum spacing of manholes shall be 400 feet.

Section 3.9: Inlet Capacity

Inlets shall be designed according to requirements listed in Sections 1103.4 through 1103.7 of the Ohio Department of Transportation (ODOT) Location and Design (L&D) Manual Volume Two Drainage Design, latest version.

Inlets at low points or sags shall have extra capacity as a safeguard for street flooding from flows overtopping the street curb. An emergency spillway designed for the 100-Year Storm shall be placed at all low points or sags. Curb openings or combination inlets should be used for overflows in the event that the grate is clogged. Special inlets may be required for streets with steep gradients to provide the extra capacity such situations require. Where avoidable, inlets shall not be placed along streets where driveways and/or aprons conflict with mountable roll or depressed curbing. Roll curb and gutter inlet grates, as a general rule, shall be placed at a maximum interval of 300 feet, provided a minimum 10-year design storm flow capacity has also been achieved. Inlets within wooded areas or locations prone to receiving larger debris may be protected by trash racks.

Section 3.10: Storm Sewer Outfalls

When a storm sewer system outfalls into a floodplain of any major watercourse, the outfall must be high enough to prevent tailwater conditions that impact HGL requirements of the storm sewer system. Headwalls and/or headwalls with wingwalls including rock channel protection and aprons as erosion control shall be constructed for all outfalls. Rock channel protection at storm sewer outfalls shall be designed in accordance with the ODOT L&D Manual Volume Two Drainage Design, latest version. Suitable baffles or other energy dissipaters shall be provided if the velocity of the storm water discharge is greater than 6.0 feet per second. Outlet pipes that are smaller than 6 inches shall be adequately protected from clogging by an acceptable external trash rack.

Section 3.11: Culvert and Bridge Design Criteria

Culverts, including proper backfill, shall be designed in accordance with the ODOT L&D Manual Volume Two Drainage Design, latest version. The maximum allowable headwater shall not exceed 1.2 times the structure rise unless specifically approved by the County Engineer on a case-by-case basis. Downstream channels must receive appropriate protection or energy dissipation if the design outlet discharge would cause erosive conditions (velocity of discharge is greater than 5.0 feet per second). Any culvert or bridge that is located in a FEMA floodplain must be analyzed using methodologies acceptable to FEMA and the County.

Section 3.12: Design of Private Storm Sewer Systems

Storm drainage systems on private sites that will not be accepted for maintenance and operation by the County shall be designed to mitigate impacts of flooding and property losses on off-site properties and drainage facilities. Storm sewer systems on these sites shall be designed using the design criteria and methods previously described in Section 2 and shall be submitted to the County Engineer for review.

SECTION 4 - OPEN CHANNEL DESIGN

Section 4.1: Purpose of Open Channels

This section describes the technical criteria necessary to design open channels using conventional design procedures. These procedures shall be applied to roadside and rear yard ditches and highly urbanized channels. The objective of open channel flow design is to determine a channel slope and size that will have sufficient capacity to prevent flooding damage during the anticipated peak runoff period; and to determine the degree of protection based on stream velocity to prevent erosion in the drainage channel.

Open channels shall be avoided wherever possible in residential subdivisions. Channels may be permitted when the required pipe size exceeds 36 inches. Natural streams and water courses should be left as undisturbed as practical.

Section 4.2: Design Storm/Methodology

For all developments, drainage channels and ditches shall be capable of conveying the 10-Year Storm flow within their banks, such that the HGL is below the top of the channel. The peak flow rate resulting from the 100-Year Storm shall be confined within the defined easement of the open channel, and below building opening elevations.

The Rational Method or SCS Method may be used to calculate runoff rates. The SCS Method shall be used for drainage areas greater than 20 acres. The SCS Hydrograph method shall be used to analyze the HGL in order to meet design criteria. Manning's Equation shall be used to calculate channel flow.

Section 4.3: Peak Flow Capacity

Each portion of the storm water system of drainage channels and watercourses shall be capable of handling the peak flows as determined by the proper method previously described in Section 2. Manning's Equation is recommended to calculate the flow rates and is listed in Section 3.3. Typical roughness coefficients applicable to open channels and ditches may be found in the latest version of the HEC-RAS Hydraulic Reference Manual.

Section 4.4: Open Channel Linings, Design Slopes, and Velocities

When open drainage channels require various lining types to attain ultimate design capacity, the earth sections of the drainage channel and its structure shall be designed and constructed to the ultimate design capacity required. Lining is required in initial construction and must be maintained throughout construction. Durable channel linings shall be designed to control flows resulting from the 10-Year Storm Event. The design of channel linings shall meet both the velocity and shear stress requirements, using the methodology described in Section 2.

Durable channel lining is required along the side slopes and bottom of the open channel up to the peak elevation of the 10-Year Storm Event. Durable channel lining may be low maintenance ground cover, sod, soil bioengineered systems, turf reinforcement mats or concrete. Rip-Rap, Aggregate Channel Lining and Gabion Baskets are to be limited to areas immediately downstream of an outlet pipe to reduce velocities and erosion potential.

Open channels and ditches are recommended to have side slopes no steeper than 3:1 (horizontal to vertical). If available right-of-way does not allow for 3:1 side slopes the County Engineer may approve 2:1 (horizontal to vertical) side slopes for roadside ditches. The minimum channel slope for open channels shall be 1.0 percent except for natural streams or paved ditches. All open channels having a velocity of 5 feet per second or less shall be sodded, except that channels may be seeded if the velocity is under 2 feet per second. All open channels with a velocity over 5 feet per second shall be lined. If the design parameters are beyond the limits of natural vegetation, then a non-degradable durable material must be used.

SECTION 5 - POST-CONSTRUCTION STORM WATER MANAGEMENT FACILITIES

Section 5.1: Purpose of Storm Water Management Facilities

The purpose of post-construction storm water management facilities is to mitigate damage caused by flooding. Retention and detention basins are important storm water management facilities for flood control purposes.

Storm water management facilities shall be designed so that no standing water remains in detention basins during dry weather (72 hours following most recent rainfall) or that standing water in retention basins shall not be allowed to stagnate and present health hazards. The use of other methods of controlling peak discharge rates, such as bioretention swales and structures, may be used if approved by the County. The amount of water to be detained shall be determined by the methods described herein using the design criteria described in Section 2.

Based upon location in the contributing watershed, alternative storm water management practices may be required by the County if it is determined or can be demonstrated that detention of runoff will be detrimental to the overall hydrologic response of the watershed.

Section 5.2: Design Methodology/Design Storm

The methodology and calculations used for the design and sizing of storm water management facilities for detention or retention shall be based on the Critical Storm Method as described below. The SCS Method shall be used for the purposes of sizing storm water management systems/detention basins.

If the post-development storm water runoff volume from a site will be greater than the pre-development storm water runoff volume from the same site, the peak flow rate from the Critical Storm and all more frequent storms shall be less than or equal to the peak flow rate from a 1-Year 24-Hour storm occurring on the same site under pre-development conditions. The post-development peak flow rate from storms of less frequent occurrence (longer return periods) than the Critical Storm up to the 100-Year 24-Hour storm shall be less than or equal to the pre-development peak flow rates from equivalent size storms.

The Critical Storm for a specific development area shall be determined as follows:

1. Determine the total volume of storm water runoff from a 1-Year 24-Hour storm for both pre-development and post-development conditions.

2. Determine the percent increase in the total volume of storm water runoff due to development and select the Critical Storm from Table 2-1.

Storm Water Runoff Volume Increase		Critical Storm
Equal to or Greater	And Less Than	
-	10%	1-Year
10%	20%	2-Year
20%	50%	5-Year
50%	100%	10-Year
100%	250%	25-Year
250%	500%	50-Year
500%	-	100-Year

Table 5.2 Critical Storm Method

Hydrographs for the 1-Year, 2-Year, 5-Year, 10-Year, 25-Year, 50-Year, and 100-Year Storm events shall be routed through the proposed storm water management facilities using the SCS Method to confirm the Critical Storm method requirements are achieved.

Section 5.3: Detention/Retention Basin Design Standards

The following conditions are required for storm water runoff control facilities:

1. The outlet control structure shall be sized to accommodate a flow equal to the 100-Year Storm post-development discharge.

2. The outlet control structure shall be designed to handle the 100-Year Storm event so that no flow passes through the emergency spillway. The emergency spillway shall be designed to handle the 100-Year Storm event without overtopping the embankment. Erosion protection and any necessary energy dissipation shall be provided for spillways and any receiving watercourse. Spillways shall not be placed over a dam. Vegetated emergency spillways shall be embedded in in-situ soils.

3. The dam crest elevation shall not be less than one foot above the highest water surface elevation during the 100-Year Storm event.

4. Detention basins shall be fully discharged within 72 hours after the storm event.

5. The detention basin shall be the first item of construction and shall be designed to function as the sediment basin throughout construction. The basin design must be checked for capacity due to additional runoff generated by disturbed site conditions.

6. The detention basin shall be easily accessible for maintenance. All basins shall be designed and constructed with side slopes no greater than 3:1 (horizontal to vertical).

7. Fencing will be required around all basins which are within lots to be deeded to the County or within easements to be granted to the County.

8. Dam permit if required by the latest regulations available from the Ohio Department of Natural Resources.

Section 5.4: Maintenance Responsibilities

The owner of a storm water runoff control facility and/or the developer of each subdivision shall be responsible for properly maintaining each storm water runoff control facility in order for such facility to function according to its design and purpose. Maintenance provisions for each facility shall be noted on the submittal plans, including suitable access as approved by the County. Upon design and before construction, an Operation and Maintenance Document of all post construction stormwater features will be required. This document can be submitted to Warren Co SWCD with the SWPPP or to the Engineer's office. The owners of all post-construction storm water management facilities and BMPs that have been reviewed and approved by the County shall be required to enter into a maintenance agreement following construction to ensure adequate long-term operation and maintenance as required by County Regulations.

SECTION 6 - WATER QUALITY BEST MANAGEMENT PRACTICES (BMPs)

Section 6.1: Purpose of Water Quality BMPs

The purpose of post-construction water quality BMPs is to reduce the pollution associated with storm water runoff from new development and re-development projects. Post-construction storm water runoff treatment requirements are the result of Ohio EPA storm water regulations that require the County to develop a storm water runoff quality treatment standard for all applicable new development and re-development projects.

Construction activities disturbing one or more acres of total land or will disturb less than one acre of land but are part of a larger common plan of development or sale that will ultimately disturb one or more acres of land, shall be required to implement post-construction water quality BMPs. The threshold acreage includes the entire area disturbed in the larger common plan of development or sale. Construction activities that meet this threshold shall obtain coverage through the Ohio EPA National Pollutant Discharge Elimination System General Storm Water Permit for Construction Activities, latest version. Post-construction water quality BMPs shall comply with the Post-Construction Storm Water Management Requirements prescribed in the Ohio EPA General Storm Water Permit for Construction Activities.

Section 6.2: Water Quality Design Standards

The design of water quality BMPs are required to be consistent with all standards and specifications included in the Ohio DNR Rainwater and Land Development manual, latest edition. Post-construction water quality BMPs shall be selected, sized, and designed to completely capture the water quality volume (WQ_v) prior to discharging from the site. The WQ_v used for sizing post-construction water quality BMPs shall be computed as outlined in the Ohio Construction General Permit (latest edition).

Post-construction water quality BMPs typically include, but are not limited to, the following:

- Wet extended detention basins;
- Dry extended detention basins;
- Constructed extended detention wetlands;
- Permeable pavements;
- Sand and other media filtration;
- Bioretention areas/cells;
- Infiltration basins; and
- Infiltration trenches.

For detailed requirements and design guidance on these types of post-construction water quality BMPs, refer to the following documents:

- Ohio Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System General Storm Water Permit for Construction Activities, latest version.
- Ohio Department of Natural Resources (DNR) Rainwater and Land Development manual, latest edition.
- Ohio Department of Transportation (ODOT) Location and Design (L&D) Manual Volume Two Drainage Design (Section 1117), latest version.

For those areas of development and re-development that result in a new or expanded discharge from the MS4 to high-quality waters, additional provisions may be required to protect existing in-stream water uses and the level of water quality necessary to protect the existing uses.

SECTION 7 - EROSION AND SEDIMENT CONTROL

Construction activities disturbing one or more acres of total land, or will disturb less than one acre of land but are part of a larger common plan of development or sale that will ultimately disturb one or more acres of land, shall be required to implement erosion and sediment controls or Best Management Practices (BMPs). The threshold acreage includes the entire area disturbed in the larger common plan of development or sale. Construction activities that meet this threshold shall obtain and Earth Disturbing Permit from the County as well as coverage through the Ohio EPA National Pollutant Discharge Elimination System General Storm Water Permit for Construction Activities (Ohio EPA OHC00005 or latest version). Erosion and sediment controls or BMPs shall comply with the Storm Water Pollution Prevention Plan (SWP3) requirements prescribed in the Ohio EPA General Storm Water Permit for Construction Activities. Erosion and sediment controls shall be selected and designed to be consistent with standards and specifications included in the Ohio DNR Rainwater and Land Development manual, latest edition.

APPENDICES

RECORD PLAN INFORMATION REQUIREMENTS (AS-BUILTS)

Prior to any transfer of ownership or maintenance responsibilities, BMP construction must be approved by the Warren County Engineer's Office. An as-built plan of the BMP must be prepared and submitted to the Warren County Engineer's Office for review. The following information shall be obtained, and the record plan prepared accordingly:

- Size and elevation of all orifices
- Length and elevation of all weir crests
- A stage-storage table that contains: elevations at 1-foot increments, area at each elevation and volume at each elevation.
- Sufficient spot elevations along the top of the embankment and the emergency spillway.

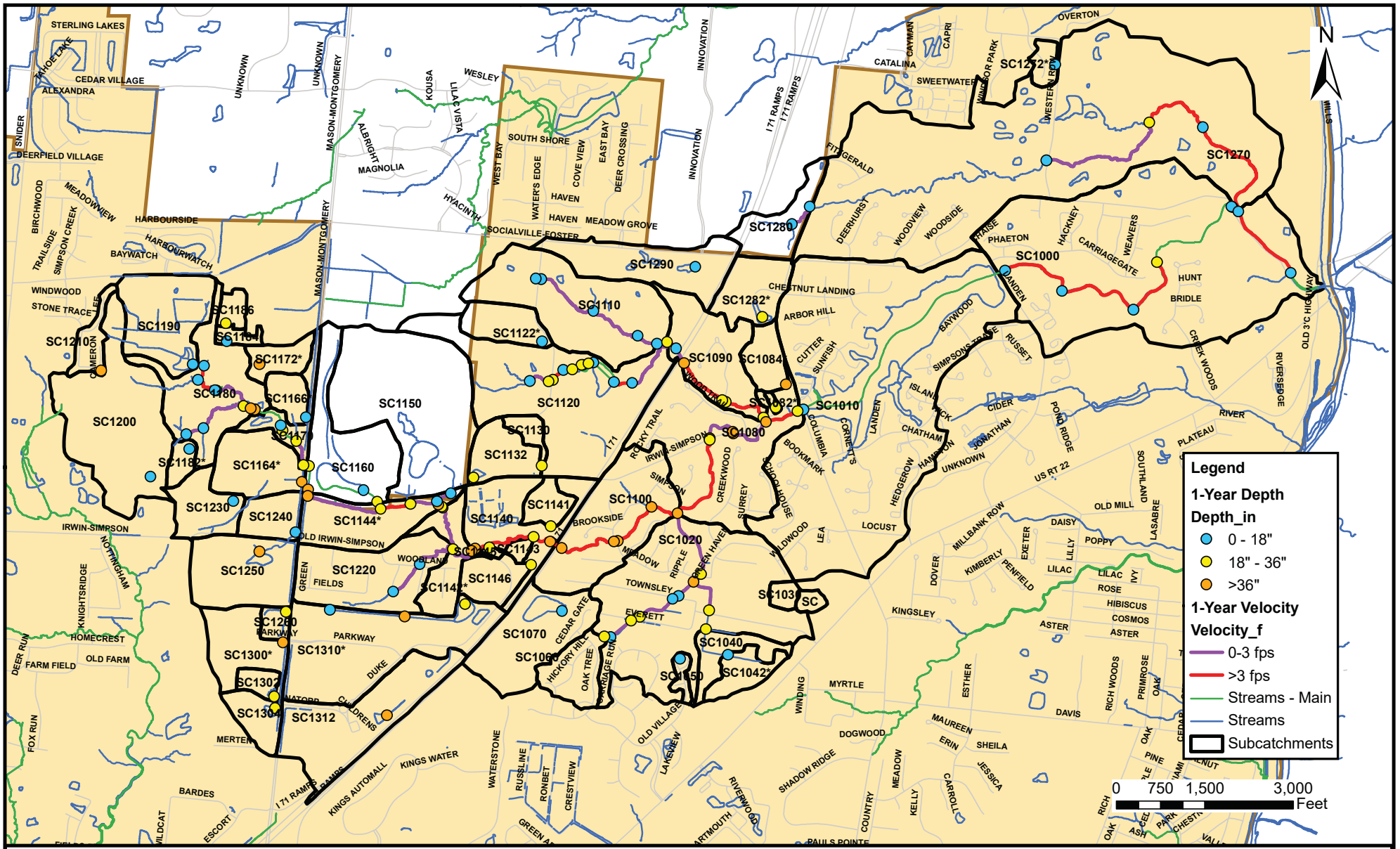
"I hereby certify that this Record Plan is based on field location of visible facilities and reflects the condition of the improvements as of _____. (Date)

_____

(Surveyor/Engineer)

APPENDIX H

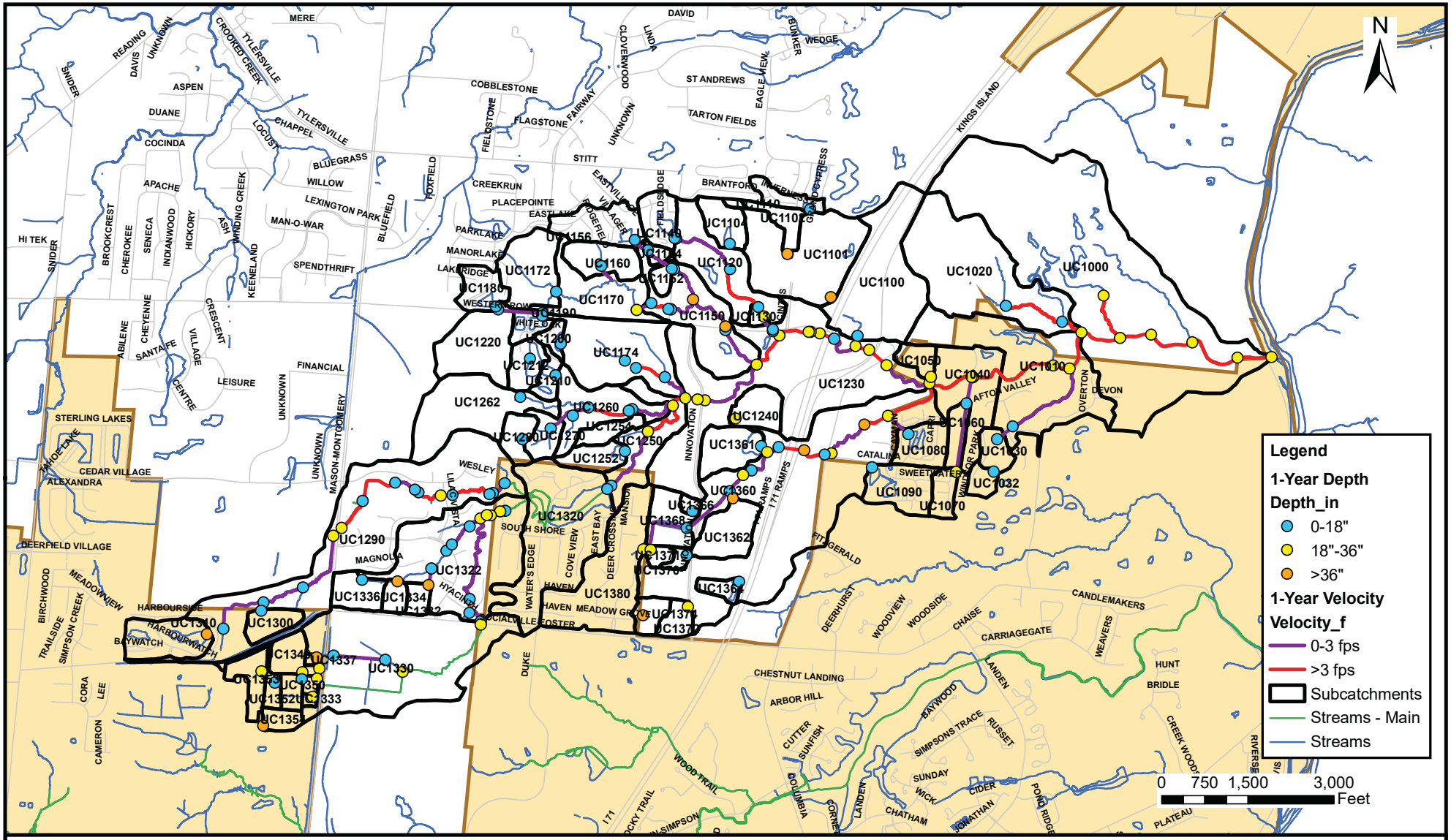
Pre-Development and Post-Development Release Rate Tables



CDM

Deerfield Regional Storm Water District
Task Order 12 - Stormwater Modeling and System Evaluation Phase I
Simpson Creek Watershed - 1-Year Depths and Velocities

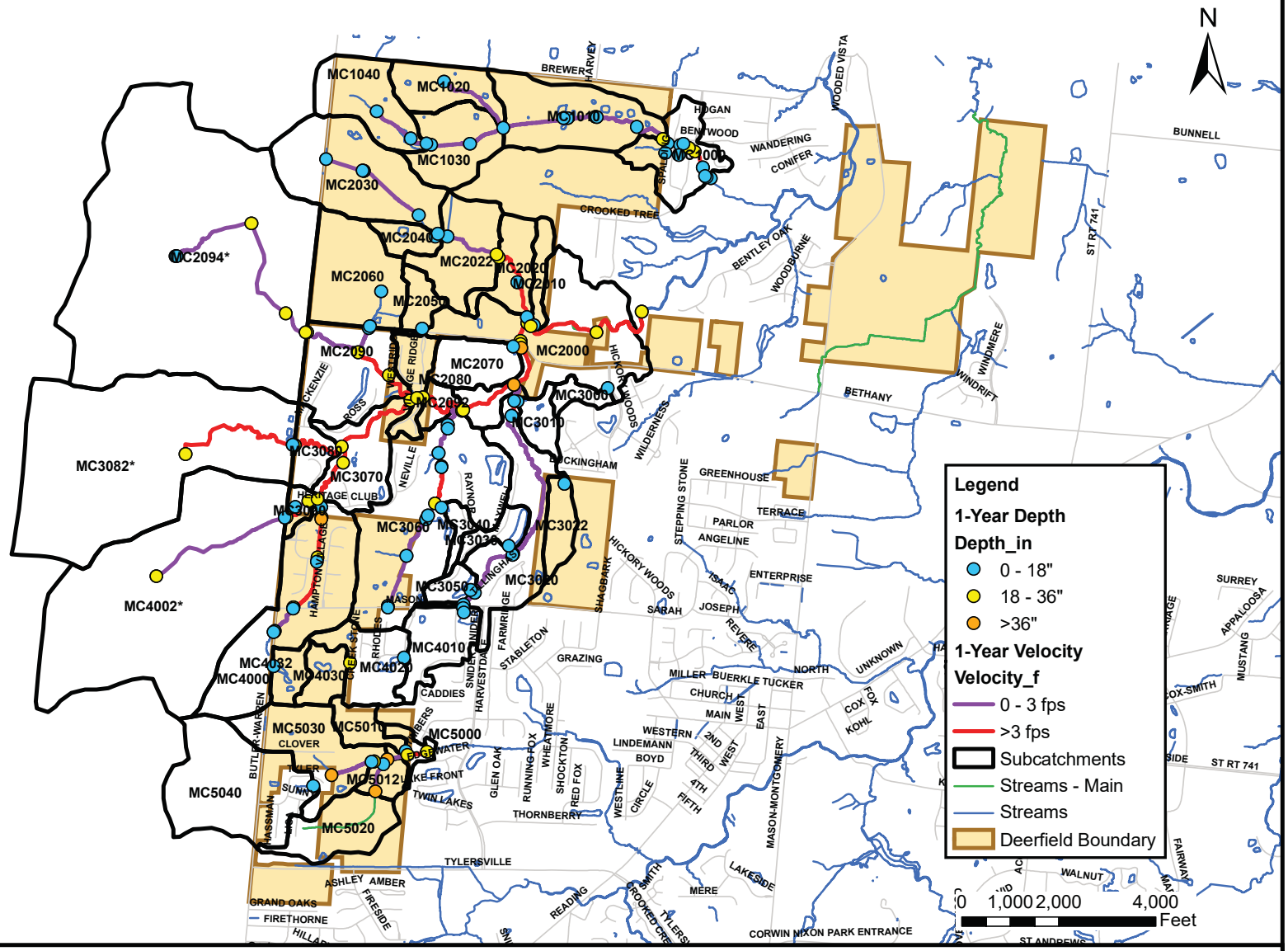
Figure 4-1



CDM

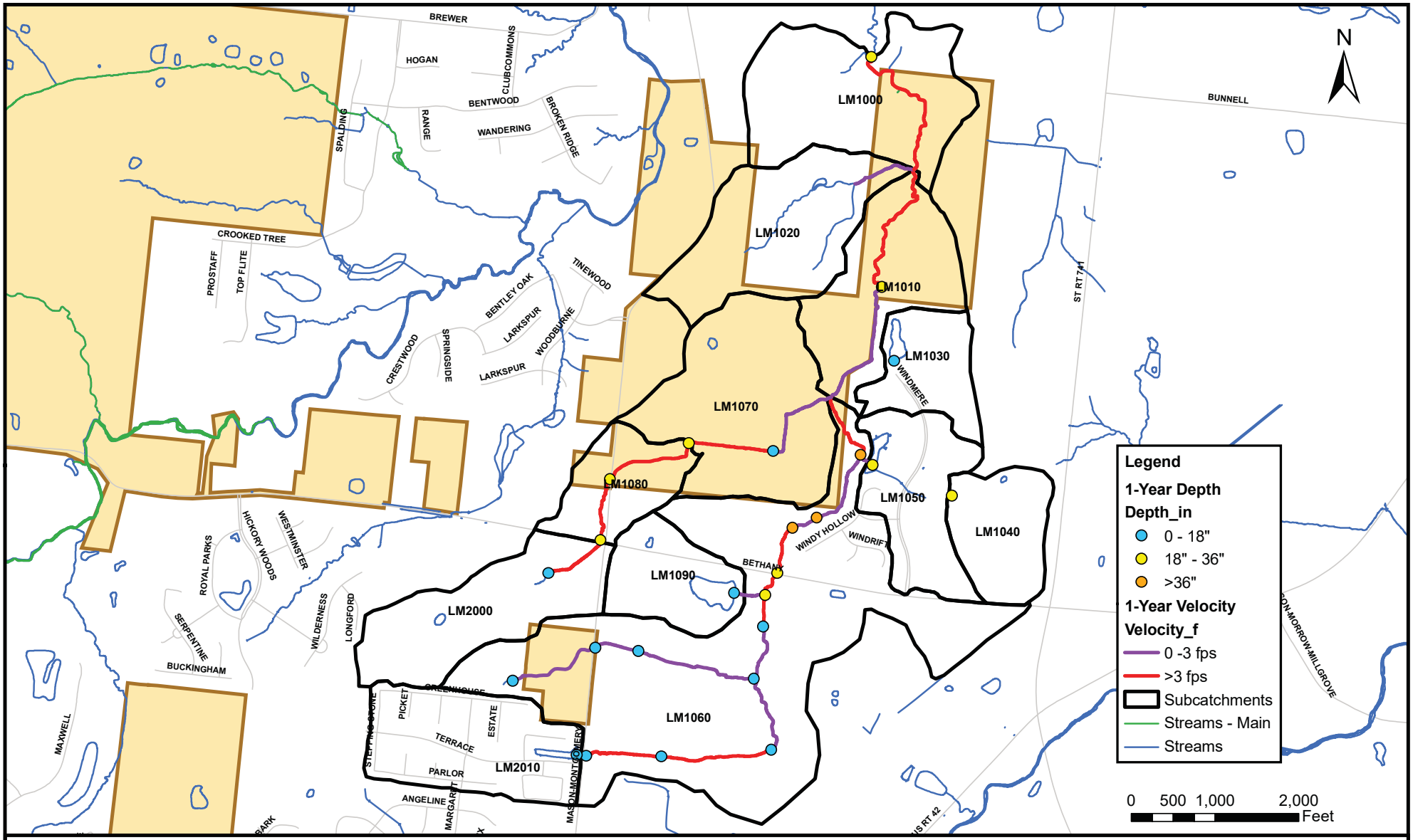
Deerfield Regional Storm Water District
Task Order 12 - Stormwater Modeling and System Evaluation Phase I
Union Creek Watershed - 1 Year Depths and Velocities

Figure 4-4



Deerfield Regional Storm Water District
Task Order 12 - Stormwater Modeling and System Evaluation Phase I
Little Muddy Creek Watershed - 1 Year Depths and Velocities

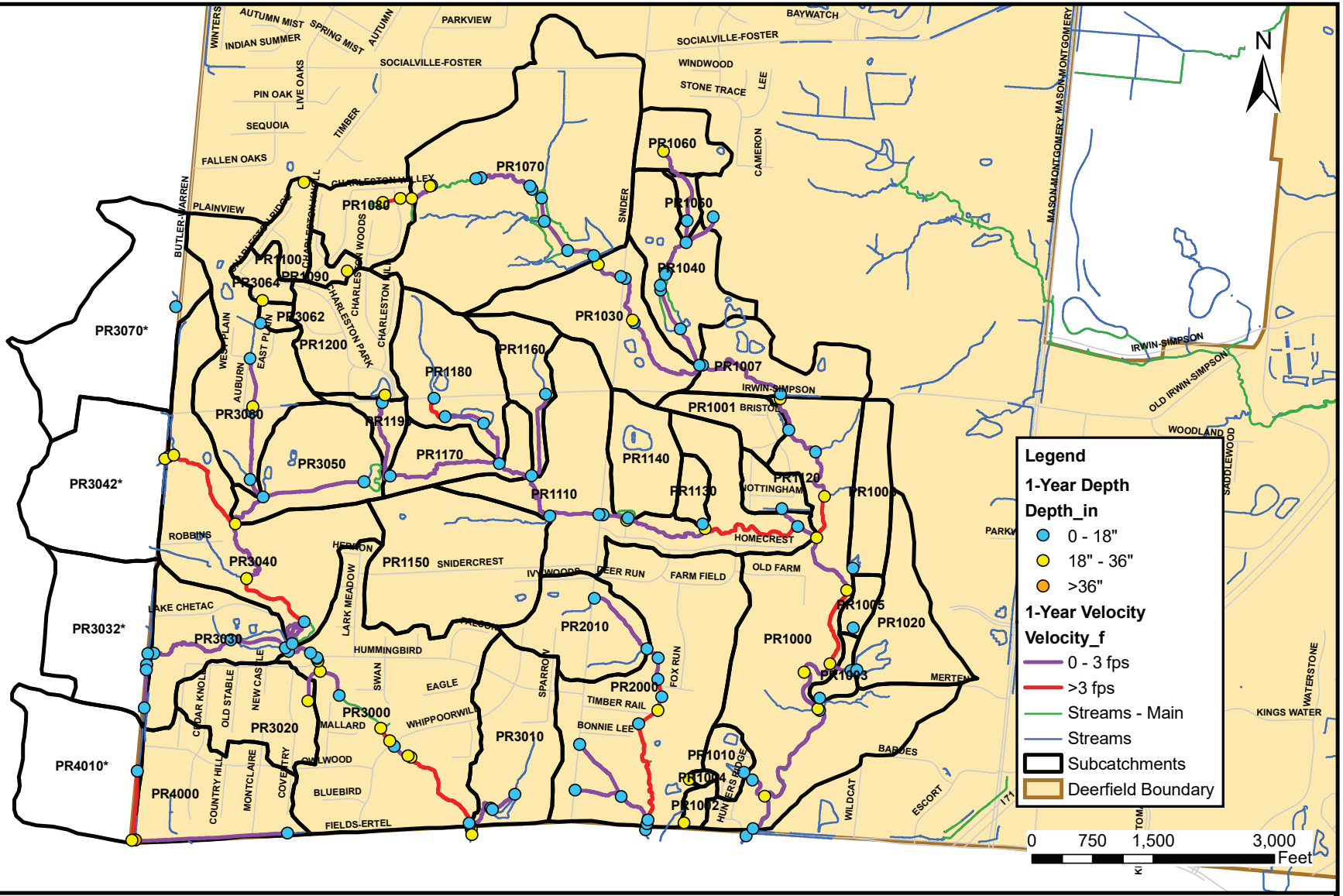
Figure 4-5



Deerfield Regional Storm Water District
Task Order 12 - Stormwater Modeling and System Evaluation Phase I
Unnamed Tributary to Little Muddy Creek Watershed - 1 Year Depths and Velocities

CDM

Figure 4-6



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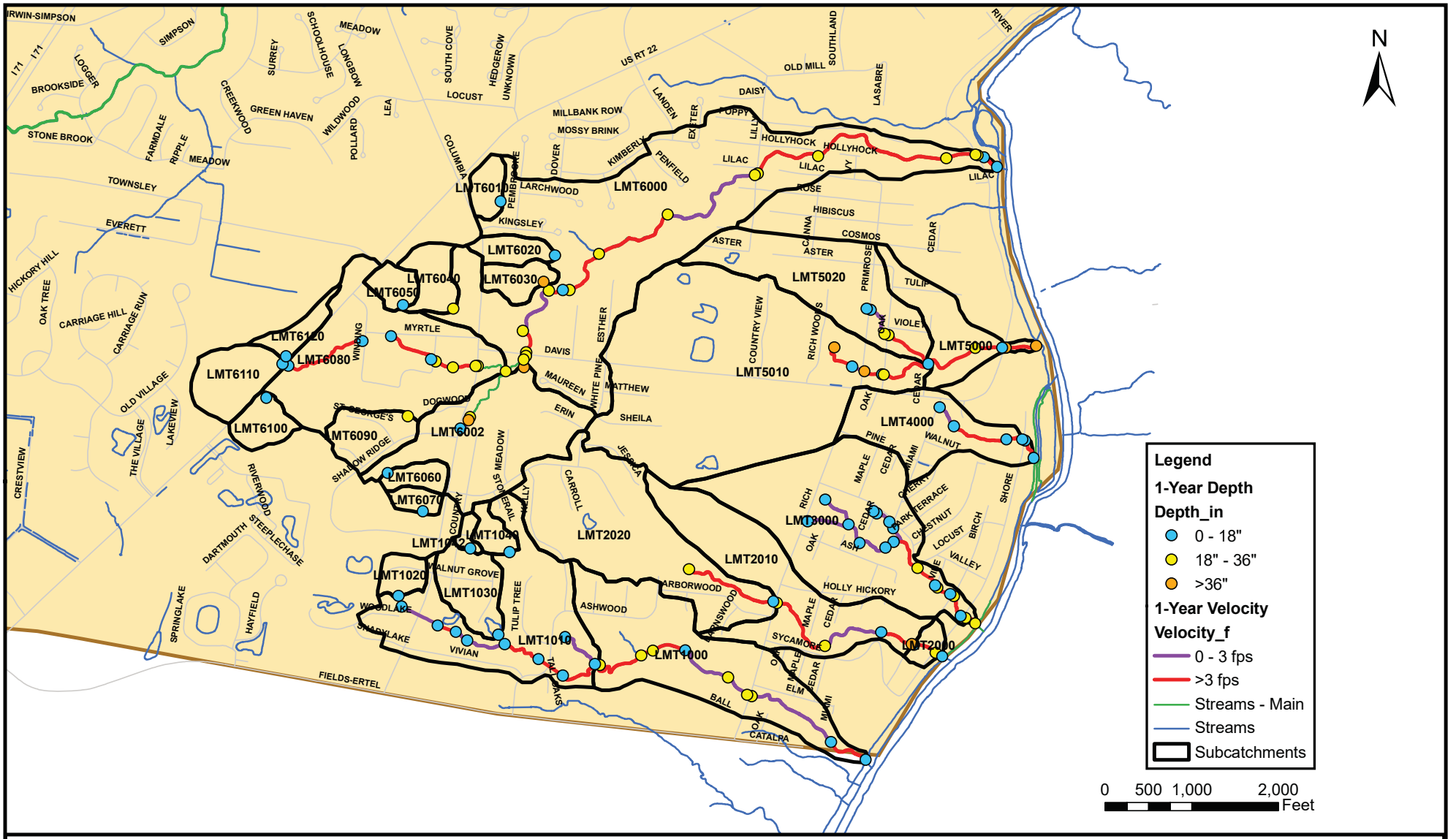
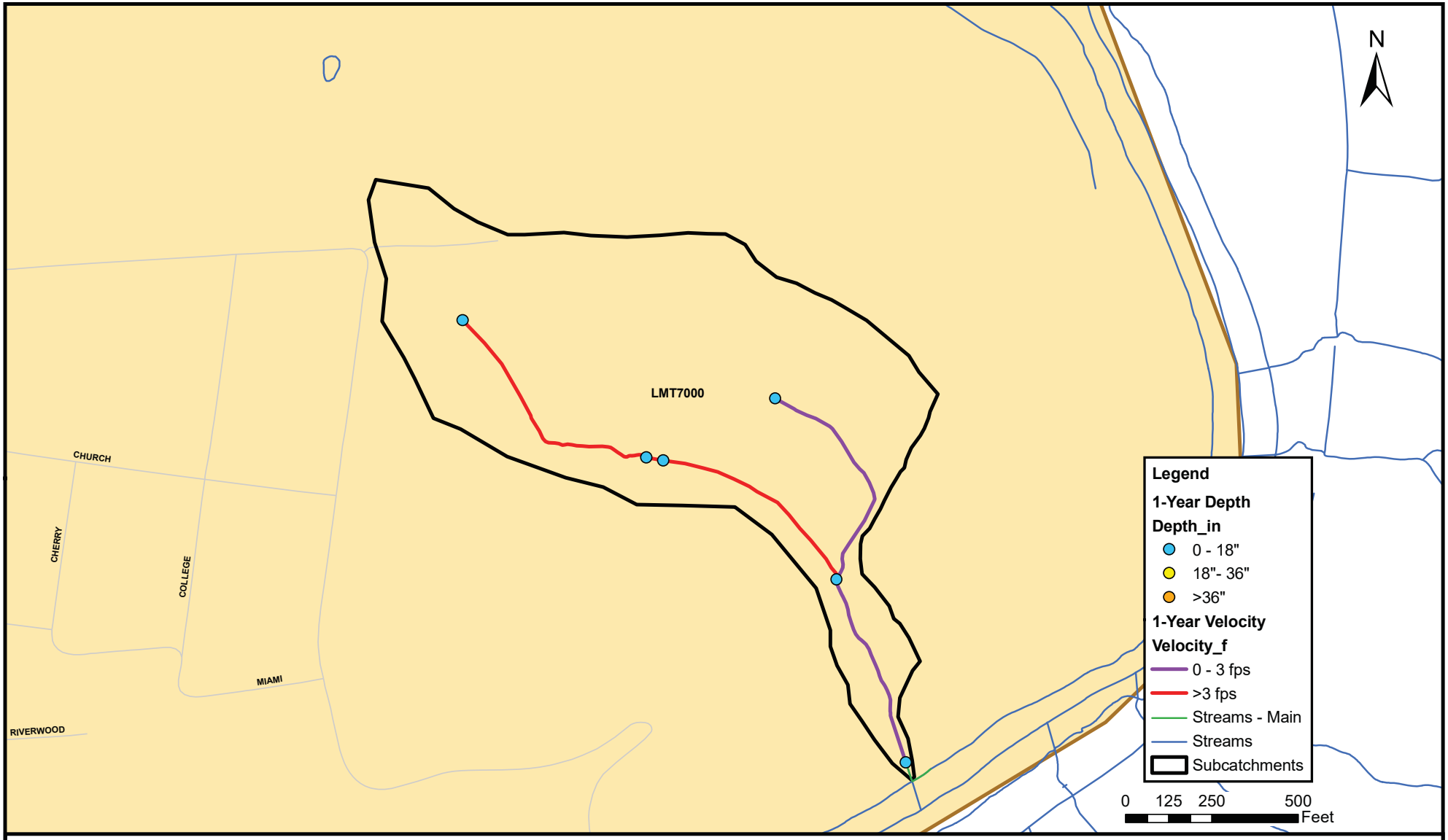
Deerfield Regional Storm Water District
Task Order 12 - Stormwater Modeling and System Evaluation Phase I
Polk Run Watershed - 1 Year Depths and Velocities

Figure 4-7



Deerfield Regional Storm Water District
Task Order 12 - Stormwater Modeling and System Evaluation Phase I
Little Miami Tributaries Watershed - 1 Year Depths and Velocities

Figure 4-8



CDM

Deerfield Regional Storm Water District
Task Order 12 - Stormwater Modeling and System Evaluation Phase I
Little Miami Tributaries Watershed - 1 Year Depths and Velocities

Figure 4-9

	Subcatchment	Area (acres)	1-year				2-year		5-year		10-year		25-year		50-year		100-year	
			Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Runoff Volume (inches)	Unit Runoff Volume (inches/acre)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)
1	SC1000	286.30	126.33	0.44	0.38	0.00	155.09	0.54	189.25	0.66	216.34	0.76	254.86	0.89	288.48	1.01	327.50	1.14
2	SC1010	342.00	334.81	0.98	0.86	0.00	412.08	1.20	503.73	1.47	576.33	1.69	684.04	2.00	864.78	2.53	1147.20	3.35
3	SC1020	156.20	72.96	0.47	0.68	0.00	89.58	0.57	129.92	0.83	188.19	1.20	291.08	1.86	392.72	2.51	517.04	3.31
4	SC1030	4.70	5.49	1.17	1.01	0.22	6.74	1.43	8.22	1.75	9.40	2.00	11.08	2.36	14.17	3.01	25.11	5.34
5	SC1040	16.70	28.97	1.73	1.72	0.10	36.45	2.18	45.41	2.72	53.59	3.21	66.69	3.99	78.79	4.72	93.12	5.58
6	SC1042*	14.70	15.35	1.04	1.80	0.12	20.19	1.37	26.24	1.79	31.24	2.13	38.99	2.65	46.33	3.15	55.32	3.76
7	SC1050	4.40	3.88	0.88	0.77	0.17	4.77	1.08	5.82	1.32	6.65	1.51	7.83	1.78	12.44	2.83	21.43	4.87
8	SC1060	22.50	21.19	0.94	1.32	0.06	43.42	1.93	68.82	3.06	86.16	3.83	107.45	4.78	124.34	5.53	142.92	6.35
9	SC1070	53.50	18.02	0.34	0.29	0.01	22.14	0.41	27.03	0.51	32.50	0.61	44.89	0.84	58.66	1.10	77.21	1.44
10	SC1080	102.90	66.72	0.65	0.56	0.01	81.94	0.80	100.00	0.97	114.33	1.11	134.70	1.31	162.56	1.58	225.65	2.19
11	SC1082*	1.10	2.71	2.47	2.14	1.95	3.33	3.03	4.06	3.69	4.65	4.22	5.47	4.97	6.28	5.70	7.40	6.73
12	SC1084*	15.30	19.43	1.27	1.10	0.07	23.87	1.56	29.14	1.90	33.31	2.18	39.25	2.57	44.43	2.90	52.15	3.41
13	SC1090	48.20	20.02	0.42	0.36	0.01	24.57	0.51	29.99	0.62	34.28	0.71	40.38	0.84	45.71	0.95	56.78	1.18
14	SC1100	73.50	26.71	0.36	0.32	0.00	32.79	0.45	40.01	0.54	45.74	0.62	53.88	0.73	72.48	0.99	148.73	2.02
15	SC1110	88.90	27.69	0.31	0.27	0.00	33.99	0.38	41.48	0.47	47.42	0.53	55.86	0.63	63.23	0.71	71.78	0.81
16	SC1120	124.72	83.96	0.67	0.59	0.00	103.18	0.83	125.98	1.01	144.05	1.15	169.74	1.36	192.16	1.54	218.16	1.75
17	SC1122*	19.80	17.99	0.91	0.79	0.04	22.08	1.12	26.95	1.36	30.80	1.56	36.29	1.83	41.08	2.07	68.60	3.46
18	SC1130	6.61	2.57	0.39	0.34	0.05	3.16	0.48	3.86	0.58	4.41	0.67	5.19	0.79	5.88	0.89	6.77	1.02
19	SC1132	21.84	25.39	1.16	1.01	0.05	31.23	1.43	38.15	1.75	43.63	2.00	51.42	2.35	58.22	2.67	66.14	3.03
20	SC1140	43.91	73.88	1.68	1.47	0.03	90.79	2.07	110.87	2.52	126.78	2.89	149.39	3.40	179.31	4.08	228.49	5.20
21	SC1141	11.32	20.56	1.82	1.58	0.14	25.24	2.23	30.81	2.72	35.22	3.11	41.49	3.67	46.97	4.15	58.53	5.17
22	SC1142*	24.20	25.11	1.04	0.90	0.04	30.83	1.27	37.63	1.56	44.75	1.85	65.94	2.72	88.38	3.65	115.05	4.75
23	SC1143	2.99	6.97	2.33	2.03	0.68	8.57	2.86	10.46	3.50	11.98	4.01	15.23	5.09	17.60	5.89	20.09	6.72
24	SC1144*	40.20	31.21	0.78	0.68	0.02	38.36	0.95	46.85	1.17	53.57	1.33	72.53	1.80	96.85	2.41	129.50	3.22
25	SC1145	1.07	2.64	2.47	2.14	2.00	3.24	3.03	3.95	3.69	4.52	4.22	5.58	5.21	6.34	5.93	7.20	6.73
26	SC1146	17.43	38.69	2.22	2.08	0.12	48.30	2.77	62.23	3.57	73.27	4.20	88.30	5.07	100.96	5.79	115.32	6.62
27	SC1150	117.90	179.93	1.53	1.37	0.01	222.20	1.88	272.32	2.31	328.61	2.79	441.76	3.75	547.65	4.65	668.36	5.67
28	SC1160	54.40	49.33	0.91	0.94	0.02	60.61	1.11	80.25	1.48	112.78	2.07	168.18	3.09	218.56	4.02	275.63	5.07
29	SC1164*	33.82	34.69	1.03	1.00	0.03	42.75	1.26	53.58	1.58	67.94	2.01	93.30	2.76	117.90	3.49	147.66	4.37
30	SC1166*	11.54	4.49	0.39	0.34	0.03	5.52	0.48	6.73	0.58	7.69	0.67	9.06	0.79	10.26	0.89	11.65	1.01
31	SC1170	15.90	16.51	1.04	0.90	0.06	20.27	1.27	24.73	1.56	28.27	1.78	33.30	2.09	37.70	2.37	67.66	4.26
32	SC1172*	13.20	29.12	2.21	1.92	0.15	35.75	2.71	43.62	3.30	49.87	3.78	58.75	4.45	66.50	5.04	75.50	5.72
33	SC1180	59.37	61.64	1.04	0.90	0.02	75.67	1.27	92.34	1.56	105.56	1.78	124.36	2.09	140.76	2.37	159.80	2.69
34	SC1182*	6.80	3.53	0.52	0.47	0.07	4.33	0.64	5.32	0.78	11.04	1.62	22.35	3.29	31.16	4.58	39.73	5.84
35	SC1184	4.67	5.46	1.17	1.01	0.22	6.70	1.43	8.17	1.75	11.13	2.38	20.68	4.43	26.19	5.61	30.87	6.61
36	SC1186	6.38	10.76	1.69	1.47	0.23	13.21	2.07	16.12	2.53	20.21	3.17	30.64	4.80	36.84	5.77	42.60	6.68
37	SC1190	48.80	32.93	0.67	0.59	0.01	40.43	0.83	49.33	1.01	56.40	1.16	66.44	1.36	75.20	1.54	85.38	1.75
38	SC1200	94.37	61.24	0.65	0.56	0.01	75.18	0.80	91.73	0.97	104.87	1.11	123.54	1.31	139.84	1.48	158.75	1.68
39	SC1210	11.30	9.97	0.88	0.77	0.07	12.24	1.08	14.94	1.32	17.08	1.51	20.12	1.78	22.77	2.02	29.20	2.58
40	SC1220	59.00	27.57	0.47	0.41	0.01	33.84	0.57	41.29	0.70	47.21	0.80	84.72	1.44	147.87	2.51	227.22	3.85
41	SC1230	24.10	43.75	1.82	1.58	0.07	53.73	2.23	65.58	2.72	74.97	3.11	88.33	3.67	99.99	4.15	118.31	4.91
42	SC1240	17.30	26.45	1.53	1.35	0.08	32.49	1.88	39.75	2.30	51.30	2.97	71.72	4.15	88.76	5.13	106.77	6.17
43	SC1250	47.80	84.27	1.76	1.53	0.03	103.51	2.17	126.34	2.64	144.44	3.02	170.18	3.56	194.35	4.07	245.95	5.15
44	SC1260	6.20	4.67	0.75	0.65	0.11	5.73	0.92	6.99	1.13	7.99	1.29	9.42	1.52	10.66	1.72	14.55	2.35
45	SC1270	398.70	124.17	0.31	0.27	0.00	152.45	0.38	186.03	0.47	212.66	0.53	250.53	0.63	283.58	0.71	321.94	0.81
46	SC1272*	7.10	7.73	1.09	0.95	0.13	9.50	1.34	11.59	1.63	13.26	1.87	18.31	2.58	24.37	3.43	31.91	4.49
47	SC1280	25.00	9.73	0.39	0.34	0.01	11.95	0.48	14.58	0.58	16.67	0.67	19.64	0.79	22.23	0.89	25.23	1.01
48	SC1282*	27.20	41.74	1.53	1.35	0.05	51.48	1.89	63.02	2.32	72.16	2.65	85.14	3.13	96.87	3.56	119.30	4.39
49	SC1290	48.40	13.82	0.29	0.25	0.01	16.97	0.35	20.70	0.43	23.67	0.49	27.88	0.58	31.56	0.65	36.12	0.75
50	SC1300*	31.59	4.10	0.13	0.11	0.00	5.03	0.16	6.14	0.19	7.02	0.22	8.27	0.26	9.36	0.30	17.19	0.54
51	SC1302	6.80	14.97	2.20	1.92	0.28	18.39	2.70	22.45	3.30	26.38	3.88	33.96	4.99	39.59	5.82	45.47	6.69
52	SC1304	15.65	35.10	2.24	2.11	0.13	45.54	2.91	58.04	3.71	67.45	4.31	80.36	5.13	91.39	5.84	104.10	6.65
53	SC1310*	91.82	227.51	2.48	2.10	0.02	289.78	3.16	356.14	3.88	407.56	4.44	480.40	5.23	543.90	5.92	617.58	6.73
54	SC1312	66.60	151.73	2.28	2.09	0.03	192.88	2.90	248.28	3.73	289.14	4.34	344.46	5.17	391.43	5.88	445.38	6.69

Total Area 2896.7
Avg. area 53.64

	Subcatchment	Area (acres)	1-year				2-year		5-year		10-year		25-year		50-year		100-year	
			Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Runoff Volume (inches)	Unit Runoff Volume (inches/acre)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)
1	UC1000	262.4	122.59	0.47	0.41	0.00	150.50	0.57	183.65	0.70	209.94	0.80	247.33	0.94	279.95	1.07	323.65	1.23
2	UC1010	88.5	36.75	0.42	0.36	0.00	45.12	0.51	55.06	0.62	62.94	0.71	74.15	0.84	83.93	0.95	95.28	1.08
3	UC1020	84.4	48.19	0.57	0.50	0.01	59.17	0.70	72.20	0.86	82.53	0.98	97.23	1.15	110.14	1.30	147.42	1.75
4	UC1030	8.25	4.50	0.54	0.47	0.06	5.52	0.67	6.74	0.82	7.70	0.93	9.07	1.10	10.51	1.27	12.93	1.57
5	UC1032	5.7	4.44	0.78	0.68	0.12	5.45	0.96	6.65	1.17	7.60	1.33	8.95	1.57	10.14	1.78	11.51	2.02
6	UC1040	35.8	21.37	0.60	0.52	0.01	26.24	0.73	32.02	0.89	36.60	1.02	43.12	1.20	48.81	1.36	55.41	1.55
7	UC1050	7.1	8.64	1.22	1.06	0.15	10.62	1.50	12.97	1.83	14.83	2.09	17.47	2.46	19.78	2.79	22.80	3.21
8	UC1060	7.9	8.29	1.05	0.92	0.12	10.22	1.29	12.51	1.58	14.33	1.81	16.90	2.14	19.15	2.42	21.75	2.75
9	UC1070	8.1	10.72	1.32	1.15	0.14	13.16	1.63	16.06	1.98	18.36	2.27	21.63	2.67	24.49	3.02	27.80	3.43
10	UC1080	14.7	16.03	1.09	0.95	0.06	19.67	1.34	24.01	1.63	27.44	1.87	32.33	2.20	36.60	2.49	41.54	2.83
11	UC1090	20.4	26.48	1.30	1.13	0.06	32.50	1.59	39.66	1.94	45.34	2.22	53.41	2.62	60.46	2.96	68.63	3.36
12	UC1100	65.95	20.54	0.31	0.27	0.00	25.22	0.38	30.77	0.47	35.18	0.53	41.44	0.63	46.91	0.71	53.25	0.81
13	UC1101	59.54	84.98	1.43	1.24	0.02	104.34	1.75	127.33	2.14	145.55	2.44	171.48	2.88	194.10	3.26	220.35	3.70
14	UC1102	8.41	3.49	0.42	0.36	0.04	4.29	0.51	5.23	0.62	5.98	0.71	7.05	0.84	7.98	0.95	9.05	1.08
15	UC1104	12.44	4.84	0.39	0.34	0.03	5.95	0.48	7.26	0.58	8.29	0.67	9.77	0.79	11.06	0.89	12.56	1.01
16	UC1110	7.8	14.57	1.87	1.62	0.21	17.89	2.29	21.83	2.80	24.96	3.20	29.41	3.77	33.29	4.27	37.79	4.84
17	UC1121	37.7	15.66	0.42	0.36	0.01	19.22	0.51	23.45	0.62	26.81	0.71	31.59	0.84	35.75	0.95	40.59	1.08
18	UC1130	2.1	4.20	2.00	1.74	0.83	5.15	2.45	6.29	2.99	7.19	3.42	8.47	4.03	9.98	4.75	11.82	5.63
19	UC1140	12.7	11.87	0.93	0.81	0.06	14.57	1.15	17.78	1.40	20.32	1.60	23.94	1.89	27.10	2.13	30.76	2.42
20	UC1150	44.36	13.82	0.31	0.27	0.01	16.96	0.38	20.70	0.47	23.66	0.53	27.88	0.63	31.55	0.71	35.82	0.81
21	UC1152	3.91	8.62	2.20	1.92	0.49	10.58	2.71	12.92	3.30	14.77	3.78	17.40	4.45	19.70	5.04	22.36	5.72
22	UC1154	2.83	2.94	1.04	0.90	0.32	3.61	1.27	4.40	1.56	5.03	1.78	5.93	2.09	6.71	2.37	7.62	2.69
23	UC1156	21.2	24.76	1.17	1.01	0.05	30.40	1.43	37.09	1.75	42.40	2.00	49.96	2.36	56.55	2.67	64.19	3.03
24	UC1160	16.3	17.34	1.06	0.92	0.06	21.29	1.31	25.98	1.59	29.70	1.82	35.00	2.15	41.77	2.56	52.50	3.22
25	UC1170	30.82	16.00	0.52	0.45	0.01	19.64	0.64	23.97	0.78	27.40	0.89	32.28	1.05	36.54	1.19	41.48	1.35
26	UC1172	27.46	28.47	1.04	0.90	0.03	34.98	1.27	42.69	1.55	48.81	1.78	57.51	2.09	65.10	2.37	73.91	2.69
27	UC1174	50.75	6.59	0.13	0.11	0.00	8.09	0.16	9.87	0.19	11.28	0.22	13.29	0.26	15.04	0.30	17.07	0.34
28	UC1180	12.6	8.83	0.70	0.61	0.05	10.84	0.86	13.23	1.05	15.12	1.20	17.81	1.41	20.16	1.60	22.89	1.82
29	UC1190	7.1	5.53	0.78	0.68	0.10	6.79	0.96	8.28	1.17	9.47	1.33	11.15	1.57	12.63	1.78	14.33	2.02
30	UC1200	4.4	3.20	0.73	0.63	0.14	3.93	0.89	4.79	1.09	5.48	1.24	6.45	1.47	7.30	1.66	8.29	1.88
31	UC1210	6.38	5.96	0.93	0.81	0.13	7.32	1.15	8.93	1.40	10.21	1.60	12.03	1.89	13.61	2.13	15.46	2.42
32	UC1212	10.75	11.16	1.04	0.90	0.08	13.70	1.27	16.72	1.56	19.11	1.78	22.52	2.09	25.49	2.37	28.93	2.69
33	UC1220	31.5	2.45	0.08	0.07	0.00	3.01	0.10	3.67	0.12	4.20	0.13	4.95	0.16	5.60	0.18	6.36	0.20
34	UC1230	140.02	25.44	0.18	0.16	0.00	31.23	0.22	38.11	0.27	43.57	0.31	51.33	0.37	58.10	0.41	65.95	0.47
35	UC1240	12.89	13.38	1.04	0.90	0.07	16.43	1.27	20.05	1.56	22.92	1.78	27.00	2.09	30.56	2.37	34.69	2.69
36	UC1250	27.15	4.93	0.18	0.16	0.01	6.06	0.22	7.39	0.27	8.45	0.31	9.95	0.37	11.27	0.41	12.79	0.47
37	UC1252	10.75	0.56	0.05	0.05	0.00	0.69	0.06	0.84	0.08	0.96	0.09	1.13	0.10	1.27	0.12	1.45	0.13
38	UC1254	7.48	2.33	0.31	0.27	0.04	2.86	0.38	3.49	0.47	3.99	0.53	4.70	0.63	5.32	0.71	6.04	0.81
39	UC1260	28.51	1.48	0.05	0.05	0.00	1.82	0.06	2.22	0.08	2.53	0.09	2.99	0.10	3.38	0.12	3.84	0.13
40	UC1262	44.94	11.66	0.26	0.23	0.01	14.32	0.32	17.47	0.39	19.97	0.44	23.53	0.52	26.64	0.59	30.24	0.67
41	UC1270	9.04	11.33	1.25	1.09	0.12	13.91	1.54	16.98	1.88	19.41	2.15	22.86	2.53	25.88	2.86	29.38	3.25
42	UC1280	9.46	0.49	0.05	0.05	0.00	0.60	0.06	0.74	0.08	0.84	0.09	0.99	0.10	1.12	0.12	1.27	0.13
43	UC1291	144.6	71.30	0.49	0.43	0.00	87.54	0.61	106.82	0.74	122.12	0.84	143.87	0.99	162.84	1.13	184.87	1.28
44	UC1300	9.4	12.20	1.30	1.13	0.12	14.98	1.59	18.28	1.94	20.89	2.22	24.61	2.62	27.86	2.96	31.63	3.36
45	UC1310	22.3	27.78	1.25	1.08	0.05	34.11	1.53	41.62	1.87	47.58	2.13	56.05	2.51	63.44	2.85	72.88	3.27
46	UC1320	78.2	79.02	1.01	0.88	0.01	97.08	1.24	118.51	1.52	135.51	1.73	159.66	2.04	180.74	2.31	205.20	2.62
47	UC1322	83.5	75.86	0.91	0.79	0.01	93.12	1.12	113.64	1.36	129.90	1.56	153.04	1.83	173.22	2.07	196.84	2.36
48	UC1330	112.48	20.44	0.18	0.16	0.00	25.09	0.22	30.62	0.27	35.00	0.31	41.23	0.37	46.67	0.41	52.98	0.47
49	UC1331	1.18	2.76	2.34	2.03	1.72	3.38	2.87	4.13	3.50	4.72	4.00	5.73	4.85	6.54	5.54	7.49	6.35
50	UC1332	4.9	9.54	1.95	1.69	0.34	11.71	2.39	14.29	2.92	16.34	3.33	19.24	3.93	21.78	4.45	24.73	5.05
51	UC1333	1.97	4.09	2.08	1.80	0.92	5.02	2.55	6.13	3.11	7.42	3.76	9.05	4.59	10.42	5.29	12.01	6.10
52	UC1334	5.2	8.77	1.69	1.47	0.28	10.77	2.07	13.14	2.53	15.02	2.89	17.70	3.40	20.03	3.85	23.97	4.61
53	UC1335	1.19	2.78	2.34	2.03	1.70	3.41	2.87	4.16	3.50	4.76	4.00	5.61	4.71	6.48	5.44	7.46	6.27
54	UC1336	12.2	26.84	2.20	1.92	0.16	32.99	2.70	40.28	3.30	46.06	3.78	54.28	4.45	62.06	5.09	71.92	5.90
55	UC1337	1.19	2.84	2.39	2.07	1.74	3.49	2.93	4.26	3.58	4.87	4.09	5.87	4.93	6.69	5.62	7.65	6.42
56	UC1341	9.29	17.93	1.93	1.76	0.19	22.27	2.40	27.43	2.95	31.51	3.39	37.32	4.02	42.37	4.56	48.24	5.19
57	UC1350	5.48	12.06	2.20	1.92	0.35	14.82	2.71	18.10	3.30	20.69	3.78	24.64	4.50	28.61	5.22	33.16	6.05
58	UC1352	5.87	6.09	1.04	0.90	0.15	7.48	1.27	9.13	1.56	10.44	1.78	12.30	2.09	13.92	2.37	15.80	2.69
59	UC1353	10.99	17.07	1.55	1.35	0.12	20.98	1.91	25.62	2.33	29.31	2.67	36.49	3.32	43.64	3.97	52.28	4.76
60	UC1354	5.58	13.19	2.36	2.07	0.37	16.24	2.91	19.87	3.56	22.74	4.08	26.82	4.81	30.38	5.44	34.67	6.21
61	UC1360	170.26	132.07	0.78	0.68	0.00	162.37	0.95	198.32	1.16	226.81	1.33	267.30	1.57	302.62	1.78	343.59	2.02
62	UC1361	17.66	11.46	0.65	0.56	0.03	14.07	0.80	17.17	0.97	19.62	1.11	23.12	1.31	26.17	1.48	29.71	1.68
63	UC1362	19.2	44.73	2.33	2.03	0.11	54.97	2.86	67.12	3.50	76.76	4.00	90.45	4.71	102.39	5.33	116.26	6.06
64	UC1364	5.2	7.42	1.43	1.24	0.24	9.11	1.75	11.12	2.14	12.72	2.45	16.40	3.15	20.13	3.87	24.52	4.72
65	UC1366	2.2	4.57	2.08	1.80	0.82	5.61	2.55	6.84	3.11	7.82	3.56	9.22	4.19	10.43	4.74	11.91	5.42
66	UC1368	15.5	26.08	1.68	1.47	0.09	32.05	2.07	39.14	2.52	44.75	2.89	52.74	3.40	59.74	3.85	69.55	4.49
67	UC1370	2.83	4.78	1.69	1.47	0.52	5.86	2.07	7.15	2.53	8.18	2.89	9.63	3.40	10.96	3.87	13.59	4.80
68	UC1371	3.22	5.85	1.82	1.58	0.49	7.18	2.23	8.76	2.72	10.02	3.11	11.80	3.67	13.36	4.15	15.17	4.71
69	UC1372	7.21	13.06	1.81	1.58	0.22	16.05	2.23	19.60	2.72	22.42	3.11	26.42	3.66	29.91	4.15	33.95	4.71
70	UC1374	7.4	6.71	0.91	0.79	0.11	8.25	1.11	10.07	1.36	11.51	1.56	13.56	1.83	15.35	2.07	17.45	2.36
71	UC1380	56.4	36.60	0.65	0.56	0.01	44.93	0.80	54.82	0.97	62.67	1.11	73.83	1.31	83.57	1.48	94.88	1.68

Total Area 2133.09
Avg. area 30.04

	Subcatchment	Area (acres)	1-year				2-year		5-year		10-year		25-year		50-year		100-year	
			Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Runoff Volume (inches)	Unit Runoff Volume (inches/acre)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)
1	PR1000	151.31	58.9	0.39	0.34	0.00	72.32	0.48	88.25	0.58	100.88	0.67	118.85	0.79	134.53	0.89	153.58	1.02
2	PR1001	15.32	9.9	0.65	0.56	0.04	12.20	0.80	14.89	0.97	17.02	1.11	20.06	1.31	22.70	1.48	25.77	1.68
3	PR1002	3.7	4.3	1.17	1.01	0.27	5.31	1.43	6.47	1.75	7.40	2.00	9.51	2.57	12.31	3.33	15.57	4.21
4	PR1003	5.2	9.4	1.82	1.58	0.30	11.60	2.23	14.15	2.72	16.18	3.11	19.06	3.67	21.58	4.15	24.49	4.71
5	PR1004	1.2	1.1	0.91	0.79	0.66	1.34	1.12	1.63	1.36	1.87	1.56	2.20	1.83	2.58	2.15	3.57	2.97
6	PR1005	6.03	1.3	0.21	0.17	0.03	1.54	0.25	1.88	0.31	2.14	0.36	2.53	0.42	2.86	0.47	3.25	0.54
7	PR1006	21.58	15.1	0.70	0.61	0.03	18.57	0.86	22.66	1.05	25.90	1.20	30.51	1.41	34.54	1.60	39.21	1.82
8	PR1007	33.22	8.6	0.26	0.23	0.01	10.59	0.32	12.92	0.39	14.77	0.44	17.40	0.52	19.69	0.59	22.35	0.67
9	PR1010	8.8	6.9	0.78	0.68	0.08	8.41	0.96	10.27	1.17	11.74	1.33	13.82	1.57	15.65	1.78	17.82	2.03
10	PR1020	36.4	34.8	0.96	0.83	0.02	42.76	1.17	52.25	1.44	59.77	1.64	70.45	1.94	79.97	2.20	93.08	2.56
11	PR1030	51.1	15.9	0.31	0.27	0.01	19.54	0.38	23.84	0.47	27.26	0.53	32.11	0.63	36.35	0.71	41.26	0.81
12	PR1040	41.6	8.6	0.21	0.18	0.00	10.61	0.25	12.94	0.31	14.79	0.36	17.43	0.42	19.73	0.47	22.39	0.54
13	PR1050	4.7	0.1	0.03	0.01	0.00	0.15	0.03	0.18	0.04	0.21	0.04	0.25	0.05	0.28	0.06	0.32	0.07
14	PR1060	17.7	4.6	0.26	0.23	0.01	5.64	0.32	6.88	0.39	7.87	0.44	9.27	0.52	10.49	0.59	11.91	0.67
15	PR1070	162.28	33.7	0.21	0.18	0.00	41.37	0.25	50.48	0.31	57.71	0.36	67.98	0.42	76.95	0.47	87.36	0.54
16	PR1080	25.16	52.2	2.08	1.80	0.07	64.14	2.55	78.26	3.11	89.47	3.56	105.40	4.19	119.30	4.74	138.83	5.52
17	PR1090	5.42	8.4	1.56	1.35	0.25	10.36	1.91	12.65	2.33	14.46	2.67	17.03	3.14	19.28	3.56	21.88	4.04
18	PR1100	12.62	18.0	1.43	1.24	0.10	22.12	1.75	26.99	2.14	30.85	2.44	36.35	2.88	41.77	3.31	53.02	4.20
19	PR1110	100.6	39.2	0.39	0.34	0.00	48.08	0.48	58.67	0.58	67.07	0.67	79.02	0.79	89.44	0.89	102.22	1.02
20	PR1120	10.3	5.1	0.49	0.43	0.04	6.24	0.61	7.61	0.74	8.70	0.84	10.25	0.99	11.60	1.13	13.31	1.29
21	PR1130	6.6	1.9	0.29	0.25	0.04	2.31	0.35	2.82	0.43	3.23	0.49	3.80	0.58	4.30	0.65	4.94	0.75
22	PR1140	26.5	7.6	0.29	0.25	0.01	9.29	0.35	11.33	0.43	12.96	0.49	15.26	0.58	17.28	0.65	19.62	0.74
23	PR1150	77.1	22.0	0.28	0.25	0.00	27.00	0.35	32.96	0.43	37.68	0.49	44.40	0.58	50.76	0.66	60.20	0.78
24	PR1160	20.8	5.9	0.29	0.25	0.01	7.29	0.35	8.90	0.43	10.17	0.49	11.98	0.58	13.56	0.65	15.40	0.74
25	PR1170	26.1	1.4	0.05	0.05	0.00	1.66	0.06	2.03	0.08	2.32	0.09	2.73	0.10	3.09	0.12	3.51	0.13
26	PR1180	45.1	2.3	0.05	0.05	0.00	2.87	0.06	3.51	0.08	4.01	0.09	4.72	0.10	5.35	0.12	6.07	0.13
27	PR1190	8.8	3.4	0.39	0.34	0.04	4.21	0.48	5.13	0.58	5.87	0.67	6.91	0.79	7.82	0.89	9.01	1.02
28	PR1200	41.15	42.7	1.04	0.90	0.02	52.45	1.27	64.00	1.56	73.16	1.78	86.19	2.09	97.56	2.37	110.76	2.69
29	PR2000	126.1	45.8	0.36	0.32	0.00	56.25	0.45	68.64	0.54	78.47	0.62	92.45	0.73	104.64	0.83	125.47	1.00
30	PR2010	36.4	13.2	0.36	0.32	0.01	16.24	0.45	19.82	0.54	22.65	0.62	26.69	0.73	30.24	0.83	38.87	1.07
31	PR3000	133.5	58.9	0.44	0.38	0.00	72.32	0.54	88.24	0.66	100.88	0.76	118.84	0.89	138.26	1.04	177.46	1.33
32	PR3010	49.3	15.4	0.31	0.27	0.01	18.85	0.38	23.00	0.47	26.30	0.53	30.98	0.63	35.07	0.71	46.48	0.94
33	PR3020	38.6	19.0	0.49	0.43	0.01	23.37	0.61	28.52	0.74	32.60	0.84	38.40	0.99	50.31	1.30	72.14	1.87
34	PR3030	41.2	17.1	0.42	0.36	0.01	21.01	0.51	25.63	0.62	29.30	0.71	34.52	0.84	42.11	1.02	56.76	1.38
35	PR3032*	52.6	16.0	0.30	0.26	0.01	19.61	0.37	23.93	0.45	27.36	0.52	39.68	0.75	63.25	1.20	96.61	1.84
36	PR3040	93.6	29.2	0.31	0.27	0.00	35.79	0.38	43.67	0.47	49.93	0.53	58.82	0.63	68.58	0.73	90.36	0.97
37	PR3042*	65.7	23.9	0.36	0.32	0.00	29.31	0.45	35.76	0.54	40.88	0.62	48.17	0.73	57.94	0.88	74.93	1.14
38	PR3050	42.7	12.2	0.29	0.25	0.01	14.97	0.35	18.26	0.43	20.88	0.49	24.60	0.58	27.84	0.65	35.42	0.83
39	PR3060	61.97	24.1	0.39	0.34	0.01	29.62	0.48	36.14	0.58	41.32	0.67	48.68	0.79	55.10	0.89	62.55	1.01
40	PR3062	3.21	3.7	1.17	1.01	0.32	4.60	1.43	5.62	1.75	6.42	2.00	7.56	2.36	8.56	2.67	9.72	3.03
41	PR3064	7.89	8.2	1.04	0.90	0.11	10.06	1.27	12.27	1.56	14.03	1.78	16.53	2.09	18.71	2.37	21.24	2.69
42	PR3070*	81.8	29.3	0.36	0.31	0.00	35.97	0.44	43.89	0.54	50.18	0.61	59.11	0.72	66.91	0.82	75.96	0.93
43	PR4000	54.5	24.0	0.44	0.38	0.01	29.52	0.54	36.03	0.66	41.19	0.76	53.04	0.97	67.06	1.23	86.17	1.58
44	PR4010*	55.5	47.8	0.86	0.75	0.01	58.71	1.06	71.64	1.29	81.90	1.48	96.49	1.74	109.21	1.97	128.93	2.32

Total Area 1910.96
Avg. area 43.43

	Subcatchment	Area (acres)	1-year				2-year		5-year		10-year		25-year		50-year		100-year	
			Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Runoff Volume (inches)	Unit Runoff Volume (inches/acre)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)
1	MC1000	54.73	36.93	0.67	0.59	0.01	45.34	0.83	55.33	1.01	63.25	1.16	74.51	1.36	84.52	1.54	135.46	2.48
2	MC1010	92.13	31.09	0.34	0.29	0.00	38.16	0.41	46.57	0.51	53.24	0.58	62.72	0.68	70.99	0.77	95.11	1.03
3	MC1020	44.05	3.43	0.08	0.07	0.00	4.21	0.10	5.14	0.12	5.87	0.13	10.74	0.24	22.90	0.52	61.38	1.39
4	MC1030	56.94	19.21	0.34	0.29	0.01	23.59	0.41	28.78	0.51	32.90	0.58	38.76	0.68	47.18	0.83	72.95	1.28
5	MC1040	62.09	4.03	0.06	0.06	0.00	4.95	0.08	6.04	0.10	6.90	0.11	8.13	0.13	9.20	0.15	10.47	0.17
6	MC2000	166.47	73.45	0.44	0.38	0.00	90.18	0.54	110.04	0.66	125.79	0.76	148.19	0.89	167.74	1.01	190.43	1.14
7	MC2010	15.72	17.16	1.09	0.99	0.06	21.30	1.36	26.22	1.67	30.12	1.92	35.66	2.27	40.49	2.58	47.06	2.99
8	MC2020	36.81	5.73	0.16	0.14	0.00	7.04	0.19	8.59	0.23	9.82	0.27	11.57	0.31	13.09	0.36	14.86	0.40
9	MC2022	63.20	41.01	0.65	0.56	0.01	50.35	0.80	61.44	0.97	70.23	1.11	82.74	1.31	93.65	1.48	124.20	1.97
10	MC2030	122.07	9.19	0.08	0.07	0.00	11.28	0.09	13.77	0.11	15.74	0.13	18.54	0.15	20.98	0.17	23.82	0.20
11	MC2040	17.85	5.10	0.29	0.25	0.01	6.26	0.35	7.64	0.43	8.73	0.49	10.28	0.58	11.64	0.65	13.21	0.74
12	MC2050	18.20	8.98	0.49	0.43	0.02	11.02	0.61	13.45	0.74	15.37	0.84	25.56	1.40	57.84	3.18	92.44	5.08
13	MC2060	87.83	36.48	0.42	0.36	0.00	44.78	0.51	54.64	0.62	62.46	0.71	73.59	0.84	83.29	0.95	103.23	1.18
14	MC2070	37.62	28.32	0.75	0.65	0.02	34.76	0.92	42.42	1.13	48.49	1.29	57.13	1.52	64.67	1.72	73.66	1.96
15	MC2080	26.57	16.55	0.62	0.54	0.02	20.32	0.76	24.80	0.93	28.34	1.07	33.39	1.26	54.22	2.04	109.21	4.11
16	MC2091	83.85	39.18	0.47	0.41	0.00	48.09	0.57	58.69	0.70	67.09	0.80	79.03	0.94	89.46	1.07	101.92	1.22
17	MC2092	12.95	4.71	0.36	0.32	0.02	5.78	0.45	7.05	0.54	8.06	0.62	9.49	0.73	10.75	0.83	14.15	1.09
18	MC2094*	564.79	174.03	0.31	0.27	0.00	213.85	0.38	261.11	0.46	298.57	0.53	351.82	0.62	398.27	0.71	477.51	0.85
19	MC3000	11.89	4.63	0.39	0.34	0.03	5.68	0.48	6.94	0.58	7.93	0.67	9.34	0.79	10.57	0.89	13.63	1.15
20	MC3010	19.42	14.62	0.75	0.65	0.03	17.95	0.92	21.90	1.13	25.03	1.29	29.49	1.52	33.38	1.72	46.45	2.39
21	MC3020	94.68	19.66	0.21	0.18	0.00	24.14	0.25	29.45	0.31	33.67	0.36	39.66	0.42	44.90	0.47	126.40	1.33
22	MC3022	24.25	9.44	0.39	0.34	0.01	11.59	0.48	14.14	0.58	16.17	0.67	19.05	0.79	21.56	0.89	24.48	1.01
23	MC3030	16.91	4.39	0.26	0.23	0.01	5.39	0.32	6.58	0.39	7.52	0.44	8.86	0.52	26.37	1.56	67.94	4.02
24	MC3040	10.40	3.24	0.31	0.27	0.03	3.98	0.38	4.85	0.47	5.55	0.53	6.54	0.63	7.40	0.71	8.40	0.81
25	MC3050	13.64	2.83	0.21	0.18	0.01	3.48	0.25	4.24	0.31	4.85	0.36	5.71	0.42	6.47	0.47	16.04	1.18
26	MC3060	190.49	44.50	0.23	0.20	0.00	54.63	0.29	66.66	0.35	76.20	0.40	89.78	0.47	101.62	0.53	115.36	0.61
27	MC3070	60.60	11.01	0.18	0.16	0.00	13.52	0.22	16.49	0.27	18.86	0.31	22.21	0.37	25.14	0.41	30.18	0.50
28	MC3080	23.44	4.87	0.21	0.18	0.01	5.98	0.25	7.29	0.31	8.34	0.36	9.82	0.42	11.12	0.47	12.62	0.54
29	MC3082*	354.89	98.56	0.28	0.24	0.00	121.00	0.34	147.65	0.42	168.79	0.48	198.85	0.56	225.08	0.63	279.08	0.79
30	MC3090	9.65	14.70	1.52	1.57	0.16	22.02	2.28	29.74	3.08	35.26	3.65	42.79	4.43	49.32	5.11	56.92	5.90
31	MC4000	140.38	51.01	0.36	0.85	0.01	70.39	0.50	125.73	0.90	183.20	1.31	276.64	1.97	364.90	2.60	470.29	3.35
32	MC4002*	372.68	86.09	0.23	0.20	0.00	105.69	0.28	128.97	0.35	149.38	0.40	234.12	0.63	348.56	0.94	512.48	1.38
33	MC4010	45.69	14.23	0.31	0.27	0.01	17.47	0.38	21.32	0.47	24.37	0.53	28.71	0.63	71.91	1.57	166.36	3.64
34	MC4020	50.34	20.91	0.42	0.36	0.01	25.67	0.51	31.32	0.62	35.80	0.71	42.18	0.84	47.74	0.95	116.28	2.31
35	MC4030	22.56	20.49	0.91	0.79	0.03	25.16	1.12	30.70	1.36	35.10	1.56	41.35	1.83	46.80	2.07	58.16	2.58
36	MC4032	18.43	16.74	0.91	0.79	0.04	20.55	1.12	25.08	1.36	28.67	1.56	33.78	1.83	38.23	2.07	43.40	2.36
37	MC5000	12.04	3.13	0.26	0.23	0.02	3.84	0.32	4.68	0.39	5.35	0.44	6.31	0.52	7.14	0.59	8.63	0.72
38	MC5010	20.90	18.99	0.91	0.79	0.04	23.31	1.12	28.44	1.36	32.51	1.56	38.31	1.83	43.36	2.07	80.96	3.87
39	MC5012	14.07	10.96	0.78	0.68	0.05	13.45	0.96	16.41	1.17	18.76	1.33	22.10	1.57	25.02	1.78	30.11	2.14
40	MC5020	53.19	48.31	0.91	0.79	0.01	59.31	1.12	72.38	1.36	82.75	1.56	97.48	1.83	110.34	2.07	134.04	2.52
41	MC5030	75.92	23.65	0.31	0.27	0.00	29.03	0.38	35.42	0.47	40.50	0.53	47.71	0.63	54.00	0.71	61.34	0.81
42	MC5040	128.00	49.83	0.39	0.34	0.00	61.18	0.48	74.66	0.58	85.34	0.67	100.54	0.79	113.80	0.89	145.89	1.14

Total Area	3348.33
Avg. area	79.72

	Subcatchment	Area (acres)	1-year				2-year		5-year		10-year		25-year		50-year		100-year	
			Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Runoff Volume (inches)	Unit Runoff Volume (inches/acre)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)
1	LM1000	88.31	2.29	0.03	0.02	0.00	2.81	0.03	3.43	0.04	3.93	0.04	4.62	0.05	5.23	0.06	5.97	0.07
2	LM1010	65.18	5.08	0.08	0.07	0.00	6.23	0.10	7.60	0.12	8.69	0.13	10.24	0.16	11.59	0.18	13.16	0.20
3	LM1020	77.3	4.01	0.05	0.05	0.00	4.93	0.06	6.01	0.08	6.87	0.09	8.10	0.10	9.16	0.12	10.40	0.13
4	LM1030	34.02	25.61	0.75	0.65	0.02	31.44	0.92	38.36	1.13	43.85	1.29	51.66	1.52	58.48	1.72	66.39	1.95
5	LM1040	38.17	32.44	0.85	0.77	0.02	40.22	1.05	49.44	1.30	56.75	1.49	67.63	1.77	78.40	2.05	91.87	2.41
6	LM1050	50.73	36.87	0.73	0.63	0.01	45.26	0.89	55.23	1.09	63.14	1.24	74.38	1.47	84.19	1.66	95.58	1.88
7	LM1060	264.75	102.98	0.39	0.34	0.00	126.48	0.48	154.37	0.58	176.49	0.67	207.93	0.79	235.37	0.89	267.21	1.01
8	LM1070	96.21	37.46	0.39	0.34	0.00	45.98	0.48	56.11	0.58	64.15	0.67	75.57	0.79	85.54	0.89	97.11	1.01
9	LM1080	35.11	10.02	0.29	0.25	0.01	12.31	0.35	15.02	0.43	17.17	0.49	20.22	0.58	22.89	0.65	25.99	0.74
10	LM1090	37.88	31.46	0.83	0.72	0.02	38.62	1.02	47.13	1.24	53.88	1.42	63.47	1.68	71.85	1.90	81.80	2.16
11	LM2000	66.73	20.78	0.31	0.27	0.00	25.52	0.38	31.14	0.47	35.59	0.53	41.93	0.63	47.46	0.71	53.88	0.81
12	LM2010	66.04	32.57	0.49	0.43	0.01	39.98	0.61	48.79	0.74	55.77	0.84	65.71	0.99	74.37	1.13	84.43	1.28

Total Area	920.43
Avg. area	76.70

	Subcatchment	Area (acres)	1-year				2-year		5-year		10-year		25-year		50-year		100-year	
			Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Runoff Volume (inches)	Unit Runoff Volume (inches/acre)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)
1	LMT1000	63.17	21.32	0.34	0.29	0.00	26.17	0.41	31.93	0.51	36.50	0.58	43.00	0.68	48.68	0.77	60.41	0.96
2	LMT1010	58.08	25.63	0.44	0.38	0.01	31.46	0.54	38.39	0.66	43.89	0.76	51.70	0.89	61.73	1.06	86.40	1.49
3	LMT1020	5.28	7.54	1.43	1.24	0.23	9.25	1.75	11.29	2.14	12.91	2.44	17.41	3.30	21.66	4.10	26.27	4.97
4	LMT1030	13.97	8.34	0.60	0.52	0.04	10.24	0.73	12.49	0.89	14.28	1.02	16.83	1.20	19.21	1.38	27.00	1.93
5	LMT1040	4.51	4.68	1.04	0.90	0.20	5.75	1.27	7.01	1.56	8.02	1.78	9.45	2.09	10.72	2.38	12.93	2.87
6	LMT1042	1.97	1.53	0.78	0.68	0.34	1.88	0.96	2.30	1.17	2.63	1.33	3.10	1.57	3.50	1.78	3.98	2.02
7	LMT2000	3.56	0.92	0.26	0.23	0.06	1.13	0.32	1.38	0.39	1.58	0.44	1.86	0.52	2.11	0.59	2.40	0.67
8	LMT2010	50.39	41.85	0.83	0.72	0.01	51.38	1.02	62.70	1.24	71.67	1.42	84.44	1.68	95.58	1.90	108.63	2.16
9	LMT2020	65.28	37.28	0.57	0.50	0.01	45.76	0.70	55.84	0.86	63.84	0.98	75.20	1.15	85.12	1.30	102.18	1.57
10	LMT3000	77.92	48.54	0.62	0.54	0.01	59.59	0.76	72.71	0.93	83.12	1.07	97.93	1.26	110.84	1.42	131.05	1.68
11	LMT4000	30.52	11.88	0.39	0.34	0.01	14.59	0.48	17.80	0.58	20.35	0.67	23.97	0.79	27.14	0.89	33.51	1.10
12	LMT5000	20.34	4.22	0.21	0.18	0.01	5.19	0.25	6.33	0.31	7.23	0.36	8.52	0.42	9.85	0.48	16.14	0.79
13	LMT5010	141.54	106.53	0.75	0.65	0.00	130.79	0.92	159.60	1.13	182.45	1.29	214.94	1.52	243.29	1.72	280.27	1.98
14	LMT5020	43.26	19.09	0.44	0.38	0.01	23.43	0.54	28.60	0.66	32.69	0.76	38.51	0.89	43.59	1.01	53.17	1.23
15	LMT6000	160.15	124.70	0.78	0.68	0.00	153.09	0.96	186.81	1.17	213.55	1.33	251.59	1.57	284.77	1.78	340.62	2.13
16	LMT6002	46.66	90.04	1.93	1.69	0.04	110.87	2.38	135.56	2.91	155.12	3.32	182.91	3.92	207.69	4.45	241.36	5.17
17	LMT6010	5.49	10.11	1.84	1.60	0.29	12.42	2.26	15.24	2.78	18.32	3.34	22.91	4.17	26.87	4.89	31.42	5.72
18	LMT6020	6.09	5.06	0.83	0.72	0.12	6.21	1.02	7.58	1.24	8.66	1.42	10.21	1.68	12.01	1.97	14.86	2.44
19	LMT6030	6.83	9.04	1.32	1.15	0.17	11.10	1.62	13.54	1.98	15.48	2.27	18.24	2.67	20.72	3.03	24.92	3.65
20	LMT6040	8.88	12.22	1.38	1.20	0.13	15.00	1.69	18.30	2.06	20.92	2.36	24.65	2.78	27.90	3.14	32.21	3.63
21	LMT6050	5.27	6.57	1.25	1.08	0.21	8.06	1.53	9.84	1.87	11.24	2.13	13.36	2.53	16.70	3.17	21.11	4.01
22	LMT6060	4.9	6.49	1.32	1.15	0.23	7.96	1.62	10.08	2.06	12.58	2.57	16.46	3.36	19.93	4.07	23.98	4.89
23	LMT6070	3.5	4.63	1.32	1.15	0.33	5.69	1.63	7.36	2.10	9.52	2.72	12.58	3.59	15.17	4.33	18.12	5.18
24	LMT6080	64.28	30.03	0.47	0.41	0.01	36.87	0.57	44.99	0.70	51.43	0.80	60.59	0.94	69.00	1.07	88.94	1.38
25	LMT6090	12.2	6.02	0.49	0.43	0.04	7.39	0.61	9.01	0.74	10.30	0.84	12.94	1.06	16.62	1.36	21.80	1.79
26	LMT6100	7.61	9.87	1.30	1.13	0.15	12.12	1.59	14.79	1.94	16.91	2.22	19.93	2.62	23.11	3.04	27.44	3.61
27	LMT6110	14.82	3.08	0.21	0.18	0.01	3.78	0.25	4.61	0.31	5.27	0.36	6.21	0.42	7.11	0.48	9.48	0.64
28	LMT6120	5.55	5.47	0.99	0.86	0.15	6.72	1.21	8.20	1.48	9.37	1.69	11.04	1.99	12.50	2.25	14.64	2.64
29	LMT7000	26.72	2.08	0.08	0.07	0.00	2.55	0.10	3.12	0.12	3.56	0.13	4.20	0.16	4.75	0.18	5.39	0.20

Total Area	958.74
Avg. area	33.06

APPENDIX I

Post-Construction Inspection Letters

Construction Site Erosion and Sediment Control Inspection		
Inspector:	Date:	Weather:
Project name:		Municipality:
Type of inspection: Pre-con ☐ Routine ☐ Follow up ☐		Photo(s): ☐

Inspection Checklist			
BMP/Activity	Maintenance Needed (Y/N)	N/A	Comments/Recommendations (ex: NOV, not installed,
Construction entrance			
Silt fence/straw wattles/mulch berm			
Cement truck rinse out			
Inlet protection			
Roads			
Basins			
• Dewatering Device			
•			
Temporary stabilization			
Permanent stabilization			
Fuel/chemical storage			
Stock Piles			
Dewatering			
Conservation Areas/ Grading barriers marked			
Other			

Additional comments:

	Description of Action Taken	Name or Date
	Verbal compliance with on-site contact	
	Written inspection sent to builder/owner	
	Follow-up inspection scheduled	
	Non-compliance resolved	
	Notice of Violation Sent	
	Second Notice of Violation Sent	
	Enforcement recommended (stop-work order)	
	Enforcement obtained/inspections suspended	

APPENDIX J

Deerfield Township / Warren County Soil & Water Conservation District Agreement

AGREEMENT BETWEEN
DEERFIELD TOWNSHIP
AND
WARREN COUNTY SOIL & WATER CONSERVATION DISTRICT

This working agreement is entered into on January 1, 2021 and becomes effective on January 1, 2021. The agreement expires on December 31, 2021. The agreement is subject to the limitations of authorities, resources and policies of the Warren County Soil and Water Conservation District (WCSWCD) and the Deerfield Township.

The Deerfield Township has elected to have their own EPA National Pollutant Discharge Elimination System (NPDES) Small Municipal Separate Storm Sewer System (MS4) Permit (permit). The MS4 is responsible for the permit requirements and contracting with the WCSWCD does not guarantee full compliance with the Ohio Environmental Protection Agency permits.

The purpose of this agreement is to detail what Minimum Control Measures (MCMs) that WCSWCD will assist Deerfield Township with to meet the terms of the permit.

1. The permit contains six MCMs that must be met for permit compliance. The six MCMs and the WCSWCD's related services are as follows:
   - MCM 1 – Public Education & Outreach*: provide educational programming opportunities for 10% (50% over the permit term of 5 years is required) of K-12 students of Deerfield Township through non-traditional educational programming, multi-media outreach and school programming.
   - MCM 2 – Public Involvement & Participation*: provide at least 1 educational program to Deerfield Township residents through volunteer and participation opportunities at workshops, festivals, and special events/meetings.
   - MCM 3 – Illicit Discharge Detection and Elimination*: oversee the Illicit Discharge Detection and Elimination (IDDE) program in accordance with permit requirements. WCSWCD will provide leadership for MCM 3 by,
     a. conducting dry-weather screening of outfalls, which includes the review of IDDE points of interest including 20 percent of total outfalls. Testing of water samples will be provided by WCSWCD. WCSWCD will provide pre-communication before any testing is conducted. Responding to and investigating illicit discharge complaints or reports.
     b. upkeep the system map by adding new infrastructure and track yearly reported outfalls, and
     c. collaborate with the Deerfield Township for program enforcement.
   - MCM 4 – Construction Site Storm Water Runoff Control*: oversee the Construction Site Storm Water Runoff Control program in accordance with the City, State and Federal applicable erosion and sediment control regulations. WCSWCD will provide leadership to MCM 4 by,

a. collaborating with Deerfield Township in reviewing, approving and permitting all active construction utilizing construction drawings, maintenance documents and SWP3 documents (these documents should be shared for review and approval before any building permits are issued) for all projects greater than one acre in size or which disturb less than one acre but are part of a larger common plan of development or sale that will disturb one or more acres,
b. issuing an earth disturbing permit for each construction site,
c. bill developers a permit fee of $125 per disturbed acre,
d. inspecting all active sites in accordance with the inspection frequency policy,
e. responding to all construction stormwater complaints and track the number of complaints, and
f. assisting Deerfield Township with enforcement actions for non-compliance as documented in the Township's Erosion and Sediment Control Regulations.

- MCM 5 – Post-Construction*: oversee inspections of the stormwater control basins for the post-construction storm water management program in accordance with permit requirements. WCSWCD will also provide,
  a. updates to the Township basin map, working in conjunction with Deerfield Township GIS department, as inspections are done with results of the visual inspection,
  b. provide letters of maintenance to basin owners documenting concerns that need to be addressed so that basins continue to operate properly, and
  c. provide basin owners with technical assistance for maintenance and repair of stormwater control basins, and
  d. provide copies of inspection letters in electronic form to Deerfield Township.
- MCM 6 – Good Housekeeping & Pollution Prevention*: oversee the pollution prevention and good housekeeping practices for Township facilities to meet the permit requirements. This will be accomplished by providing,
  a. yearly trainings for Township workers,
  b. provide yearly inspections for Township facilities as outlined in the Stormwater Pollution Prevention Plans (SWPPPs), and
  c. provide SWPPPs as deemed necessary for Township facilities.

2. Write and update the 2021 MS4 annual report for Deerfield Township as required by the MS4 permit by April 1, 2022.

*A quarterly report will be provided to Deerfield Township detailing work that the WCSWCD has conducted within that time period. Reports will be delivered electronically to a contact person(s) deemed by Deerfield Township. Quarterly reports will be delivered by the end of the first full week of the next month after the quarter has ended (Example: Quarter 1 = January thru March, report will be delivered by April 10, 2021.)

The chart below details the costs associated with each MCM and service that the WCSWCD can provide. Please initial which MCM and/or service Deerfield Township would like to contract with the WCSWCD for the 2021 year:

Please initial which MCM and/or Service Deerfield Township is choosing in 2021.	Minimum Control Measure (Please see above for more description)	Cost
✓	MCM1	$11,959.56
✓	MCM 2	$2,391.91
✓	MCM 3	$1,913.53
✓	MCM 4	$14,351.47
✓	MCM 5	$7,175.73
✓	MCM 6	$2,391.91
✓	2021 Annual Reporting	$2,391.91
	Total	$42,576.02

Deerfield Township will (please provide initials of signatory if opting out of service):

1. Compensate the WCSWCD $ 42,576.02 for the services provided.
2. Submit a Notice of Intent (NOI) with the Ohio Environmental Protection Agency requesting coverage under the NPDES Small MS4 Stormwater Permit.
3. If MCM 3 is chosen, Deerfield Township will provide to the WCSWCD access to current GIS map information for IDDE.
   - Deerfield Township elects to opt out of this service - _____
4. If MCM 4 is chosen, Deerfield Township will provide to the WCSWCD construction drawings, SWP3 documentation, and the operation and maintenance document for each construction site before the building permit is issued. Deerfield Township will work with the Warren County Engineer's office for review of post-construction stormwater design and approval.
   - Deerfield Township elects to opt out of this service - _____
5. If MCM 5 is chosen, Deerfield Township will provide to the WCSWCD access to current GIS map information for current storm basin locations.
   - Deerfield Township elects to opt out of this service - _____
6. If the Annual reporting service is chosen, Deerfield Township will agree to provide statistics (waste oil generated, yard waste collected, street sweeping material collected, total salt applied, pesticide and herbicide applied, and fertilizer applied, etc.) for the annual report. Deerfield Township will check annual report information and electronically sign off on report through the Ohio EPA Business Center.
   - Deerfield Township elects to opt out of this service - _____

Termination:

This agreement may be terminated at any time by mutual consent of the parties involved or may be terminated by either party by giving 90 days notice in writing to the other.

Warren County Soil and Water Conservation District

Signature	Director Title	1/7/21 Date

Deerfield Township

Signature	ADMINISTRATOR Title	1/6/21 Date