
STORM WATER MANAGEMENT PLAN

Requirements and General Compliance Guidelines and
NPDES Phase II Storm Water Discharge Requirements
For Storm Water Drainage System Design For
Development and Re-Development Projects within
Kochville Township of Saginaw County
Individual Permit MIG610162



Kochville Township

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TABLE OF CONTENTS

I. INTRODUCTION.....	3
A. THE OBJECTIVE OF THE STORM WATER MANAGEMENT PLAN.....	3
B. THE NEED FOR STORM WATER MANAGEMENT IN KOCHVILLE TOWNSHIP.....	4
C. ADMINISTRATION OF THE STORM WATER DISCHARGE PERMIT AND MANAGEMENT PLAN	4
II. ADMINISTRATION.....	4
A. DEFINITIONS.....	4
B. REVIEW PROCEDURE	9
1. PRE-DESIGN MEETING	9
2. FORMAL REVIEW	10
3. FORMAL REVIEW FOR SUBDIVISIONS, CONDOMINIUMS, AND PLATTED DEVELOPMENTS	11
C. PLAN APPROVAL AND ISSUANCE OF STORM WATER PERMIT	12
D. CHANGES TO PLAN AFTER APPROVAL.....	12
E. INSPECTION AND LETTER OF CERTIFICATION REQUIREMENTS.....	13
1. SMALL DEVELOPMENTS AND RE-DEVELOPMENTS.....	13
2. LARGE DEVELOPMENTS AND REDEVELOPMENTS	13
3. PLATTED DEVELOPMENTS, SUBDIVISIONS, AND CONDOMINIUM/APARTMENT PROJECTS.....	14
F. FEE SCHEDULE	14
G. EXEMPTIONS	15
H. APPEAL PROCESS.....	15
I. PENALTIES AND ENFORCEMENT.....	16
III. DESIGN CALCULATIONS.....	16
A. ALLOWABLE DISCHARGE RATE (Q_A) AND 10-YEAR DESIGN DISCHARGE (Q_{D10})	16
B. STORM WATER DETENTION REQUIREMENTS	16
C. FIRST FLUSH REQUIREMENTS	16
D. DISCHARGE RESTRICTOR REQUIREMENTS	17
E. BANK FULL FLOOD REQUIREMENTS	17
IV. DESIGN STANDARDS	17
A. REQUIREMENTS	17
1. GENERAL REQUIREMENTS	17
2. STORM SEWER PIPING REQUIREMENTS	19
3. DETENTION AND RETENTION REQUIREMENTS.....	20
4. REAR LOT DRAINAGE REQUIREMENTS.....	22
B. GENERAL COMPLIANCE GUIDELINES	23
C. VARIANCES FROM REQUIREMENTS	23
D. EASEMENTS.....	24
E. STORM WATER MANAGEMENT SYSTEM MAINTENANCE PLANS FOR SUBDIVISIONS AND CONDOMINIUMS	25
F. EVALUATION OF COST-EFFECTIVE STRUCTURAL AND NON-STRUCTURAL BEST MANAGEMENT PRACTICES (BMPs).....	27
G. BMPs TO MINIMIZE POST CONSTRUCTION IMPACTS ON WATER QUALITY	27

I. INTRODUCTION

A. The Objective of the Storm Water Management Plan

The purpose of developing this plan is to aid developers in the design of their storm water runoff collection and detention systems. Current storm water management requirements are in the form of Township policies and procedures as related to the Township's storm water management guidelines, adopted by Kochville Township in 2006. This storm water management plan (SWMP) will formalize these policies to allow for a more uniform application of the guidelines. Additionally, this SWMP has been adopted as a means to comply with the National Pollutant Discharge Elimination System (NPDES) Phase II regulations related to storm water discharge. These regulations are part of the Clean Water Act (CWA) as amended in 1987. Kochville Township has an NPDES Storm Water Discharge Permit and must comply with the goals and objectives of the Watershed Management Plan (WMP) and Storm Water Pollution Prevention Initiative (SWPPI) developed to address storm water quantity and quality issues. Furthermore, the township understands that it is part of the Saginaw Bay Watershed with valuable water resources that must be protected to the maximum extent practicable.

The Storm Water Management Plan establishes the framework through which detention measures and the design of storm water collection systems will be implemented and details the process that must be followed to gain approval for new developments and redevelopment projects. The SWMP will address storm water quality standards, best management practices (BMPs), post-construction storm water runoff from new development and redevelopment projects (*includes private, commercial and public projects and instances where Kochville Township is the developer*), preventing or minimizing water quality impacts, and innovative design for Kochville Township to assure that the storm water discharged into storm water drainage systems under jurisdiction of the county or state is as clean as possible. The plan requires storm water management design practices that will help to minimize the impacts of proposed development or redevelopment projects on the existing drainage system. In addition, these guidelines will help ensure adequate drainage systems are being constructed for future development in the Township. The following types of developments and earth changes require a Storm Water Management Plan:

1. Land development proposals subject to site plan review requirements in the Township Zoning Ordinance.
2. Projects that disturb at least one or more acres, including projects less than an acre that are part of a larger common plan of development or sale and discharge to Kochville Township's MS4.
3. Subdivision plat proposals.
4. Site Condominium developments pursuant to the Condominium Act, P.A. 59 of 1978 as amended; MCLA 559.101 et.seq.
5. Any development on property divided by land division in connection with which one or more public or private roads are created or extended, and/or in connection with which more than three parcels of less than one acre are created.
6. Any proposal to mine, excavate, or clear and grade or otherwise develop one acre or more land for purposes other than routine single family residential landscaping and gardening, or any proposal within 500 feet of an inland lake, river, or stream.

The Storm Water Management Plan provides information about the Township's storm drainage system and explains the Township's proactive approach to managing the quantity and quality of storm water runoff. The Storm Water Management Plan promotes the practice to infiltrate storm water as part of the natural process when soil conditions permit. The SWMP also promotes regional detention as a means to store stormwater runoff and

discharge it at a pre-determined rate. Regional detention provides for a more economical utilization of land and can provide more opportunities to provide a more aesthetically pleasing landscape. Regional Detention areas are to be reviewed for applicable situations in areas zoned for commercial development (Appendix I) such as B-1, B-2, B-3, M-1 and M-2. This plan also promotes innovative procedures in storm water management such as bio-filtration, bio-swales, rain gardens, and other practices that enhance storm water quality by cleansing pollutants from runoff. This plan also promotes and encourages proper maintenance of storm water conveyance and storage systems to assure they are working properly. It is further noted that it is **not** the responsibility of the township to maintain or operate these systems. However, if the township is forced into a situation to provide maintenance on a storm water conveyance or storage system any costs incurred by the township will be passed on to the owner plus a 20% administration fee.

The Storm Water Management Plan includes:

1. A summary of the administrative procedures to be followed to comply with the plan, including meeting requirements, review procedures, inspection requirements, fee schedule, issuance of the permit, penalties and enforcement, and other county / state regulatory agency requirements.
2. A description of design calculations.
3. A description of design standards and guidelines and an operation and maintenance plan & agreement.
4. A summary of existing drainage conditions within the Township. (Appendix A)

B. The Need for Storm Water Management in Kochville Township

Kochville Township has been managing storm water runoff under the guidelines and review of the Saginaw County Public Works Commissioner’s office to reduce the risk of overloading the storm drainage systems located within the Township. In the continuing effort to minimize impacts to the existing storm drainage system and to provide adequate drainage in the future, the Township has prepared this formalized Storm Water Management Plan. Additionally, this Storm Water Management Plan will now address storm water quality issues as brought out in Watershed Management Plans developed by the Saginaw Area Storm Water Authority. This SWMP will provide the guidelines and direction for development in Kochville Township as it relates to storm water issues.

C. Administration of the Storm Water Discharge Permit and Management Plan

The Storm Water Management Plan will be implemented and operated by the Kochville Township Zoning Administrator or designee. The Zoning Administrator or designee will be responsible for the review of new development and redevelopment plans and for the installation and maintenance of measures within the Township to accomplish the plan. The Planning Commission or designee will work in conjunction with Township Administration, the County Public Works Commissioner, the County Road Commission, planning, architectural and engineering consultants, landowners, and developers within the Township.

II. ADMINISTRATION

A. Definitions

For the purpose of this Storm Water Management Plan, the following definitions are adopted:

1. *Allowable Discharge*: The maximum flow rate that can be discharged from a site, as calculated for design criteria in accordance with this Storm Water Management Plan.

2. *Base Flood Elevation:* The 100-year flood elevation as determined from Flood Insurance Rate Maps (FIRMs) or the best available information.
3. *Bankfull or Channel Protection:* The purpose of bankfull or channel protection criteria is to prevent habitat degradation and erosion in urban streams caused by an increased frequency of bankfull and sub bankfull stormwater flows. Channel protection seeks to minimize downstream channel enlargement and incision that is a common consequence of urbanization. Typical design is not to exceed the pre-development rate and volume for all storms up to the 2-yr 24-hr storm at the site. At a minimum, pre-development is the last land use prior to the planned new development or re-development. Exclusions to this standard are the following; The Great Lakes or connecting channels of the Great Lakes; Rouge River downstream of the Turning Basin; Saginaw River; Mona Lake and Muskegon Lake (Muskegon County); and Lake Macatawa and Spring Lake (Ottawa County) and engineered county drains.
4. *Best Management Practices (BMPs):* Structural, vegetative or managerial practices used to protect and improve the quality of surface water and groundwater.
5. *Bio-filtration:* is a soil filtration system. Principal components of the system (figures 1&2) include:
 - a pretreatment grass filter strip
 - surface planting with woody and herbaceous plant species
 - a surface 2-3 inch thick mulch layer
 - a minimum 2 foot thick sandy loam or loamy sand soil-textured planting soil media (See specifications)
 - a 6-inch thick sand layer
 - Perforated PVC pipe under-drainage within a 15-inch thick gravel bed protected with geotextiles
6. *Bio-swale:* Drainage channels that divert runoff water from the storm sewer into a natural area where native wetland plants help absorb and recycle it. Plants like grasses and rushes are commonly found in bioswales because they help to trap the water and force it to absorb, rather than flowing through the bio-swale to the other side.
7. *Conduit:* Any channel, pipe, sewer or culvert used for the conveyance or movement of water, whether open or closed.
8. *Control Elevation:* Contour lines and points of predetermined elevation used to denote a detention storm area on a plat or site drawing.
9. *Detention Facility:* A facility constructed to provide detention storage.
10. *Detention Storage:* The temporary detaining or storage of storm water in a storage basin, on rooftops, in streets, parking lots, school yards, parks, open space, or other areas under predetermined and controlled conditions, with the rate of drainage regulated to the allowable discharge by appropriately installed devices. These detention storage areas shall not be considered regulated wetlands.

11. *Developer/Owner Engineer:* The engineering company formally designated by the Developer/Owner to act as their Engineer.
12. *Development:* The construction of a building, parking lot, structure, etc. on a piece of land or otherwise changing the use of a piece of land.
13. *Discharge:* The release or outflow of water from any source.
14. *Drainage Area:* The area from which storm water runoff is conveyed to a single outlet (i.e. a watershed or catchment area).
15. *Easement:* A parcel of land on which the owner has granted rights-of-way to make surveys, construct, maintain, operate, alter, replace, repair, and remove at any time that part of the storm drainage system located within the easement. The landowner will not be allowed to construct buildings or other structures on said easement without the written consent of the easement grantee.
16. *Engineer:* A civil engineer that is licensed to work in the state of Michigan or a person who is working under the direct supervision of a civil engineer licensed to work in Michigan.
17. *Excess Storm Water Runoff:* The volume and rate of flow of storm water discharged from a drainage area, which is in excess of the allowable discharge.
18. *Floodplain:* The special flood hazard lands adjoining a watercourse, the surface elevation of which is lower than the Base Flood Elevation and is subject to periodic inundations determined from Flood Insurance Rate Maps (FIRMs) or the best available information. A parcel of land can be located within a floodplain without being shown on a FIRM map.
19. *First Flush:* Is the volume of 1.00 inch of rain over the area of land contributing storm runoff. The first flush of a rain event typically carries the most pollutants to our storm sewer system and ultimately to our rivers, lakes and streams. The first flush volume must be discharged over an 18-24 hour period of time to settle out pollutant loads.
20. *Impervious Factor (IF):* The percentage of impervious surface specific to a site that the existing storm drain outlet has been historically designed to convey. The **IF** is used to calculate the allowable discharge from a site. Proposed developments or redevelopments will not be allowed to discharge storm water at a rate, which is greater than the runoff that would occur from the site with the percentage of impervious surfaces defined by the impervious factor. **IF**'s have been established for the existing drains and storm sewer systems located within the Township and are all 0%.
21. *Impervious Surface:* A surface that does not easily allow the infiltration or penetration of water. During rainstorm events, a large percentage of water will runoff. (Typically considered as rooftops, paved walks, roadways, driveways, sidewalks, parking lots, etc.)
22. *NPDES:* National Pollutant Discharge Elimination System. In 1987 the Clean Water Act was amended and required to implement a program that would address pollutants being discharged to the nation's waters. This now includes storm water discharges into waters of the nation/state.
23. *Peak Flow:* The maximum rate of flow of storm water runoff at a given location.

24. *Percent Imperviousness (IMP)*: The actual proposed percentage of impervious surface for a proposed development or redevelopment. The **IMP** is used to calculate the design discharge (Q_d). The design discharge is used to determine storm sewer sizes and required detention volumes. Minimum impervious factors have been established for various zoned land uses (See Table II, Appendix G).
25. *Pervious Surface*: A surface that allows infiltration or penetration of water. During rainstorm events, a percentage of water will infiltrate into the surface with the remaining storm water running off. The percentage of runoff is dependent on the type, slope, percent saturation, etc. of the surface. (i.e. lawns, farm fields, parks, wooded areas, golf courses, etc.). Design personnel should attempt to maximize these surfaces as much as possible.
26. *Rain Gardens*: A depressed area of a size that was determined by specified engineering guidelines with amended soils and specific plants, shrubs, and trees that has a specific volume to store storm water runoff.
27. *Rear lot drainage*: A storm water system designed to provide drainage in rear lot areas to prevent water from ponding for extended periods of time. It must be noted that these systems are not designed to convey storm water in a rapid manner. It is a deliberately designed system that can provide additional detention capabilities during severe runoff conditions. It is a system that in condo or subdivisions is the responsibility of the owner to maintain. It is not the townships responsibility. The township may repair the system if necessary to prevent damage to neighboring properties, but all associated repair costs, plus a 20% administrative fee will be passed on to the owner.
28. *Redevelopment*: Altering, improving, reconstructing or otherwise changing the use of an existing developed property. A site will be considered a redevelopment for this Storm Water Management Plan when an area greater than or equal to 5% of the existing developed portion of the site (i.e. roof, gravel, & paved surfaces) or, an area greater than 20,000 square feet is increased or reconstructed with roof, pavement, or any other impervious surface. NOTE: this percentage is cumulative. If redevelopment is 2% one year and 3% at another time, this will meet the 5% rule. Also, at times, less than 5% can create drainage problems and the Storm Water Management Plan Reviewer may require additional detention or storage based on historical or anecdotal problems on a site.
29. *Regional Detention Areas*: A regional detention area is one that is designed to provide the required detention volume and discharge requirements for multiple parcels that are developed to a predetermined or planned imperviousness. These detention areas must institute best management practices to provide improved water quality for storm water runoff to the maximum extent practicable. For example, it is recommended that forebays or BMPs with similar objectives be used to assure water quality.
30. *Retention Storage*: The permanent retaining or storage of storm water in a storage basin, on rooftops, in streets, parking lots, schoolyards, parks, open space, or other areas under predetermined and controlled conditions. The only discharge of storm water from the retention storage area is by ground infiltration, evaporation, etc. An emergency overflow must be provided in the event the capacity of the retention facility is exceeded. These retention storage areas shall not be considered regulated wetlands.

31. *Saginaw Area Storm Water Authority (SASWA)*: The SASWA was formed by the NPDES Phase II communities in Saginaw County. The Authority provides communities with information on storm water issues and regulations, more information is available at www.saswa.org
32. *Saginaw County Land Development Advisory Committee*: When a development is to be proposed in the Township and will involve the Road Commission, Saginaw County Public Works Commissioner (a county drain) and the Township it is advisable to begin the development process with this committee. The advisory committee shall include a member of the Saginaw County Road Commission, Saginaw County Public Works Commission, and Kochville Township. The goal of the committee is to arrive at a mutual understanding of the procedures, standards, and/or requirements as they may apply to the proposed development. The website for obtaining a form to request a meeting is in Appendix C.
33. *Storm Water Management Plan Reviewer*: The engineering firm or professional person formally designated by Kochville Township to act as their plan reviewer.
34. *Storm Water Runoff*: The water from a rainstorm or snowmelt, which flows over the surface of the ground or is collected in a drainage system.
35. *Ten-Year Design Storm*: A precipitation event with a duration equal to the time of concentration, having a ten percent probability of occurring in any given year or occurring once every 10 years on average. This amounts to approximately 3.46 inches of rain in 24 hours. But, brief, intense storms of 10-year design can range from 1.71 inches in 1 hour to 3.05 inches in 12 hours. (Source: http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=mi)
36. *Time of Concentration (T_c)*: The elapsed time for storm water runoff to flow from the most hydraulically distant point in a drainage area to the outlet or other predetermined point.
37. *Township Engineer*: The engineering firm formally designated by Kochville Township to act as their Engineer in specified matters.
38. *Upland Area*: Land located in the upper portion of a watershed whose surface drainage flows toward the area being considered for development.
39. *Urbanization*: The development, change, or improvement of any parcel of land consisting of one or more lots for residential, commercial, industrial, institutional, recreational, or public utility purposes.
40. *Urbanized Area*: An area designated by the US Census Bureau, which has specific rules and regulations concerning storm water under the NPDES Phase II regulations. This regulated area may require adherence to specific water quality standards. There will be a special Appendix for these water quality design issues and best management practices (BMPs).
41. *Watercourse*: Any natural or artificial stream, river, creek, channel, ditch, canal, conduit, culvert, drain, waterway, gully, ravine, street, roadway, swale, or wash in which water flows in a definite direction, either continuously or intermittently.

42. *Waters of the State*: Means any of the following: the Great Lakes bordering the State and heir connecting waters, all inland lakes, rivers, streams, impoundments, open drains, and other surface bodies of water within the jurisdiction of the state, including wetlands as defined by Part 303 of PA 451 of 1994. In Kochville Township, that would include streams that have a defined bed and bank, and established flow, established county drains, and the Saginaw River.

B. Review Procedure

A site will be considered in compliance with the Kochville Township SWMP when a review and approval of a site's Storm Water Management Plan and post-construction storm water runoff BMPs has been completed. The Township will not accept runoff into drainage systems located within the Township from newly developed or redeveloped sites without compliance with this SWMP. **Developers or Builders should not install the storm water system unless they are working from a set of plans that have been stamped as "APPROVED"** with appropriate signature from the Township's Storm Water Plan Reviewer.

To comply with the Kochville Township SWMP, complete the following process and deliver or mail all submittals to **Kochville Township Hall, Supervisor, c/o Storm Water Discharge Permit**, 5851 Mackinaw Road, Saginaw, MI 48604.

1. Pre-Design Meeting

The Developer's Engineer shall be responsible for coordinating a pre-design meeting. This meeting, at a minimum, shall consist of the Developer's Engineer, the Township's reviewer or designee, and a representative of Saginaw County Public Works Commissioner. The purpose of the meeting is to address the various storm water management proposals of the developer. Conceptual storm water management alternatives can be discussed and potential problems addressed prior to the design phase of the project. The goal of the meeting is to eliminate potential problems up front and reduce the time and costs needed for the design and review of the project.

This meeting will be required for all platted developments, condominium and apartment projects, and site developments larger than 5 acres. It is recommended that other site development projects have this meeting or, at a minimum, correspond with the Township's designee by phone, e-mail, and/or facsimile regarding conceptual design alternatives prior to submitting for formal review.

The Developer's Engineer and/or Township's designee should have in his possession, or have an understanding of, the following information prior to attending the pre-design meeting.

- a. The drainage district in which the proposed development is located and the design impervious factor for the proposed development. This information can be obtained from the Storm Water Management Plan Reviewer or Saginaw County Public Works Commissioner's engineer.
- b. Small location map showing the section, or part of the section in which the site is situated.
- c. Location and description of activities that may impact or be impacted by the proposed development or redevelopment, both on and off the site.
- d. Acreage of the total site and an estimate of the area contributing to the proposed storm drainage system (watershed area). This should include offsite runoff.
- e. The size and location of the proposed storm drainage outlet.
- f. If known, a conceptual layout of the proposed storm drainage system for the development or

redevelopment.

- g. Whether the proposed drainage system is going to be owned and maintained by a private or public entity.

If required, the Owner/Developer and his/ her technical consultant shall attend a Saginaw County Land Development Advisory Committee (LDAC) meeting. It is especially important if the project involves a county road or county drain as the County's Road Commission and Public Works Commissioner have design standards that must be met. The intent of this meeting is to obtain uniform direction and communication to minimize misdirection of early construction and minimize financial losses to proprietors, developers, and consultants. The application for this meeting can be obtained at the following web site:

http://www.saginawcounty.com/Publicworks/permits_forms.htm.

If the Township's designee and the Developer's Engineer agree upon the conceptual layout of the storm drainage system, the Owner/Developer shall begin completing plans and calculations for formal review by the Township.

2. Formal Review

- a. In addition to the site plan review requirements, the owner / developer must put together the following for the review of the storm water management plan for the site:
1. Completed Storm Water Discharge Permit Application and Checklist
 2. Four (4) sets of plans related to the site's storm water drainage*
 3. Two (2) sets of calculations*
 4. Any other supporting information
 5. An **operation and maintenance plan with signed maintenance agreement** for the Storm Water Management Plan, if applicable.

Another complete set of this information shall be submitted to the Saginaw County Public Works Commissioner call 989-790-5258 for submittal details. The plans and calculations will comply with the requirements of this Storm Water Management Plan. The permit application, checklist, design calculations, and design standards to be used during the formal review process are established by this Storm Water Management Plan.

*One set of plans and one set of calculations are retained by the Township for their files, the remaining copies are sent to reviewers.

- b. Submit deposit/fee in accordance with the fee schedule adopted by the Kochville Township Board.
- c. Formal review and approval will not begin until all items required for application have been received. The proposed drainage system will be approved or rejected with reason, and returned to the owner/developer.
- d. The Storm Water Management Plan Reviewer will review all plans, calculations, and other information for compliance with the Township's Storm Water Management Plan. All materials will be reviewed for completeness. Calculations will be checked. The minimum design calculations and design requirements outlined in this document and additional supporting documents pertaining to required calculations will be used for review. The permit application and drainage plan checklist will be reviewed.
- e. Furthermore, the Township Engineer will review how the developer meets the performance standards and

ensures long-term operation and maintenance of BMPs based on the signed maintenance plans submitted with all construction plans in accordance with Section IV, Sub-Section E. Storm Water Management System Maintenance Plans, below. The Township Engineer will review the submitted evaluation of cost-effective structural and non-structural BMPs, if applicable, and the BMPs utilized on all new or re-development sites to minimize post construction impacts on water quality. *(Please refer to Section VI, Sub-Sections E-G for additional requirements for long-term operation and maintenance of BMPs.)*

- f. A typical review will take approximately 3 weeks to complete from the date the plan is submitted in complete form.
- g. If the proposed drainage system is rejected, three sets of plans and one set of calculations will need to be resubmitted to the reviewing agency with the appropriate revisions. One copy of the plans and any revised calculations must be sent to the Township for their files. A completed checklist may also have to be resubmitted.

3. Formal Review for Subdivisions, Condominiums, and Platted Developments

- a. In addition to the site plan review requirements, the owner / developer must put together the following for the review of the storm water management plan for the site:
 - 1. four (4) sets of plans;
 - 2. two (2) sets of calculations;
 - 3. a copy of the completed permit application & checklist;
 - 4. a storm water system maintenance plan and maintenance agreement, if applicable, for review by the Township Engineer;
 - 5. Any other supporting information for the site.

The plans and calculations shall comply with the requirements of this Storm Water Management Plan. The permit application, checklist, design calculations, and design standards to be used during the formal review process are established by this Storm Water Management Plan.

One set of plans and one set of calculations are retained by the Township for their files.

- b. The developer / owner will submit to the Saginaw County Public Works Commissioner in a separate submittal. A determination by the owner must be made if the system is to be a private development or a public development. If the roads and utilities are to be turned over to public agencies such as the Road Commission or the Public Works Commissioner, then a submittal must be sent to that agency for review and comment.
- c. Submit deposit/fee for storm water management plan review and inspection to the Township in accordance with the fee schedule outlined in this plan or on the permit.
- d. Formal review and approval will not begin until all items required for application have been received. The proposed drainage system will be approved or rejected with reason and returned to the owner/developer.
- e. A typical review will take approximately 3 weeks to complete from the date the plan is submitted in complete form.
- f. If the proposed drainage system is rejected, three sets of revised plans and one set of any revised calculations will need to be resubmitted to the reviewing agency, with one copy of each to the Township for their records. A completed permit application and checklist will also have to be resubmitted.

- g. Utility contracts will not be awarded until such time at the storm water management plan is approved.

C. Plan Approval and Issuance of Storm Water Permit

Once the storm water management plan has been approved, the Storm Water Management Plan Reviewer will stamp three copies of the plans “APPROVED”. One set will be sent to the applicant, one set will be sent to the Township, and one set will be kept on file with the Storm Water Management Plan Reviewer. A Storm Water Permit will be issued to the applicant by the Storm Water Management Plan Reviewer, and copied to the Township, Storm Water Management Plan Reviewer, and Saginaw County Public Works Commissioner. The permit will include inspection requirements, compliance requirements, date of issuance, date of expiration, etc. A copy of a sample permit has been included in Appendix B.

NOTE: For Subdivisions, Condominiums, and Platted developments the Storm Water Management Plan Reviewer will issue the storm water permit by coordinating the review with the Saginaw County Public Works Engineer. This permit will only be issued when both reviews (storm drain, detention, rear lot, etc.) are completed and approved.

The developer will be required to meet all performance standards and ensure long-term operation and maintenance of all structural and non-structural Best Management Practices (BMPs) during the duration of the development. A Soil Erosion and Sediment Control Permit from the county enforcement agency (CEA), inspections, and documentation throughout the duration of the development will all be required; please see Appendix B for more detailed requirements for inspections, maintenance, and scenarios when a Soil Erosion and Sediment Control Permit is required. All stormwater runoff control structures, measures, systems and facilities shall be maintained by the property owner or homeowners association following development. (For example, property owners will be individually responsible for rear lot drainage structures or best management practices (BMPs) on their parcels. Associations will be responsible for common use facilities, measures, systems and structures.)

Maintenance agreements shall specify responsibilities for financing maintenance and emergency repairs, including, but not limited to, the maintenance and repair of the following: detention and/or retention basins (wet or dry), Best Management Practices implemented on the site to address water quality, flow restriction structures, rear lot drainage systems, storm sewer structures, pipes as required by type of system and ownership of such a system. (For example, if the system is under control of the MDOT, they will maintain the system, if a private owner or association, then they have responsibility.)

If necessary to protect public health, safety, welfare, or water resources, including lakes, rivers, streams, protected wetlands, county drains or other receiving bodies of water, the Township may initiate emergency action to abate imminent and substantial danger and risk. Any costs incurred will be the responsibility of the owner or association responsible for maintenance of the storm water system.

D. Changes to Plan after Approval

1. Any changes made to the approved plan after issuance of the storm water permit, and before construction begins, shall require four sets of plans for submittal to the Township for review and approval. Another complete set of this information shall be submitted to the Saginaw County Public Works Commissioner if the system will be turned over to this office.

If the change is minor and occurs in the field during the construction phase, the contractor shall contact the Storm Water Management Plan Reviewer and advise him/her of the change in a written letter. Anything that increases impervious area or affects the rate of discharge from the site may require additional intervention to

be decided at the time of occurrence. The Storm Water Management Plan Reviewer may choose to approve modifications by field inspection and a follow up to the Township with a letter approving the modification. The project owner will be invoiced for the engineer's time.

2. Upon receipt of this information, it will be determined whether additional information, such as calculations, revised checklist, etc., will be required.
3. The fee for review of any changes to the plan after approval will be billed on an hourly basis. An occupancy permit will not be issued until all changes have been approved and the Township has received all review fees.

E. Inspection and Letter of Certification Requirements

Inspection of storm sewer systems, rear lot systems and/or detention facilities will be required on all development and redevelopment projects. The extent of the inspection will depend on the size and type of the development or redevelopment. Inspection requirements will be outlined in the storm water management permit. Descriptions of the inspection requirements are outlined below. The fees associated with this inspection are included in the original deposit as outlined in Section II, Sub-Section F.

1. Small Developments and Re-developments

(1 acre or more or less than 5 acres or less than one acre that is part of a larger common plan of development or sale) - A final inspection of the restrictor and the detention storage areas by the Storm Water Management Plan Reviewer will be required. This one-time inspection will be performed at the completion of the project. Subsequent inspections may be required if deficiencies exist.

The Contractor must complete a letter of certification indicating that the storm drainage system has been constructed as shown on the approved storm water management plans (See Appendix B for certification). An occupancy permit will not be issued until the Township has received a letter of certification and the final inspection of the site has been completed by the Storm Water Management Plan Reviewer. (Amended August, 2002)

2. Large Developments and Redevelopments

(5 acres and greater) - Periodic Site inspections of the storm sewer, outlet, restrictors, and detention storage areas may be required by the Storm Water Management Plan Reviewer / Township Engineer. Specific items needing inspection prior to the completion of the project will be identified in the storm water management permit (i.e. installation of restrictors, restricting pipes, etc.).

The Storm Water Management Plan Reviewer / Township Engineer or designee shall be informed 24 hours in advance of the placement of items requiring inspection as outlined on the storm water management permit.

A final inspection of the restrictor and the detention storage areas by the Storm Water Management Plan Reviewer / Township Engineer or designee will be required. This one-time inspection will be performed at the completion of the project. Subsequent inspections may be required if deficiencies exist.

The Developer's Engineer will have to complete a letter of certification (found in Appendix B) indicating the storm drainage system has been inspected during construction and the drainage system was constructed as shown on the reviewed storm water management plans for the site stamped "Approved". An occupancy permit will not be issued until the Township has received a letter of certification and the Storm Water Management Plan Reviewer / Township Engineer or designee has completed the final inspection of the site.

3. Platted Developments, Subdivisions, and Condominium/Apartment Projects

Daily inspection of storm sewer and drainage system construction will be required. The Owner/Developer’s Engineer or the Storm Water Management Plan Reviewer shall perform this inspection. Daily inspection reports shall be completed for all days on which construction of the storm drainage system occurs. At a minimum, the daily inspection reports shall include the information shown on the sample daily inspection report included in Appendix B. These daily inspection reports do not have to be submitted to the Township. However, they should be on file with the Engineer and made available upon request.

INSPECTIONS:

A final inspection by the County Public Works Engineer will be required for the restrictor / outlet device or metering line, storm sewers and the detention storage areas. The Public Works Engineer may also require videotaping of the system or portions of the system before accepting the drainage system as a public utility. The cost of the videotaping is the responsibility of the owner or contractor. Subsequent inspections may be required if deficiencies exist. Any additional fees incurred during this inspection process are the responsibility of the owner or contractor.

A final inspection of the rear lot drainage system by the Storm Water Management Plan Reviewer will be required. This one-time inspection will be performed at the completion of the project, or when directed by the Township. Subsequent inspections may be required if deficiencies exist. If additional inspection fees are incurred as a result of construction deficiencies these will be passed on to the owner or contractor.

The Developer’s Engineer and Contractor will have to complete a letter of certification indicating the storm drainage system has been constructed as shown on the approved storm water management plans (See Appendix B). An occupancy permit will not be issued until the Township has received a letter of certification and the County Public Works Engineer and the Storm Water Management Plan Reviewer have completed the final inspections of the site.

F. Fee Schedule

The fee schedule for reviewing storm drainage submittals and performing inspection of drainage system construction **if not under the site plan review process is outlined below:**

Area of Proposed Work	Fee	Collection of Fees
Small Developments and Redevelopments (0 to 3 acres)	\$500	Fees added to Building Permit fee
Large Developments and Redevelopments (3+ acres)	Hourly, minimum \$600 fee	Fees added to Building Permit fee
Subdivision, Condominium, and Platted Developments	\$500	\$500 deposit collected prior to initiation of the Rear Lot Reviews
Determination if a redevelopment project is exempt from compliance	\$100	Fees added to Building Permit fee

These permit fees include:

- a. Pre-design meeting, if necessary
- b. Initial formal review
- c. Review of requested changes made during first review
- d. First inspection of site upon completion

G. Exemptions

Redevelopment projects will be exempt from the requirements of the storm water management plan provided:

- There was an existing approved storm water management plan for the site
- The area of additional roof, paved, and gravel surfaces is less than 5% of the existing improved areas of the site.
- The additional roof, paved, and gravel surface does not exceed 20,000 sq. ft.
- There is no cumulative increase equal to, or greater than the 5% area of improvement. (For example; If the site has added 2% one year, 3% another year, and another 2% increase in imperviousness. This is a cumulative 7% increase for the site.)
- There is no significant impact or change in detention amounts that may have adverse effects on neighboring properties.

Example: Existing 1-acre site with 0.75 acres of improved property plans to add 3,000 square feet of paved surface to the existing development. $.05*(.75*43560) = 1633.5$ sq. ft. $3,000 > 1633.5$ therefore project will need to follow Storm Water Management Plan.

To obtain this exemption, the contractor, developer, or developer's engineer must fill out the REQUEST FOR EXEMPTION form in Appendix B. Also, supply a site plan with existing conditions (buildings, parking lots, other impervious / pervious surfaces, etc.), current storm water management plan for the site, and proposed changes (buildings, parking lot, changes in impervious / pervious surfaces, etc.) with supporting calculations necessary for review purposes. These calculations are shown above. If the calculation is not present, the Storm Water Management Plan Reviewer will not review the plan.

NOTE: If no storm water management plan exists, the site must come into compliance to the maximum extent practicable.

An exemption may still be granted to re-development projects not meeting the above requirements if approved by the Storm Water Management Plan Reviewer.

The Storm Water Management Plan Reviewer can exercise the right to have a site comply with the Kochville Township SWMP guidelines even if the change in impervious area is less than 5% if special circumstances exist, such as historical drainage problems affecting the area, or other concerns related to storm water runoff.

H. Appeal Process

If the developer is in disagreement with any of the reviews or inspections made by the Township and/or Storm Water Management Plan Reviewer, an appeal can be made to the Township Supervisor within 30 days of the review and/or inspection.

U Upon review of the items presented for appeal the Township Supervisor may:

- Refer to an independent third party for an opinion / recommendation.
- Arbitrate with the Developer and Storm Water Management Plan Reviewer to reach an acceptable solution.
- Override the Storm Water Management Plan Reviewer.

I. Penalties and Enforcement

The Township will not award any contracts for the installation of the water or sanitary sewer utilities until such time as the storm water management plan has been approved by the Storm Water Management Plan Reviewer. Additionally, penalties may be utilized in the form of civil infractions and court action until compliance is achieved with the approved plan.

NOTE: Storm water systems cannot be altered once approved and constructed unless it has been reviewed by the Township. Removing restrictors or creating a situation that is harmful to neighboring parcels will be the owner's liability

III. DESIGN CALCULATIONS

Please refer to the excel spreadsheet for the required design calculations that must be submitted for review to Kochville Township's Engineer, or appointed designee. The excel spreadsheet can be provided by Kochville Charter Township and/or designee upon request and/or obtained at the following website:

<http://www.saswa.org>

A. Allowable Discharge Rate (Q_a) and 10-Year Design Discharge (Q_{d10})

The storm water discharge rate from any proposed development or redevelopment site in Kochville Township shall be restricted to an allowable discharge (Q_a). The allowable discharge required by Unit Allowable Discharge as provided herein.

Calculate the allowable discharge (Q_a) in cubic feet per second (cfs):

$$\begin{aligned} Q_a &= (q_a)(A_{\text{site}}) \\ A &= \text{Allowable Discharge Rate (cfs).} \\ q_a &= 0.25 \text{ cfs/acre.} \\ A_{\text{site}} &= \text{Proposed site area or contributing area in acres.} \end{aligned}$$

B. Storm Water Detention Requirements

The storm water detention storage required for a site is to be calculated using the Kochville Township's excel spreadsheet.

C. First Flush Requirements

In order to meet the storm water quality discharge requirements of Phase II of Section 10 of the Clean Water Act and to meet the Environmental Protection Agency's storm water guidelines, designs must provide for storm water treatment. Therefore, all site development projects are required to detain the first flush volume, which is defined as 1.0 inch of runoff over the impervious area of the site first contributing storm runoff (A_i) for new development or re-development. This volume will be calculated as:

$$V_{ff} = 3630 * A_i * C$$

$$C = 0.9 \text{ for all calculations}$$

This volume must be held for more than 18 hours but not more than 24 hours. The average allowable release rate for runoff resulting from 1.0 inch of rain in 24 hours is calculated as follows:

$$Q_{ff} = \frac{\text{Volume (Vff)}}{(\text{X hours}) * \left(\frac{3600\text{sec}}{1\text{hour}}\right)}$$

It will also be acceptable for site development projects to calculate the runoff generated by the 90 percent annual non-exceedance storm. **If this method is chosen, please contact the Township Engineer, or other appointed designee for guidance.**

D. Discharge Restrictor Requirements

A restrictor regulates the discharge of storm water to the allowable discharge rate (Q_a) established for a site. Restrictors may be a circular in-line plate restrictor or a metering line. The circular in-line plate restrictor is based on the orifice formula.

$$a = \frac{Q_a}{0.62 * (64.4 * \Delta h)^{\frac{1}{2}}}$$

a = area of orifice (sq. ft.)

Δh = head differential from center of orifice to Hydraulic Grade Line of detention pond at maximum capacity, (ft.).

E. Bank Full Flood Requirements

The purpose of bankfull or channel protection criteria is to prevent habitat degradation and erosion in urban streams caused by an increased frequency of bankfull and sub-bankfull stormwater flows. Channel protection seeks to minimize downstream channel enlargement and incision that is a common consequence of urbanization. Typical design is not to exceed the pre-development rate and volume for all storms up to the 2-yr, 24-hr storm at the site. At a minimum, pre-development is the last land use prior to the planned new development or re-development. Waterbodies excluded to this channel protection performance standard are the following; The Great Lakes or connecting channels of the Great Lakes; Rouge River downstream of the Turning Basin; Saginaw River; Mona Lake and Muskegon Lake (Muskegon County); and Lake Macatawa and Spring Lake (Ottawa County) and engineered county drains. Contact the Saginaw County Public Works Commissioner's Engineer upon determination of bank full flood requirements when dealing with Saginaw County drains.

IV. DESIGN STANDARDS

A. Requirements

1. General Requirements

- a. Storm water detention requirements for any new construction development, redevelopment, or land use change occurring within Kochville Township will be determined according to this storm water management plan.
- b. For business and commercial site developments it is recommended that a licensed landscape architect be utilized early in the design process. The landscape architect should be knowledgeable in addressing

issues related to storm water quality and incorporate designs that would effectively utilize space. The guidelines of this storm water management plan regarding storage and discharge must still be met. The use of native or similar plants and innovated designs such as rain gardens, bio-detention areas or swales to address water quality should be used whenever possible.

- c. The peak runoff rate during a 10-year storm event from a developed or improved site shall not exceed the allowable discharge rate (Qa). This rate is determined as outlined in the design calculation section of this plan.
- d. There shall be no detrimental effect on the floodway or the floodplain elevation during a 10-year design storm upstream or downstream of the proposed development area as a result of the proposed development.
- e. Engineering calculations must be submitted with the storm water discharge permit application. The calculations shall follow the procedures outlined in this document and the additional supporting documents pertaining to calculation requirements.
- f. Roof drains should discharge onto landscaping or to rain gardens to promote infiltration for water quality reasons. It is preferable to have the water flow through vegetation such as a rain garden, bio-swale or bio-filtration before reaching a catch basin for discharge. Unrestricted runoff from roof drains directly to a public drain or private unrestricted drain will not be acceptable. There are no exemptions. However, if the site is very small and no landscaping is available and discharge over a sidewalk or paving could create a slip / fall hazard the roof drain may be connected to a storm sewer system if there is an appropriate Best Management Practice in place in the detention area to deal with water quality issues and the detention discharge flow is properly restricted.
- g. The Developer, Storm Water Management Plan Reviewer and/or Saginaw County Public Works Commissioner shall make a determination as to whether any or all of the facilities proposed are to become private or part of the Saginaw County drainage system, Saginaw County Road Commission drainage system, or the Michigan Department of Transportation drainage system.
- h. The Storm Water Management Plan Reviewer shall in the case of a proposed subdivision, make a determination as to those control elevations that shall be entered on the final plat or make a determination as to the necessity for deed restrictions on any particular lot in said subdivision requiring the preservation of mandatory drainage facilities. Where a non-subdivided parcel of land is proposed for development, the Storm Water Management Plan Reviewer and/or the Saginaw County Public Works Commissioner shall make a determination as to the need for covenants to maintain responsibility for mandatory drainage facilities. All the said facilities shall be located in easements dedicated to the public, and shall be subject to continual inspection during the construction period.
- i. Proposed storm sewer enclosures must be designed so they will not adversely impact any adjacent properties, upstream or downstream, and must be designed to the impervious factors of the lands based upon zoning, not necessarily existing conditions.
- j. Soil erosion and sedimentation control measures, including Best Management Practices (BMPs), must be implemented and properly maintained per Part 91 of Public Act 451 of 1994 (NREPA).
- k. The owners of the property shall be advised to annually clean out the sumps of all catch basins or manholes and routinely check restricted outlets for obstructions (see example maintenance plans in Appendix E)
- l. It is recommended that BMPs addressing water quality for stormwater be instituted on all storm sewer systems, see Appendix E for examples. Additional examples can be found in the following:
 - i. Upper Saginaw Watershed Management Plan or Lower Tittabawassee Watershed Management Plan available at www.saswa.org
 - ii. MDEQ's "Guidebook of Best Management Practices for Michigan Watersheds", available from regional DEQ office in Bay City.
 - iii. Office of Management and Budget, State of Michigan

- iv. Michigan Department of Transportation
- m. The use of infiltration BMPs to not exacerbate existing conditions will not be implemented to meet the water quality treatment and channel protection standards for new development or redevelopment projects in areas of soil or groundwater contamination. Coordination with the MDEQ staff will be done when deemed necessary.
- n. Best Management Practices will be implemented to address the associated pollutants in potential hot spots as part of meeting the water quality treatment and channel protection standards for new development or redevelopment projects. These hot spots include areas with the potential for significant pollutant loading such as gas stations, commercial vehicle maintenance and repair, auto recyclers, recycling centers, and scrap yards, whether existing currently or throughout the duration of the five year permit. Hot spots also include areas with the potential for contaminating public water supply intakes.

2. Storm Sewer Piping Requirements

- a. Proposed storm sewer shall be designed to convey the 10-year design storm runoff rate (Qd). Please refer to the Design Calculations section of this document along with the additional supporting documents pertaining to calculation requirements.
- b. Class III or IV concrete pipe, or other suitable material approved by the Saginaw County Public Works Commissioner or the Saginaw County Road Commission, must be used for the following:
 - i. Storm sewers within county and state right-of-way
- c. Provide 2' minimum cover, with minimum 5' cover in M.D.O.T. R.O.W.
- d. Provide 18" vertical separation between all other utilities, including sanitary sewers and water mains. Provide 10' horizontal separation from other utilities. Any deviations from these vertical and horizontal separations must be discussed with and approved by the Storm Water Management Plan Reviewer.
- e. A minimum of 4 inches of sand bedding is required beneath the pipe and a minimum of 6 inches of sand backfill is required above the pipe.
- f. Manhole/catch basin shall be placed at a maximum distance of 300' from any other manhole/catch basin for access/maintenance purposes.
- g. Provide a sump discharge outlet for each individual property/lot in all developments. Sump leads can be connected to rear lot drainage systems. However only foundation water can be discharged from these systems. Sumps cannot discharge domestic or industrial waste waters (e.g. washing machines, dirty water, cleaning water or any water containing any type of pollutant)
- h. Place a catch basin (minimum 3' diameter) between each pair of driveways, if curb and gutter, driveway culverts, and/or valley shaped ditches are not proposed.
- i. When appropriate the catch basins should have leads strategically placed.
- j. Minimum pipe grades must be such to produce minimum scouring velocity of 2.5 ft./sec when pipe is flowing full without surcharging.
- k. Concrete pipe (C-76-III, IV) shall have fabric wrapped joints.
- l. For private storm sewer systems, plastic pipe may be used. This plastic pipe shall be either smooth walled HDPE or SDR 35 PVC Pipe. If pipe is perforated, a manufacturer's sock shall be used over the pipe.
- m. Minimum pipe diameter for catch basin leads is 10". The material should be PVC.
- n. Minimum pipe size for storm sewer main is 12" in systems that are publicly owned.
- o. When two or more pipes of different sizes come into a structure, the 8/10th flow lines shall match when possible.
- p. Catch basins should have a minimum sump depth of 24 inches.
- q. Inlets may be allowed if approved by the Storm Water Management Plan Reviewer and adequate sediment trapping measures are provided.

- r. Catch basin inlets must be permanently marked with “Dump No Waste” , “Drains to River” for outfall destination or cast in the metal of the inlet (e.g. EJIW 4000 series curb inlets), and is required through watershed planning process.
- s. Condominiums / Subdivisions / Apartment Complexes should have signage at the site’s best management practices informing residents that the storm water system drains to the Saginaw River or designated drain, and these implemented BMPs are improving the storm water quality for the watershed.

3. Detention and Retention Requirements

- a. Residential developments will need to provide a separate lot or parcel for detention or retention. In addition the following requirements will apply:
 - i. This area cannot be dedicated through an easement that covers more than one parcel.
 - ii. This individual lot or parcel must abut a public road with a twenty (20') minimum width and should be near the outlet.
 - iii. Maintenance easements should be shown on the plans (see section D).
 - iv. The outer limits shall be delineated on the Exhibit B drawings of a Condominium Development and Final Plat.
 - v. Setbacks will be such that the minimum distance to adjacent lots side property line is 10 feet.
 - 1. Condominium Developments - Detention or Retention areas shall be designated as general common areas.
 - 2. Platted Developments - Detention or Retention areas shall be designated as a storm water detention/retention area or recreation area when approved by the Storm Water Management Plan Reviewer. (See State Requirements)
- b. Requirements for all Detention / Retention Areas
 - i. Proposed storm water detention or retention facilities shall be designed to detain/retain the 10-year design storm runoff volume from the entire contributing area in excess of the allowable discharge from the site (See the Design Calculations Section along with additional supporting documents pertaining to design calculation requirements).
 - ii. The maximum design storage elevation in a detention area must be a minimum of one (1) foot below the lowest ground elevation adjacent to the detention/retention area.
 - iii. The design maximum storage elevation in a detention area must not exceed a depth of nine (9) inches above any paved surfaced in non-residential developments. In residential developments the maximum ponding elevation in the detention pond shall not exceed the lowest rim elevation in the development.
 - iv. Parking Lots - the design maximum storage elevation in a detention area must not exceed a depth of nine (9) inches above any paved surfaced in non-residential developments. If parking lot storage is to be used then commercial silt sacks must be placed in the catch basins and maintained by the property/business owner. For example, Ultra Drain Guard by Ultra Tech or similar product.
 - v. In residential developments the maximum ponding elevation in the detention/retention pond shall not exceed the lowest rim elevation in the development. The only exception to this would be rear lot rim elevations.
 - vi. The design maximum storage elevation in a detention or retention area must not be closer than one (1) foot below the lowest opening, window, or door of the proposed structure(s) or existing facilities.

- vii. An emergency overflow shall be provided at the detention/retention basin ensuring the maximum ponding elevation does not exceed the depths outlined in items iii and iv above. This overflow shall be able to allow drainage from the site in the event the 10-year storm is exceeded or the restricted outlet is obstructed. This overflow should be to a public street. If no acceptable emergency overflow exists for a site, the site may be required to store the volume of a 100-year storm or more.
- viii. Designs of detention/retention facilities shall incorporate safety features, particularly at inlets, outlet structures, and at any attractive nuisances. These features may include, but not be limited to, fencing, handrails, lighting, steps, grills, signs. On steep slopes, (e.g., 3H: 1V or steeper), landscaping and other protective or warning devices to restrict access may be required by the Township. These items will be discussed and approved by the Township.
- ix. Side slopes and the bottom of detention/retention basins shall have topsoil to a minimum of 3 inches, and seeded.
 - x. The side slopes and bottom of the basins shall be shaped with maximum slopes of 1 vertical to 3 horizontal to allow mowing of these surfaces. If side slopes are steeper than 3H:1V, other design and landscaping features may be needed to provide for protection of the public (e.g. fences, hedgerows, etc.).
 - xi. Detention/retention basins with bottom slopes less than 1% shall be underdrained. If a detention basin is designed to be a “dry” basin, the owner must make corrections if it is not draining properly.
 - xii. Typical setbacks for detention areas must meet the required setback requirements for the zoning district where the development is located.
 - xiii. Detention/retention basins shall be constructed with the top of banks a minimum of 5 feet from any pedestrian walkway (i.e. public and private sidewalks/ bike paths).
 - xiv. If a detention/retention basin is proposed in a front yard area it must be designed to be aesthetically compatible with the development. (i.e. mild slopes, rain garden etc.).
 - xv. Incorporate BMPs that address water quality issues, such as forebays, grass swales, vegetated strips, rain gardens, bio-filtration, etc.
 - xvi. Maintenance Requirements for Detention/Retention Facilities (see Appendix E)
 - xvii. Detention/retention basins and restrictors will be maintained as necessary. If a detention/retention basin is found not to be maintained, or a restrictor is removed or not maintained, the owner will have 30 days to complete the necessary maintenance. If this maintenance is not completed, the Township will take the necessary legal action to have the work completed.
- xviii. Condominium Projects - If the detention/retention facility areas are designated as general common element, the Master Deed will set up a mechanism by which the storm water facility will be maintained by the Condominium Association.
- xix. Platted Developments - An association for the subdivision will need to be established. The Saginaw County Public Works Commissioner will require an easement be established that will enable their office to repair any problems associated with the system and assess the charges back to the subdivision association members. This will only occur if the association does not properly maintain the detention/retention area.
- xx. Maintenance shall include: mowing of the basin bottom and side slopes, removal of excess spoils from the basin, removal of debris and sediment from the outlet, repair of fencing, spraying for plants, brush, and cattails, and any other maintenance necessary to ensure the basin remains functional and is aesthetically pleasing to surrounding landowners.

4. Rear Lot Drainage Requirements

- a. All lots within a condominium or platted development shall require rear lot drainage. Each lot shall be adjacent to a rear lot catch basin.
- b. Minimum rear lot tile drain sizes and slopes have been determined assuming ponding will occur in rear yards for a duration 4 times the duration of a given 10 year design storm event. This time may range from 4 to 24 hours depending on drainage conditions. The following minimum pipe sizes and slopes apply:
- c. Rear lot tile drains with contributing drainage areas up to 2 acres will have a minimum diameter of 6 inches and placed at a minimum slope of 0.5 %.
- d. Rear lot tile drains with contributing drainage areas greater than 2 and less than 3 acres shall have a minimum diameter of 8 inches and placed at a minimum slope of 0.4%
- e. Rear lot tile drains with contributing drainage areas greater than 3 and less than 4 acres shall have a minimum diameter of 10 inches and placed at a minimum slope of 0.32%.
- f. Rear lot tile drains with a contributing area greater than 4 acres shall be considered main line storm sewer and shall be designed according to corresponding storm sewer requirements (See the Design Calculations Section of these requirements along with additional supporting documents pertaining to design calculation requirements). Calculations shall be submitted to verify that rear lot drains have the capacity to pass the 10-year design storm event. Plastic pipe is acceptable for rear lot drainage systems draining more than 4 acres provided it is installed in landscaped/ lawn areas.
- g. Any rear lot basin must be directly connected to the development's storm sewer system. Storm sewer services cannot be connected to a branch of a rear drainage system.
- h. Connections at the rear yard basin and at the storm sewer shall be soil tight and or constructed using pre-manufactured seals, joints, etc. (i.e. Kor-n-Seal).
- i. The rear lot system's piping shall be SDR-35 PVC piping or a dual wall HDPE piping.
- j. Rear lot tile drains cannot connect to road underdrains.
- k. Sand backfill and bedding is not required for rear lot drainage systems provided dual wall pipe is used (i.e. N-12, H-1-Q, etc.) or SDR-35 PVC pipe.
- l. Rear lot drainage tiles shall have a minimum cover of 2'. A minimum of 4 inches of sand bedding is required beneath corrugated plastic pipe and a minimum of 6 inches of sand backfill is required above corrugated plastic pipe.
- m. Rear lot catch basins shall have a minimum diameter of 2 feet. Plastic pre-manufactured structures may be used for rear lot drainage systems. Concrete structures are required for storm sewer systems. The catch basins shall not be placed at spacing greater than 300 feet. Any bends, turns, or dead ends shall require a structure.
- n. If pipe is perforated, a manufacturer's "sock" shall be used over the pipe.
- o. A 10' wide easement shall be provided on every lot for all rear lot drainage systems. Said easements shall be written as to permit neighboring property and/or condominium owners to maintain the rear lot drainage system as it may affect their property. This is to assure a minimum of 20' of easement for maintenance purposes. NOTE: if no rear lot system exists on the property this easement should still be provided in case of future drainage problems.
- p. Existing rear lot drainage systems abutting a proposed development may be used for the new development provided
- q. The existing rear lot drainage system has the capacity to convey storm water runoff from the proposed rear lot drainage areas.
- r. A signed agreement is obtained from property owners located within the existing subdivision allowing the proposed subdivision's rear lot storm water runoff to pass through their existing system.

- s. Phased developments owned by the same proprietor may utilize proposed rear lot drainage for a current development phase on future phases of the development provided.
- t. Covenants shall be recorded into the deeds of the property owners affected in the current phase allowing for future phases of the development to drain into the current phase's rear lot drainage system.
- u. If covenants are not made as outlined above, future phases will require separate rear lot drainage systems or agreements from the current land owners allowing for the use of their rear lot drainage system
- v. The rear lot drainage system shall be designed to convey rear lot drainage from both the existing and proposed rear lot drainage areas.
- w. Easements shall be provided, allowing for maintenance by both abutting landowners in current and proposed phases of development.
- x. Rear lot drainage shall be shown on the preliminary plat (subdivisions) or site plan (condominiums).
- y. All rear lot drains will connect to an approved storm water drainage system.
- z. Rear lot drainage systems in platted developments are the responsibility of the homeowners and the homeowner's association. An easement is present to provide for maintenance work on rear lot drainage systems. The property must be returned to its pre-maintenance conditions after repairs or maintenance has been performed. The homeowners association should develop a preventive maintenance plan for the rear lot system to assure proper (see Appendix F for a sample) function of the system. If necessary, the homeowner may repair the rear lot system on their own if they so desire. However, the area worked on must be returned to the condition it was in prior to the repair.
- aa. Rear Lot layout examples can be found in Appendix F.

B. General Compliance Guidelines

The following guidelines are recommended, but are not a requirement of this plan. These guidelines are provided for reference.

The minimum surface slopes for overland drainage are as follows:

- a. For bituminous paved surfaces, 1.0 %
- b. For concrete paved surfaces, 0.5 %
- c. For concrete curb and gutter, 0.32 %
- d. For drainage swales and valley shaped ditches, 0.50 %
- e. For rear lot drainage swales and valley shaped ditches, 0.50 %
- f. Landscape grading, 2.0 %

The maximum surface slopes for overland drainage are as follows:

- a. For bituminous, concrete paved surfaces, 5.0 %
- b. For concrete curb and gutter, 5.0 %
- c. For drainage swales and valley shaped ditches, 5.0 %
- d. For rear lot drainage swales and valley shaped ditches, 5.0 %
- e. Drainage swales and valley shaped ditches shall have maximum side slopes of 3 horizontal to 1 vertical
- f. Landscape grading, 4 horizontal to 1 vertical

C. Variances from Requirements

The Township may issue a storm water discharge permit that waives allowable discharge requirements and or detention/retention requirements. Variation from these requirements shall be made by filing an appeal

with the Township Zoning Administrator. The disposition of the variance will be reviewed and acted upon by the Planning Commission whose actions shall be conditioned upon the following:

1. A petition shall be submitted describing in detail the rationale for the proposed design changes including hydraulic and/or hydrologic computations.
2. Special circumstances or conditions exist which will affect the property under consideration such that strict compliance with the provisions of the storm water discharge permit would deprive the applicant of the reasonable use of their land.
3. A variance is necessary for the preservation and enjoyment of a substantial property right of the proprietor.
4. Granting of the variance will not be detrimental to the public health, safety or welfare, or injurious to other property in the territory in which said property is located.
5. An affirmative recommendation must be received from the Storm Water Management Plan Reviewer supporting such variance

D. Easements

1. Wording relative to easement information will be as specifically required by the Saginaw County Public Works Commissioner's office. If a county drain is to be established under the Michigan Drain Code, related easement language will be depicted on final Mylar plats and condominium exhibit B drawings as follows:
“ _____foot wide private easement to Saginaw County Public Works Commissioner and the _____ Homeowner's (or Condominium) Association for drainage.”
2. The typical easement language will be included in the subdivision deed restrictions or condominium master deed.
3. The location and purpose of drainage easements should be clearly described in subdivision deed restrictions or condominium master deeds.
4. Language will be included within the subdivision deed restriction or condominium master deed that clearly notifies property owners of the presence of storm water management facilities and accompanying easements, as well as restrictions on use or modification of these areas.
5. If a utility is to be located within the right-of-way of any county drain or drainage easement, it will be located such that it will not increase the expense of maintaining the drainage facility.
6. Retention/detention basins or other storm water management facilities will have sufficient easements for maintenance purposes. Easements will be sized and located to accommodate access and operation of equipment, spoils deposition, and other activities identified in the development's storm water system maintenance plan.
7. Easement widths will be determined by the Saginaw County Public Works Commissioner and be situated in such a way as to allow maximum maintenance access, for example, offsetting them from the centerline. In general, easement widths will conform to the following:
 - a. Open channels and watercourses: A minimum of 50 feet total width. Additional width may be required in some cases, including, but not limited to the following: watercourses with

floodplains delineated by FEMA; sandy soils, steep slopes, at access points from road crossings.

- b. Open swales (cross lot drainage): A minimum of 30 feet total width.
 - c. Enclosed storm drains: A minimum of 20 feet will be required (10 feet each side of centerline), 30 feet preferred (15 feet each side of centerline), situated in such a way as to allow maximum maintenance access. Additional width will be required in some cases. These may include, but are not limited to, pipe depths exceeding 4 feet from the top of pipe, sandy soils, and steep slopes.
 - d. Drain fields (septic areas) shall not be located within drainage easements.
8. Open channels and watercourses: A minimum of 50 feet total width. Additional width may be required in some cases, including, but not limited to: watercourses with floodplains delineated by FEMA; sandy soils, steep slopes, at access points from road crossings.
 9. Open swales (cross lot drainage): Minimum of 30 feet total width.
 10. Enclosed storm drains: A minimum of 20 feet will be required (10 feet each side of centerline), 30 feet preferred (15 feet each side of centerline), situated in such a way as to allow maximum maintenance access. Additional width will be required in some cases. These may include, but are not limited to, pipe depths exceeding 4 feet from the top of pipe, sandy soils, and steep slopes.
 11. Drain fields (septic areas) shall not be located within drainage easements.

E. Storm Water Management System Maintenance Plans for Subdivisions and Condominiums

1. Maintenance plans will be submitted with all construction plans and included in the subdivision agreement or master deed documents of all businesses, subdivisions and site condominiums. These plans shall include the following information:
 - a. An annual maintenance budget itemized by task. The financing mechanism shall also be described.
 - b. A copy of the final approved drainage plan for the development that delineates the facilities and all easements, maintenance access, and buffer areas.
2. A listing of appropriate tasks defined for each component of the system described, and a schedule for their implementation. The following areas will be covered:
 - a. Maintenance of facilities such as pipes, channels, outflow control structures, infiltration devices, and other structures.
 - b. Long-term operation and maintenance of all structural and vegetative BMPs installed and implemented to meet the performance standards.
 - c. Debris removal from catch basins, channels, and basins.
 - d. Dredging operations for both channels and basins to remove sediment accumulation. Storm water system maintenance plans shall require that sediment be removed when sediment reaches a depth of equal to 50% of the depth of the forebay or 12 inches, whichever is less.
3. The party responsible for performing each of the various maintenance activities described which will be recorded with final approved plans and plats.
4. A detailed description of the procedure for both preventive and corrective maintenance activities. The preventative maintenance component will include:

- a. Periodic inspections, adjustments, and replacements.
 - b. Record-keeping of operations and expenditures
5. Provision for the routine and non-routine inspection of all components within the system described:
 - a. We recommend scheduled wet weather inspections of structural elements and inspection for sediment accumulation in detention basins shall be conducted annually, with as-built plans in hand. These should be carried out by a professional engineer reporting to the responsible agency or owner.
 - b. Housekeeping inspections, such as checking for trash removal, should take place at least twice per year.
 - c. We recommend emergency inspections on an as-needed basis, upon identification of problems; a professional engineer should conduct these inspections.
 6. A description of ongoing landscape maintenance needs. Landscaping shall consist of low maintenance and/or native plant species. The proprietor will monitor the viability of plantings for at least two years after establishment and plantings will be replaced as needed. Subsequent monitoring shall be conducted by the landowner or development association. The Saginaw County Public Works Commissioner is not responsible for landscape maintenance.
 7. Provision for the maintenance of vegetative buffers by landowner, development associations, conservation groups, or public agencies. Buffers must be inspected annually for evidence of erosion or concentrated flows through or around the buffer.
 8. Property deed restrictions or condominium master deed documents will specify the time frame for action to address needed maintenance of storm water management facilities. These restrictions or documents will also specify that, should the private entity fail to act within this time frame, the responsible governmental entity may perform the needed maintenance and assess the costs against the property owners within the subdivision or condominium association, in accordance with Act 288 of the Public Acts of 1967.
 9. Routine maintenance of storm water management facilities will be completed per the schedule submitted with the construction plans or within 30 days of receipt of written modification by the responsible governmental entity that action is required, unless other acceptable arrangements are made with the supervising governmental entity.
 10. Emergency maintenance will be completed within 36 hours of written notification unless threat to public health, safety and welfare requires immediate action.
 11. The proprietor may fulfill the obligation to ensure that a governmental entity will be responsible for drainage system maintenance by establishing a county drainage district, or any other similar mechanism approved by the Public Works Commissioner, to provide for the permanent maintenance of storm water management facilities and necessary funding. Or, a Resolution of Intent may be completed to provide a mechanism for funding maintenance on the drainage system, see example in Appendix E.
 12. If a County Drain is not established, the proprietor will submit evidence of a legally binding agreement with another governmental agency responsible for maintenance oversight

13. A legally binding maintenance agreement will be executed before final project approval is granted. The agreement shall be included in the property deed restrictions or condominium master deed documents so that it is binding on all subsequent property owners.
14. A sample maintenance plan and annual budget is illustrated in Appendix E.

F. Evaluation of Cost-Effective Structural and Non-Structural Best Management Practices (BMPs)

1. To meet Kochville Township's NPDES Phase II regulatory requirements for storm water, the Township may request and the developer must supply the following:
 - a. Either preliminary or actual constructed cost of a best management practice.
 - b. Projected or actual maintenance costs of a best management practice.
 - c. A maintenance agreement from the developer, owner, or operator responsible for the long-term maintenance of structural and vegetative BMPs installed and implemented to meet the performance standards. Please see an example of a maintenance agreement in Appendix E.
 - d. Any other pertinent information deemed necessary to meet NPDES Phase II regulations.
2. If the requested information is not provided in a timely manner the final occupancy permit will be held until compliance is attained and the information received in the requested format.
3. The information requested will be in a concise formatted manner.

G. BMPs to Minimize Post Construction Impacts on Water Quality

1. Kochville Township requires that BMPs be utilized on all new or redevelopment sites improve storm water runoff quality in the post construction phase.
2. Kochville Township requires BMPs to be designed on a site-specific basis to reduce post-development total suspended solids loadings by 80 percent or achieve a discharge concentration of total suspended solids not to exceed 80 milligram per liter.
3. The BMPs used on a site must be reviewed and approved by the Township Engineer during the site plan review and approval process.
4. The site Designer, Engineer, or Architect must supply a list of BMPs being used on a site that will improve water quality of the runoff being discharged from a site for the review process.
5. The list of approved BMPs can be found in Appendix I of this document. The Saginaw Area Storm Water Authority at times will approve BMPs for addition to this Appendix and the Township will consider placing these approved BMPs in this plan after a review process.

APPENDIX A

Storm Drainage System within Kochville Township

APPENDIX B

- A. Kochville Township Permit Application and Checklist*
- B. SESC / NPDES Permit Procedure*
- C. Typical Daily Inspection Report Form*
- D. Storm Water Management Plan Reviewer Final Inspection Checklist*
- E. Engineer's Certification of Storm Sewer Construction Form*
- F. Request for Exemption*

KOCHVILLE TOWNSHIP STORM WATER DISCHARGE PERMIT APPLICATION

PROJECT NAME:	
Property Tax Identification #:	
Planning Commission Approval #:	
Date Applied:	
Expiration Date:	
NAME OF DEVELOPER/OWNER:	
ENGINEER/ARCHITECT:	
Contact Person:	Contact Person:
Address:	Address:
City, State Zip:	City, State Zip:
Telephone:	Telephone:
Email:	Email:
PROJECT LOCATION:	
Street Address:	
Name of Subdivision / Plat:	
Drainage District (if applicable):	
STORM WATER DESIGN INFORMATION (*Calculations must be submitted for verification. Calculations must have clearly labeled headings, clearly labeled formulas, and clearly labeled units.)	
Type of Development (<i>Commercial Site, Industrial Site, Residential Platted, Residential Condominium, or Other</i>):	
*AREA OF DEVELOPMENT (ACRES):	
*AREA OF CONTRIBUTING DRAINAGE DISTRICT (ACRES):	
*AREA OF EXISTING IMPERVIOUS SURFACES (ACRES):	
*AREA OF PROPOSED IMPERVIOUS SURFACES (ACRES):	
*DESIGN IMPERVIOUS FACTOR (IF):	
*ALLOWABLE DISCHARGE RATE (Qa) (cfs)	
*TOTAL VOLUME OF STORAGE REQUIRED (Vt in cubic feet)	
*TOTAL VOLUME OF STORAGE PROVIDED (cubic feet)	
STORM WATER DETENTION STORAGE ELEVATION (ft.)	
EMERGENCY OVERFLOW ELEVATION (ft.)	
LOWEST FINISHED FLOOR ELEV. or LOWEST GRADE ELEV. (ft.)	
*HEAD DIFFERENTIAL THROUGH RESTRICTOR (ft.)	
DIAMETER(s) OF PROPOSED RESTRICTOR(s) (inches)	
*ACTUAL RESTRICTED DISCHARGE (cfs)	
OUTLET DRAIN SIZE AND DESIGN FLOW CAPACITY (cfs)	
OUTLET DRAIN INVERT ELEVATION (ft.)	
Authorized Signature	Date

CHANGES TO PLANS AFTER APPROVAL:

1. Any changes made to the approved plan after issuance of the storm water permit shall require three sets of plans to be submitted to the Township for review and approval.
2. Upon receipt of this information, it will be determined if additional information, such as calculations, revised checklist, etc. will be required.
3. The fee for review of any changes to the plan after approval will be billed on an hourly basis. An occupancy permit will not be issued until all changes have been approved and the KOCHVILLE TOWNSHIP has received all review fees.

FEE SCHEDULE:

The fee schedule for reviewing storm drainage submittals not going through normal PLANNING REVIEW PROCESS and performing inspection of drainage system construction is outlined below:

Type of review	Fee	Collection of Fees
Small Developments and Redevelopment (0 to 3 Acres)	\$500	Fees added to Building Permit Fee
Large Developments and Redevelopments (3+ Acres)	Hourly, minimum fee of \$600	Fees added to Building Permit Fee
All Condominium, Apartment, and Platted Developments	Hourly, minimum fee of \$500 for rear lot only	\$500 deposit collected Prior to initiation of the review
Determination if redevelopment project is exempt from compliance.	\$100	Fees added to Building Permit Fee

These permit fees include:

- a) Pre-design meeting, if necessary
- b) Initial formal review
- c) Review of requested changes made during first review.
- d) First inspection of site upon completion.

An additional fee will be required for subsequent reviews beyond the first formal review and subsequent inspections beyond the first site inspection. The fee will be based on the actual hours needed to complete the subsequent reviews and inspection.

Condominium projects and Platted developments will receive a refund or be billed the difference between the deposit and the actual cost.

INSPECTION/LETTER OF CERTIFICATION REQUIREMENTS:

Refer to Section II.E of the Storm Water Management Plan and this permit for minimum inspection and Letter of Certification requirements.

PENALTIES/ENFORCEMENT:

The Kochville Township will not award any contracts for the installation of the water or sanitary sewer utilities until such time as the storm water management plan has been approved by the Kochville Storm Water Management Plan Reviewer.

APPEALS PROCESS:

If the developer is in disagreement with any of these reviews or inspections made by the Kochville Township and/or Kochville Storm Water Management Plan Reviewer, an appeal can be made with the Kochville Township Supervisor within thirty (30) days of the review and/or inspection.

The Owner/Developer must provide a Complete Storm Water Permit Submittal to Kochville Township for review by the Kochville Storm Water Management Plan Reviewer. This includes a completed permit application with calculations, three complete sets of the site drainage and grading plan, one copy of the calculations for allowable discharge and on-site storage requirements, as prepared by a Registered Professional Engineer or Architect, a signed operation and maintenance agreement, any other supporting information, and completion of the drainage checklist outlined below.

Complete the drainage checklist by checking each of the following items after you have verified they are clearly indicated on the plan:

- Total acres of site.
- Total acres of watershed draining through the site outlet.
- Drainage District and impervious factor. Drainage district lines, including sub district lines, contributing to individual storm sewers and rear lot drainage systems, showing all land to be drained through proposed drainage system, including rear lot drainage systems.
- Location of site, including dimension to nearest intersection, road, or section line.
- Existing and proposed ground elevations at maximum 50 foot centers, including shots on perimeter of site and 50 feet beyond or contour lines at one (1) foot intervals extending 50 feet beyond the site limits.
- Existing and proposed elevations at edge of pavement or buildings within 50 feet of site.
- Existing and proposed elevations of top of curb, gutter, ditch line, and centerline of road at maximum 50 feet intervals within 50 feet of site.
- Rim and invert elevations of existing catch basins, manholes, sewers, and culverts.
- Location of all existing and proposed utilities, water main, storm drains, sanitary sewer, and corresponding right-of-ways.
- Horizontal control of all storm water drainage facilities and building locations.
- Location of proposed lawn/landscape areas, paved areas, and building locations.
- Location, size, length, slope, and type of proposed storm sewer and rear lot drains.
- Rim and invert elevations(s) of proposed manholes and catch basins, including rear lot drainage.
- Location of on-site storage showing contour line for top of storage elevation.
- Provide sufficient dimensions, cross-sections, profiles, tie downs, and horizontal controls to determine the location and size of proposed storm sewers and detention/retention areas. This information will be used for verifying proposed detention/retention volume calculations in grassed and paved areas.
- Location and elevation of emergency overflow.
- Proposed grades for bituminous and concrete paving comply with storm water management plan.
- Storm sewer material, sizes, and minimum grades comply with storm water management plan.
- Rear lot drainages comply with storm water management plan.
- Location, size, and detail of proposed restrictor.
- Trench detail, manhole detail, catch basin detail, restrictor detail, curb detail, pavement detail, storm water detention basin detail, and top soil and seeding detail.
- Detailed hydrology and hydraulic calculations used for sizing storm sewer (can be submitted on separate form). Calculations must show there will be no adverse impacts upstream or downstream of proposed development.
- Calculations of maximum allowable discharge on-site storage, storage volume, and size of restrictor.

Beyond Kochville Township requirements, the Developer must submit applications for permits with all agencies that regulate storm water within the area of development. These may include Michigan Department of Transportation, Michigan department of Environmental Quality, Saginaw County Public Works Commissioner, Saginaw Road Commission, and others.

A general procedure for Soil Erosion and Sediment Control (SESC) and NPDES permits to discharge storm water from construction sites:

There have been changes in the permitting for construction sites for contractors, developers, municipalities, and other public agencies. These rules took effect at the date listed below; everyone must adhere to these changes and be aware of them.

EFFECTIVE DATE – MARCH 10, 2003

General procedure to follow:

Site has a soil disturbance of 1 to <5 acres:

Apply for Soil Erosion Sediment Control permit from either the County Enforcement Agency (CEA) or Municipal Enforcement Agency (MEA). The Saginaw County Public Works Commissioner is the County Enforcement Agency.

The following site offers a direct link to the Soil Erosion and Sedimentation Control Permit:

http://www.saginawcounty.com/Docs/publicworks/FillInForms/Permit_Application_SESC.pdf

The NPDES discharge permit for this site is covered by the "permit by rule"; no permit or application needs to be filled out for the state.

Note: If the client is an APA (Authorized Public Agency for soil erosion and sediment control) they still must follow the permit by rule, they do not need a SESC Permit as they have procedures approved by MDEQ. The rules are at the following site:

http://www.michigan.gov/documents/deq/wb-sw-Construction-Rules-1to5acres_264064_7.pdf

Site has a soil disturbance of 5 or more acres:

Apply for Soil Erosion Sediment Control permit from either the County Enforcement Agency (CEA) or Municipal Enforcement Agency (MEA) first.

Create an account on the MDEQ's MiWaters online database system and fill out the NPDES Notice of Coverage form for discharges from the construction site, submit the proper fee, and submit the form for the State's review.

Once the form is submitted and approved by the state, the site is covered.

Note: If the client is an APA (Authorized Public Agency for soil erosion and sediment control) they still must create a MiWaters account and fill out and submit the NPDES Notice of Coverage form to discharge storm water from a construction site; they do not need a SESC Permit as they have procedures approved by the MDEQ.

<https://miwaters.deq.state.mi.us/miwaters/#/external/home>

Once the project site is stabilized and has good vegetative cover, remember to fill out a project termination form on the MiWaters online database system; this can be found at the following:

<https://miwaters.deq.state.mi.us/miwaters/#/external/home>

Determine inspection responsibilities:

Make sure that SESC issues are an agenda item at the pre-bid meeting and at the pre-construction meeting. Do not just put a note on the plans that SESC is the contractor's responsibility; make sure they are fully aware of their site responsibilities. Remember that the owner of the project is ultimately the responsible party, the MDEQ or enforcing agency will be fining them.

DAILY INSPECTION REPORT FORM

PROJECT NAME:		WORK ORDER NO.:		
CONTRACTOR:		REPORT NO.:		
SUPERINTENDENT:		DATE:		
WEATHER (CLEAR, CLOUDY, RAIN, SNOW):		TEMPERATURE:	INSPECTOR:	
WORK FORCE ON SITE:	NUMBER:	TRADE:	NUMBER:	TRADE:
EQUIPMENT IN USE (Number and Type):				
WORK DONE (Location, Amount, and Type): (Be Specific)				
TYPE OF UTILITY INSTALLED (Water, Sewer, Pavement, size, Class, Description, Source):				
GROUND CONDITIONS ENCOUNTERED (Clay, Sand, Wet, Dry, Good Poor, or Other & Detail Further):				
BACKFILL INSTALLED:				
EXISTING UTILITIES ENCOUNTERED:				
RELOCATION OF PROPOSED UTILITIES AND REASON NECESSARY:				
MATERIAL DELIVERED TO SITE (Size, Class, Description, Source):				
VISITORS TO WORK SITE (Name, Affiliation):				
REMARKS:				

NOTE: Complete in ink each day. Use reverse side if necessary.

By: _____ Date: _____

**KOCHVILLE TOWNSHIP
DETENTION AND RESTRICTION
FINAL INSPECTION REPORT FORM**

Name of Site Development:	
Planning Commission Approval Number:	
Location:	
Type of Development:*	
Size of Restrictor:	
Type of Restrictor:**	
Location of Restrictor:	
Required Detention (ft ³):	
Type of Detention:***	
Location of Detention:	
Do As-builts Conform To Present Site Conditions?	
Inspection Comments:	
Date of Inspection:	
Inspector's Name and Affiliation:	

* - Residential, Commercial, Subdivision, Etc.

** - Orifice in Outlet Pipe, Metering Outlet Pipe, Square Orifice, Etc.

*** - Parking Lot Ponding, Detention Basin, Etc.

**KOCHVILLE TOWNSHIP
STORM WATER MANAGEMENT**

**Engineer's Certification of Storm Sewer Construction for
Platted Developments and Condominium Projects, or Large
Developments/Redevelopments (5 acres or greater)**

PROJECT NO.: _____
PROJECT NAME: _____
SITE ADDRESS: _____
CONTRACTOR NAME: _____
ADDRESS: _____
CITY: _____ STATE: _____ ZIP: _____
MICHIGAN LICENSE NO.: _____

I hereby certify that the storm sewer system installed has been inspected during construction and is in general conformance to the approved plans and specifications. In my professional opinion, this site's storm sewer system is in compliance with Kochville Township Storm Water Management Plan design guidelines.

Printed Name and Title	Date
Signature	Date
WITNESSES:	Date

STATE OF MICHIGAN)
) ss.
COUNTY OF _____)

Subscribed and sworn to before me on the _____ day of _____, 200__, by

Notary Public
_____ County, Michigan
My Commission Expires: _____

**REQUEST FOR EXEMPTION
KOCHVILLE TOWNSHIP
STORM WATER MANAGEMENT PLAN**

Development Name: _____

Development Location: _____

Total Area of Site: _____ Acre(s)

Existing Impervious Area: _____ Acre(s)

Proposed Impervious Area: _____ Acre(s) % Change in Impervious Area _____ %

Has this site had a previous exemption? Yes _____ No _____

Is any existing impervious area being removed? Yes _____ No _____

Is any existing storm sewer being removed? Yes _____ No _____

Is any existing detention storage area being disturbed? Yes _____ No _____

Developer:

Name: _____

Contact Person: _____

Telephone: _____

Fax: _____

Engineer:

Name: _____

Contact Person: _____

Telephone: _____

Fax: _____

Note: A site plan, including the existing site features, proposed site features, and a location map must be included with this request form.

APPENDIX C

- A. Saginaw County Land Development Advisory Committee Meetings*
- B. MDOT Individual Application and Permit for use of State Trunkline Right-of-Way Form*
- C. MDOT Storm Water Discharge Permit Application*
- D. MDEQ Joint Permit Application*
- E. Saginaw County Road Commission Permit Application*
- F. Saginaw County Soil Erosion and Sedimentation Control Permit Application*
- G. MDEQ NPDES Notice of Coverage and Notice of Termination*

SAGINAW COUNTY
LAND DEVELOPMENT ADVISORY COMMITTEE -
REQUEST FORM

http://saginawcounty.com/Docs/LDAC_Form.pdf

MDOT INDIVIDUAL APPLICATION AND PERMIT FOR USE OF STATE TRUNKLINE RIGHT-OF-WAY FORM #2205

<http://mdotcf.state.mi.us/public/webforms/public/2490.pdf>

MDOT STORM WATER DISCHARGE PERMIT APPLICATION

Contact Bay Region MDOT Office
55 E. Morley Dr., Saginaw, MI 48601

[Map](#)

Phone: 989-754-7443

FAX: 989-754-8122

MDEQ JOINT PERMIT APPLICATION

Click on



[MDEQ/USACE Joint Permit Application](#)

SAGINAW COUNTY ROAD COMMISSION PERMIT APPLICATION

Information regarding permits available at the following website:

<http://www.scrc-mi.org>

The Saginaw County Road Commission office is located as follows:

**Saginaw County Road Commission
3020 Sheridan Avenue
Saginaw, MI 48601**

(989) 752-6140

SAGINAW COUNTY
SOIL EROSION AND SEDIMENTATION
CONTROL PERMIT APPLICATION

http://www.saginawcounty.com/Docs/publicworks/FillInForms/Permit_Application_SESC.pdf

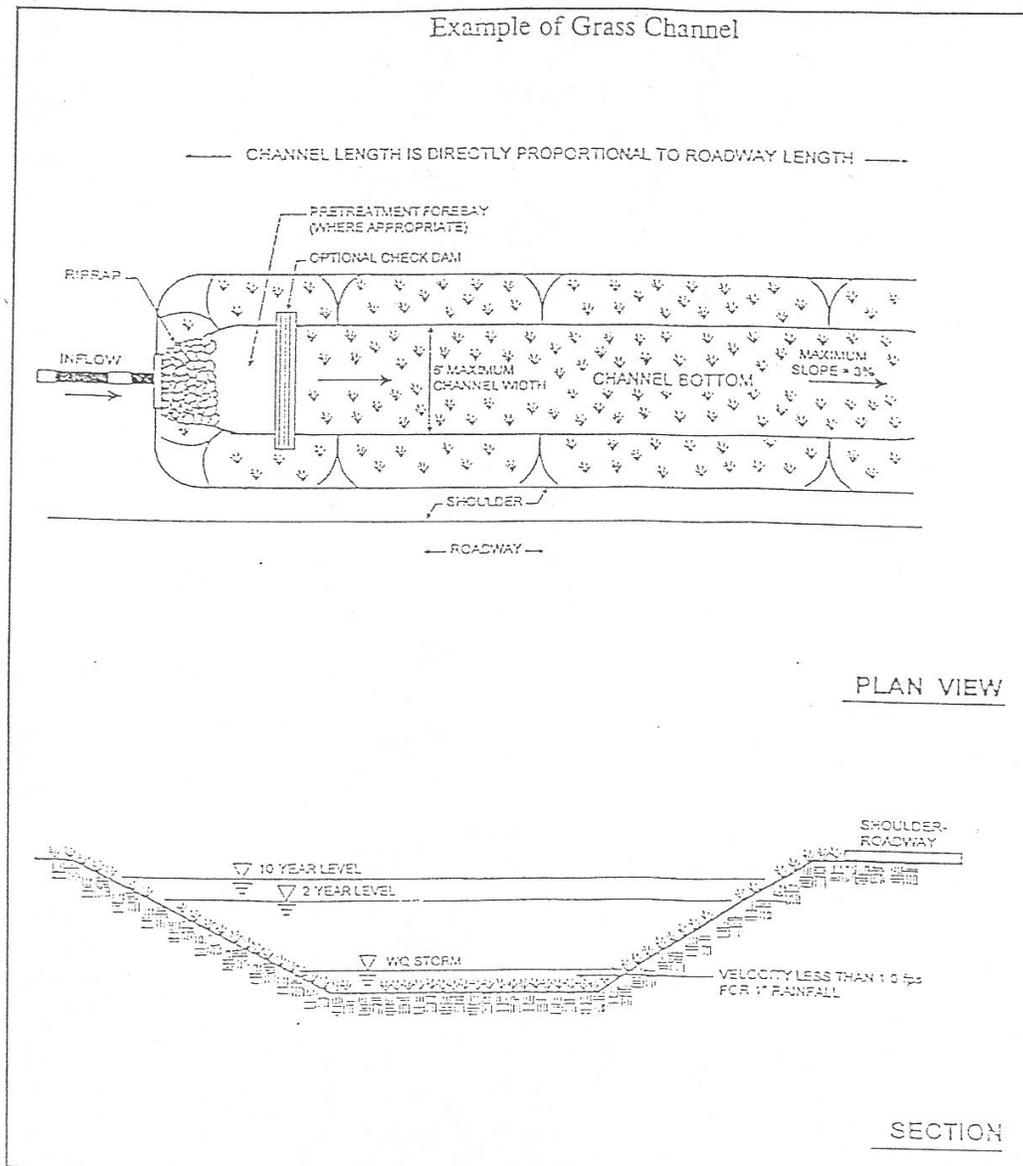
**MDEQ
NPDES NOTICE OF COVERAGE
AND
NOTICE OF TERMINATION**

<https://miwaters.deq.state.mi.us/miwaters/#/login>

APPENDIX D

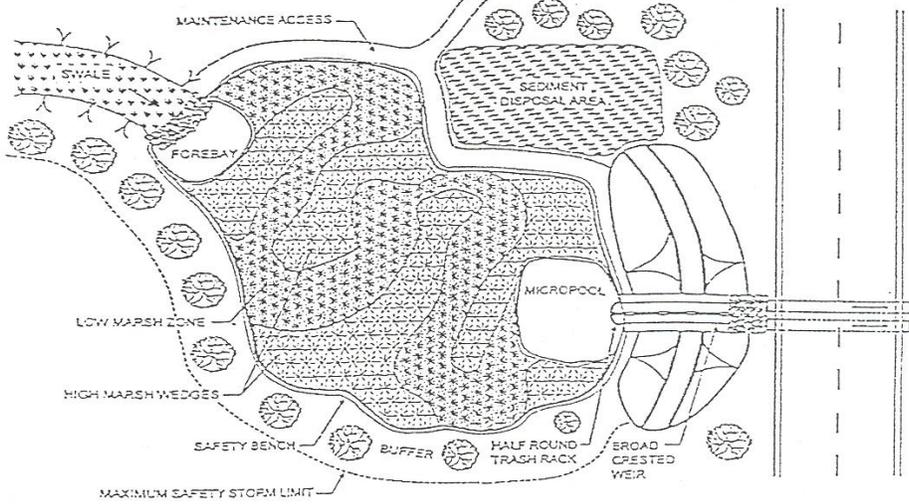
A. Design Examples

Example of Grass Channel

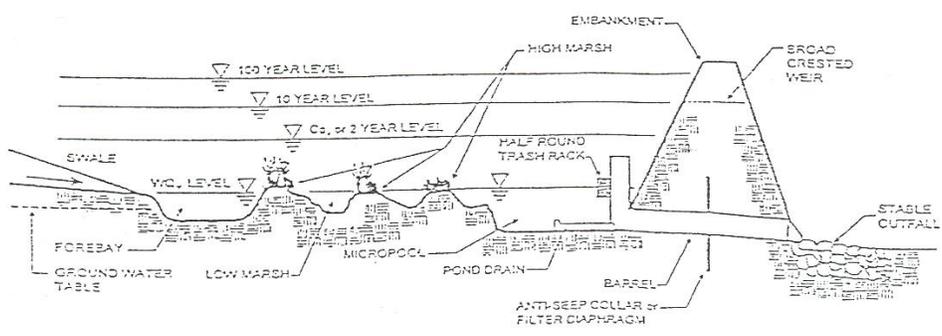


Source: State of Maryland, 1998

Example of "Pocket" Wetland



PLAN VIEW

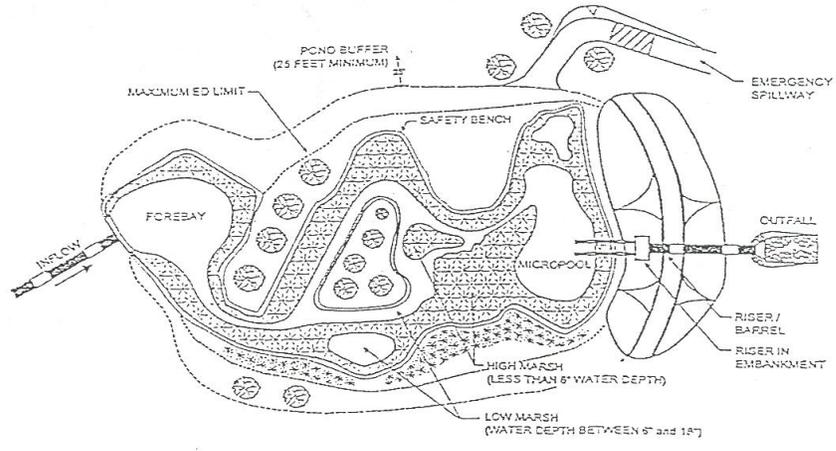


PROFILE

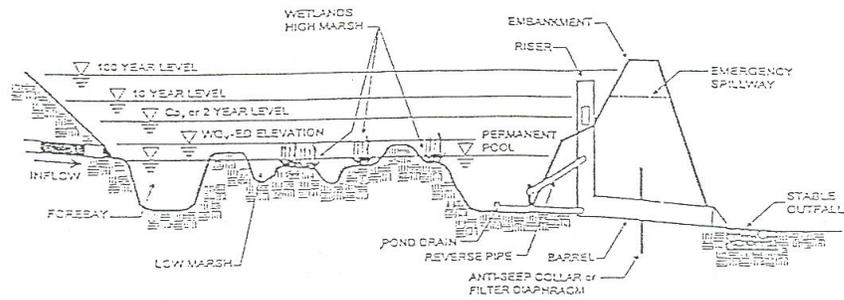
A high water table or groundwater interception helps maintain the shallow marsh pool in a pocket wetland.

Source: State of Maryland, 1998

Example of Extended Detention Shallow Wetland



PLAN VIEW

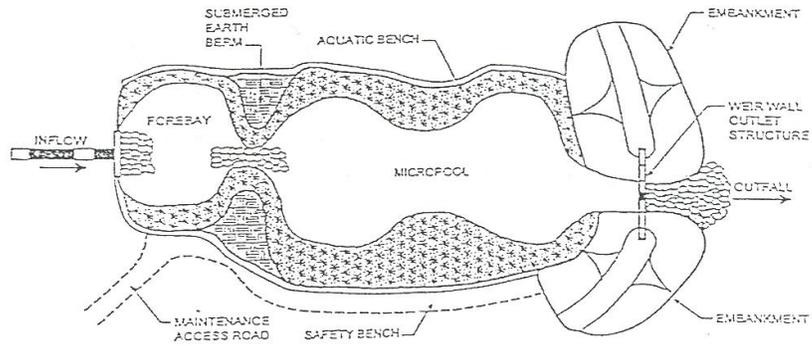


PROFILE

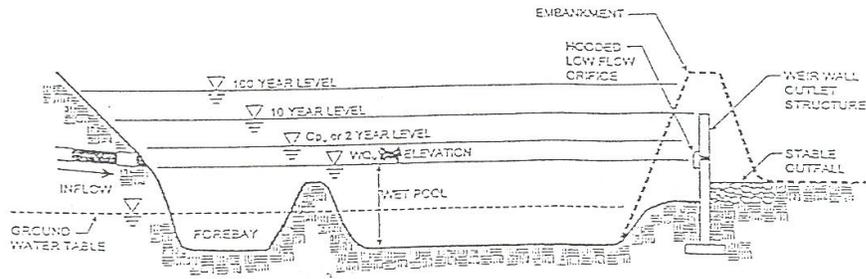
ED shallow wetlands provide water quality storage by a combination of shallow marsh pool and extended detention storage.

Source: State of Maryland, 1993

Example of "Pocket" Pond



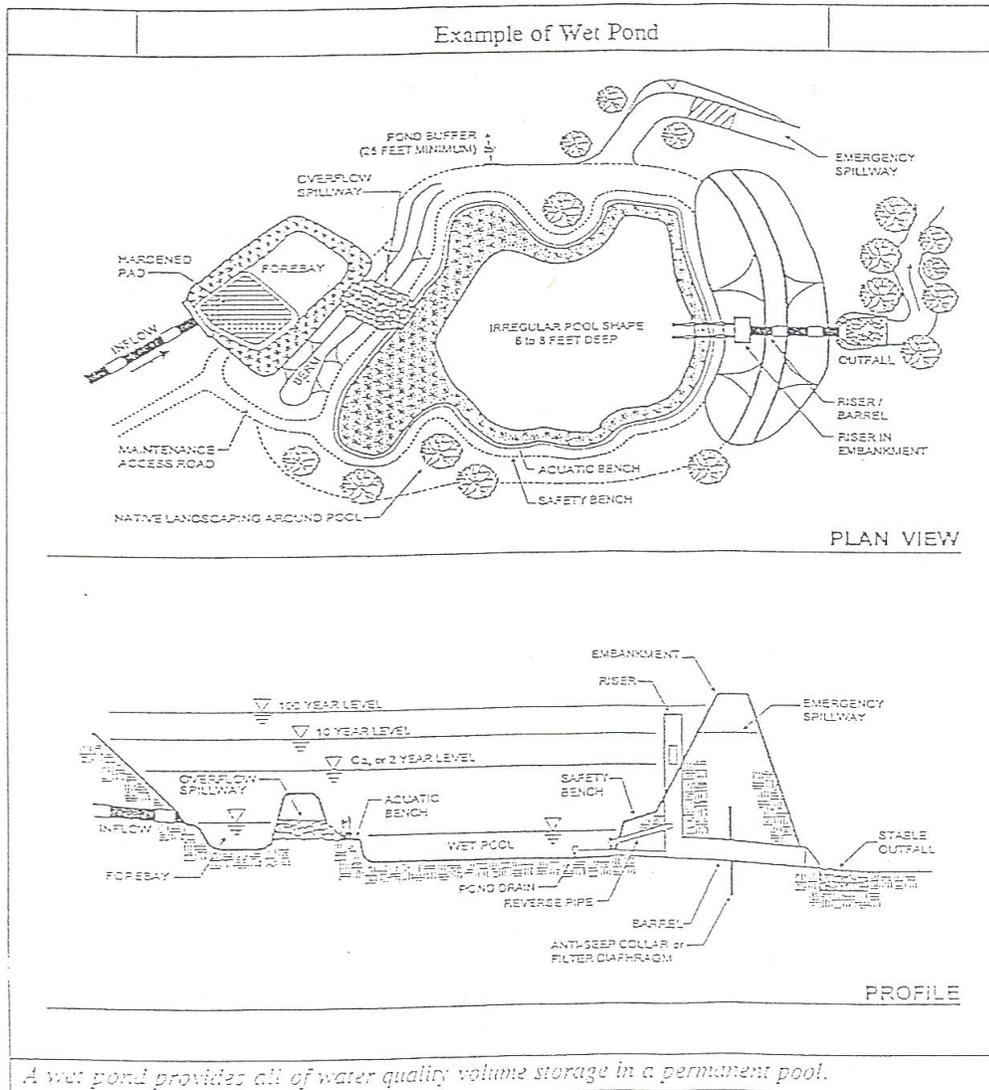
PLAN VIEW



PROFILE

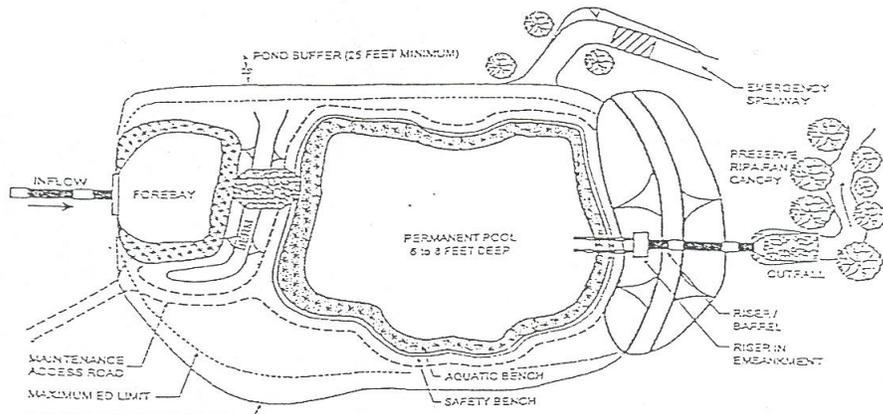
A high water table or groundwater interception maintains permanent pool level in a pocket pond. However, excavation to groundwater interception should be avoided where the land uses draining to the pond may contaminate drinking water supplies.

Source: State of Maryland, 1998

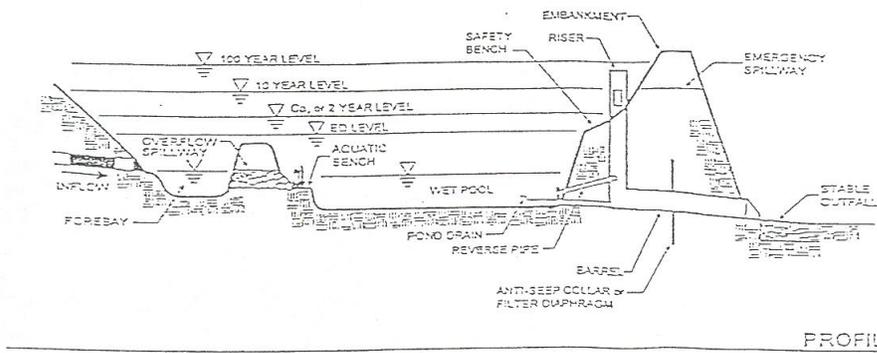


Source: State of Maryland, 1998

Example of Wet Extended Detention Pond



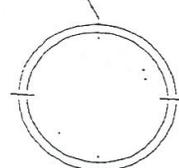
PLAN VIEW



PROFILE

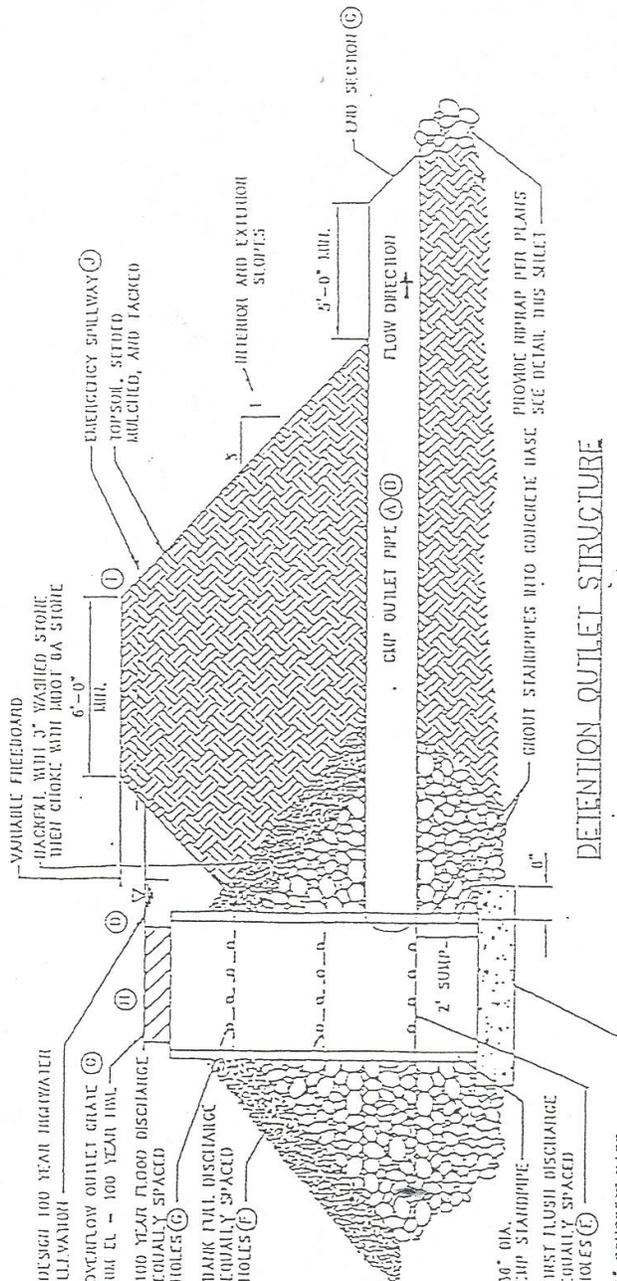
The wet ED pond provides water quality storage through a combination of permanent pool and extended detention storage.

Source: State of Maryland, 1996



PERFORATED PVC PIPE ATTACHED TO EXTERIOR OF
 CAP STAMPPIPE WITH GALVANIZED 1/2" BHEADED
 100 HOLES AND LOGIC WASHERS VERTICALLY
 SPACED EVERY 6" OF STAMPPIPE

100 HOLES TO BE
 CHECKED IN CAP STAMPPIPE AT
 ELEV. LISTED IN TABLE.



DETENTION OUTLET STRUCTURE

DETENTION OUTLET SCHEDULE									
OUTLET PIPE LENGTH (A)	OUTLET PIPE SLOPE (B)	END SECTION INVERT (C)	100-YEAR FLOOD INFL (D)	FIRST FLUSH DISCHARGE INV/ORIFICE SIZE (E)	100 YEAR FLOOD DISCHARGE INV/ORIFICE SIZE (F)	DIARK FULL DISCHARGE INV/ORIFICE SIZE (G)	TOP OF STAMP PIPE ELEVATION (H)	FIXED CREST ELEVATION (I)	EMERGENCY SPILLWAY ELEVATION (J)

APPENDIX E

A. Maintenance Plan and Budget

B. Maintenance Plan and Budget Sample

C. Maintenance Agreement

Maintenance Plan and Budget

Sample Maintenance Plan and Budget

“XYZ” Leasing Company

Storm Water Management System Maintenance Plan

I. Responsibility for Maintenance

- A. During construction, it is the developer’s responsibility to perform the maintenance.
- B. Following construction, it will be the responsibility of “XYZ” Leasing Company to perform the maintenance.
- C. The Master Deed will specify that routine maintenance of the storm water facilities must be completed within ___ days of receipt of written notification that action is required, unless other acceptable arrangements are made with the (Township of _____), (Saginaw County Public Works Commissioner) or successors. Emergency maintenance (i.e. when there is endangerment to public health, safety or welfare) shall be performed immediately upon receipt of written notice. Should “XYZ” Leasing Company fail to act within these time frames, the (Township), (County), or successors may perform the needed maintenance and assess the costs against “XYZ” Company.

II. Source of Funding

- A. “XYZ” Leasing Company is required to pay all maintenance activities on a continuing basis.

III. Maintenance Tasks and Schedule

- A. See the charts on the next two pages: The first describes maintenance tasks during construction to be performed by the developer. The second describes maintenance tasks to be performed by “XYZ” Leasing Company.
- B. Immediately following construction, the developer will have the storm water management system inspected by an engineer to verify grades of the detention and filtration areas and make recommendations for any necessary sediment removal

Maintenance Plan Budget (example)

Annual inspection for sediment accumulation	\$ 100.00
Removal of sediment accumulation every 2 years as needed	\$ 500.00
Inspect for floatables and debris annually and after major storms	\$ 100.00
Removal of floatables and debris annually and after major storms	\$ 150.00
Inspect system for erosion annually and after major storms	\$ 100.00
Re-establish permanent vegetation on eroded slopes as needed	\$ 350.00
Replacement of stone	\$ 100.00
Mowing 0-2 times per year	\$ 400.00
Inspect structural elements during wet weather and compare to as-built plans every 2 years	\$ 150.00
Make structural adjustments or replacements as determined by inspection as needed	\$ 400.00
Have professional engineer carry out emergency inspections upon identification of several problems	\$ 200.00
Budget	\$ 2,550.00

NOTE: Maintenance Plans and budgets vary widely due to the size and unique characteristics of each storm water management system proposed. The budget is intended for use as a starting point in the development of an appropriate maintenance plan specific to the size and components of each system.

APPENDIX F

Rear Lot Design Examples

APPENDIX G

A. Table I: Percent Impervious Table

TABLE I
PERCENT OF IMPERVIOUSNESS BASED ON FUTURE LAND USAGE

Zoned Land Usage Percent Imperviousness (IMP)*	Percent Imperviousness (IMP)*
Agricultural	10
Low Density Residential	20
Medium Density Residential	30
High Density Residential	40
Office	50
Neighborhood Business	50
Corridor Business	50
Area-Wide Business	50
Exclusive Business	50
Manufacturing	85
Floodplain	N/A
Open Space / Parks	10
Public	Dependent on use and area

* These percentages of Imperviousness are assumed minimum values. **The actual proposed and/or existing amount of impervious surface shall be used when designing the storm sewer system and detention volume.** The basis for determining the proposed and/or existing amount of impervious surface shall be submitted with calculations.

APPENDIX H

- A. Kochville Township Drainage District Base Map*
- B. Kochville Township Interim Zoning Map*

APPENDIX I

Best Management Practices – Rules and Regulations