Ottawa County

STANDARDS & SPECIFICATIONS

for

Drain Commissioner's

Approval

September 9, 2005
Amended Revision

A resolution acknowledging and recognizing the "Ottawa County Drain Commissioner's Standards & Specifications", the Development Drainage Standards" and the "Storm Water Control Policy" promulgated and published by the Ottawa County Drain Commissioner and to authorize the fee schedule set forth therein pursuant to the authority granted in the Subdivision Control Act of 1972 was adopted by the Ottawa County Board of Commissioners on May 14, 1996. The original Board of Supervisor's resolution adopting the Drain Commissioner's drainage rules was approved January 15, 1968.

Ottawa County Commissioners: Roger Rycenga, Chair, Donald Disselkoen, Vice-Chair, Joyce Kortman, Philip Kuyers, Dennis W. Swartout, Jane Ruiter, Robert Rinck, Gordon Schrotenboer, Edward Berghorst, James Holtrop and Cornelius Vander Kam.

PURPOSE AND INTRODUCTION

All plats recorded with the Register of Deeds must be in conformity with the Michigan Land Division Act, Public Act 591 of 1996. Under this Act, the Drain Commissioner is responsible for reviewing the drainage or storm water management system of a development. The following standards and specifications are designed for these purposes.

The Drain Commissioner of Ottawa County, through Public Act 40 of the Public Acts of 1956, as amended, MSA 11.1001 et seq.; MCLA 280.1 et seq. known as the Drain Code of 1956, has acquired jurisdiction over established county drains and under the terms of Michigan Land Division Act acquires jurisdiction of drainage systems within subdivided lands and drains external to the proposed subdivision after January 1, 1968. In accordance with the provisions of the Michigan Land Division Act, Public Act 591 of 1996, the Drain Commissioner has the authority to ensure that established drains and natural watercourses, both inside and outside of the plat, be improved or protected to the standards established by the Drain Commissioner. Primary drainage systems within subdivided lands under the jurisdiction of the Drain Commissioner are public systems.

The Ottawa County Drain Commissioner in the review of the following will also apply the general standards set forth herein:

Site Condominium plans prepared under the Condominium Act, Public Act 59 of 1978, as amended, when requested by local government.

Mobile Home Park plans prepared under the Mobile Home Commission Act (Public Act 96 of 1987.)

A Drain Use Permit will be required for activity within a county drain including but not limited to crossings, connections, cleanouts, enclosures and relocations.

Review of storm water system plans in other classes of development or redevelopment, when requested by local governments.

These rules provide minimum standards for proprietors to comply with, and in no way limit the authority of the local municipality in which the development is situated to adopt and enforce higher standards as a condition of approval of the development. If the local municipality has adopted more stringent standards, the Drain Commissioner's Office will review plans in accordance with those standards.

The Drain Commissioner's Office reviews plats and site condominiums using Development Review Procedures. Drainage systems within Plats and Site Condominiums, which are reviewed and approved by the Drain Commissioner, will be established public systems under the jurisdiction of the Drain Commissioner.

DEVELOPMENT REVIEW PROCEDURES

Preliminary Plan Review (Plats & Site Condominiums)

In order for plats/site condominiums to be prepared in conformity with the Michigan Land Division Act, the proprietor shall have prepared a preliminary plan showing the layout of the area intended for development. This plan shall be prepared under the direction of a professional engineer or a professional land surveyor, and shall be drawn to a scale not smaller than 1"=100'. Existing and proposed contour information should be shown on the plan, unless otherwise permitted, shall be a 2' topographical survey.

The preliminary plan must give the location of the proposed plat/site condominium with reference to the section and part of section in which the parcel is situated and the name of the local municipality (township, city or village). The plan shall show the proposed street and alley layout, lot and development dimensions, sizes and locations of upstream and downstream culverts serving the major drainage routes flowing into and out of the development and all pertinent factors such as adjoining roads and subdivisions, railroads, high tension power lines or underground transmission lines, cemeteries, parks, sanitary sewers, floodplain areas, wetlands, natural water courses, established drains, easements, or any other feature, the existence, location, or description of which might be of value in determining overall drainage requirements for the plat/site condominium.

In the case where the proprietor wishes to subdivide a given area but wishes to begin with only a portion of the total area, included with the preliminary plan shall be a proposed general plan for the entire area. Clearly superimpose the first subdivided phase upon the storm water management plan in order to illustrate the method of development, which the proprietor intends to follow. Each subsequent plan shall follow the same procedure until the entire area controlled by the proprietor is subdivided. The final acceptance of a plat/site condominium, which is a partial development of a larger general layout, does not automatically ensure the final acceptance of the overall layout. A Storm Water Master Plan of the overall development is strongly encouraged by this office.

Submit two prints of the preliminary plan prepared in accordance with the above standards, completed application and preliminary plan review fee to the Drain Commissioner's Office. Plans received without fees will not be reviewed. A copy of the site report furnished by the Ottawa County Environmental Health Department may be required.

After the Drain Commissioner's Office receives a complete submittal, we will forward a copy of the submittal to one of our reviewing engineers. The reviewing engineer has 30 days from the date the Drain Commissioner's Office receives the original submittal to review and comment in writing to the Drain Commissioner's Office. The reviewing engineer will send copies of their comments to the proprietor and their agent. We expect the proprietor or their agent to address these written comments with the reviewing engineer or the Drain Commissioner's Office. Once the reviewing engineer recommends approval and the Drain Commissioner's Office has been satisfied the Drain Commissioner shall issue a letter of preliminary approval.

If the proprietor finds it advantageous to make changes to the preliminary plan, they should submit the new plan for approval even though the Drain Commissioner may have already approved the original plan. Note changes on the cover letter and detail on the plan. If the proprietor does not present the construction plan to the Drain Commissioner for approval within a period of one year after receiving approval of the preliminary plan, revival of the project will require resubmitting the preliminary plan for review by the Commissioner.

Fees

Administrative Fee _____ $200.00

Review Fee _____ $10.00 per lot (min. of $200.00)

Deposit fees outlined above with the office of the Ottawa County Drain Commissioner prior to review and approval of the drainage layout in the site plan.

Fees fund the review of plans by the Drain Commissioner's engineer. If the expense to review the proposed development exceeds the amount of fees collected, the Commissioner will charge additional fees.

Construction Plan Review (Plats & Site Condominiums)

Once the Drain Commissioner has approved the preliminary plan of the proposed plat/site condominium, the proprietor's engineer may proceed with the preparation of the drainage plans for the construction of the plat/site condominium. A professional engineer must prepare and seal all plans submitted to the Drain Commissioner for approval. Include in these plans plan, profile, cross-section, location of drainage facilities and structures, special details, and other such drainage information as may be necessary. All plans shall be referenced to the N.G.V.D. or any other accepted federal benchmark system. Submit two prints of construction plans showing drainage and calculations, completed application and construction plan review fees to the Drain Commissioner's Office. Plans received without fees will not be reviewed.

After the Drain Commissioner's Office receives a complete submittal, we will forward a copy of the submittal to one of our reviewing engineers. The reviewing engineer has 30 days from the date the Drain Commissioner's Office receives the original submittal to review and comment in writing to the Drain Commissioner's Office. The reviewing engineer will review the drainage of the lots and the main storm line within the proposed development. The reviewing engineer will send copies of their comments to the proprietor and their agent. We expect the proprietor or their agent to address these written comments with the reviewing engineer or the Drain Commissioner's Office. Once the reviewing engineer recommends approval and the Drain Commissioner's Office has been satisfied, the Drain Commissioner shall issue a letter of construction approval.

Drainage plans, which the proprietor's engineer prepared, shall clearly show how the surface drainage will leave the streets in the proposed plat/site condominium. Show the main trunk line of the storm sewer on the plan in the centerline of the road right-of-way (OCRC Standard.) Where drainage easements are required, show the existing ground elevations with proposed swale, ditch or storm sewer profiles. In order to provide for the surface drainage of the proposed plat/site condominium it is often necessary to do work outside the limits of the plat/site condominium and/or acquire easements across private property. The proprietor's engineer will need to show how they will accomplish this. If the Drain Commissioner requires drainage easements beyond the limits of the plat/site condominium, the proprietor shall acquire these easements. In the event the proposed plat/site condominium is a partial development of a larger area, it will be necessary for each phase to be self sufficient from the standpoint of drainage, and for each phase to be compatible with the overall plan.

Where storm sewers are to be constructed, the proprietor's construction plans and profiles shall show the location and size of each storm sewer and drainage structure in the drainage system, together with elevations and proposed grades. The plan sheet shall clearly show which areas will be contributing storm water runoff to each inlet in the storm sewer system. The Proprietor's engineer shall show sufficient data

showing drainage originating outside the proposed development, which has thus far flowed onto or across the proposed development.

Bliss/Huizenga Intercounty, Drain #28, Hager Creek Watershed, Rush Creek, and Tulip Intercounty have separate policy statements, which apply to all developments. You will find these policy statements later in the Standards and Specifications of the Drain Commissioner's development review process.

When necessary for drainage purposes, install crossroad culverts and driveway approach culverts at locations shown on the plans or as designated by the engineer.

If the proprietor finds it advantageous to make changes to the construction plan, they should submit the new plan for approval even though the Drain Commissioner may have already approved the original plan. Note changes on the cover letter and detail on the plan. If the proprietor does not present the final plan to the Drain Commissioner for approval within a period of two years after receiving approval of the construction plan, revival of the project will require resubmitting the plan for review by the Commissioner.

Fees

Administration Fee_____$0.00 due w/ preliminary submittal

Review Fee

Open Storm Drain_____$0.25 per foot

Rear Yard Drainage Patterns w/ drainage easement_____$0.25 per foot

Enclosed Storm Drain_____$0.60 per foot

Detention/Retention Ponds (greatest distance across) _____$0.60 per foot

Deposit fees outlined above with the office of the Ottawa County Drain Commissioner prior to review and approval of the drainage layout in the site plan.

Fees fund the review of plans by the Drain Commissioner's engineer. If the expense to review the proposed development exceeds the amount of fees collected, the Commissioner will charge additional fees.

Final Plat Approval

Final plat Mylar of the number and type directed by the Michigan Department of Commerce must be prepared in accordance with the requirement of the Subdivision Control Act, which sets forth size, scale, material, and reproduction process. Deliver final plat submittal to the Drain Commissioner's Office for review at least 10 workdays prior to the Drain Commissioner signing the final plat. If the Drain Commissioner rejects the plat Mylar, the proprietor shall receive notice of such rejection and reason and the clerk of the related local municipality within 10 days.

The final plat submittal shall include a paper copy of the final plat, a digital copy of the final plat in CAD format to gisdept@co.ottawa.mi.us (you will find more detailed instructions in the appendices,) payment of all unpaid preliminary plan review fees, construction plan review fees and any extra fees incurred during the review process, as well as the remaining parts of this section.

Drainage District Agreement (433 Agreement)

In accordance with the Michigan Drain Code of 1956, the drainage system of the proposed plat/site condominium shall be contained within an established drainage district or districts.

Section 433 of Drain Code provides for the creation of new drains and drainage districts where none currently exist and enlargement of existing drains and drainage districts. A formal agreement is required between the proprietor and the Drain Commissioner on behalf of the drainage district. Owners of adjoining properties who will be included in the assessment district for maintenance of the drain must be parties to the agreement. The property of any adjoining landowner who refuses to sign cannot be included in the drainage district for assessment purposes. However, the proprietor must accommodate surface and subsurface runoff from the adjoining property in the storm water collection system and outlet. Use an "Agreement to Establish a County Drain and County Drainage District" (see appendices) to establish a drainage district per Sec. 280.433(5) of the Drain Code of 1956. Use an "Agreement for the Extension of a County Drain and County Drainage District" (see appendices) to add lands and/or storm drainage system to an existing 433-Drainage District Agreement. You must contact the office of the Drain Commissioner to determine which agreement will be necessary. The proprietor or proprietor's agent shall prepare the document and submit to the Drain Commissioner's Office for review and approval. The exhibits that must accompany the agreement are; drainage district drawing, drainage district boundary legal description, drain route & course drawing and drain route & course legal description. The route & course description shall consist of the entire route and course of the drain being established. This includes storm sewer pipes, detention/retention facilities, rear-yard drainage patterns, catch basins, catch basin leads and portions of footing drain leads downstream of the cleanout. When describing detention/retention pond you need to describe through the facility to the outlet, in some instances to the receiving watercourse, then go on to say shall also include the detention/retention pond as described as follows: *describe perimeter of pond*. When you describe catch basins and footing drain leads say to include all catch basins, catch basin leads and footing drain leads. After the agreement has been approved it shall be signed and submitted to the Drain Commissioner's Office along with a check (made payable to the Ottawa County Drain Commissioner's Office) for the appropriate recording fee (current OCRD fees are $14.00 for the 1st page, $3.00 each additional page). The Drain Commissioner's Office shall record the document after the plat has been recorded.

The landowner or developer who transfers a drainage system to the Drain Commissioner shall deposit 5% of the cost to construct the drain but not more than $2,500.00. The Drain Commissioner's Office will deposit the money in a drain maintenance fund, for use of future maintenance on that specific drain.

A plat or site condominium that adds land and/or storm drainage system to an existing 433-drainage district will need to maintain a $2,500.00 drainage district fund balance, prior to the plat or site condominium being approved.

IRS Reporting Requirements (GASB Statement 34)

Due to new governmental accounting standards, Ottawa County is now required to report the value of their drain infrastructure. This would include all drainage systems established by a Section 433 Drainage District Agreement. Submit the value of the drainage system accompanied by a cost break down (i.e. Contractor's Bid Proposal) with your final plat submittal.

Easements

The following minimum easement widths are standard for established county drains and natural watercourses and/or lay within the confines of the proposed plat/site condominium.

Open drains and watercourses shall have a minimum easement width equal to the extreme width of the drain, plus 30 feet. Center the easement on the centerline of the drain, watercourse, or have a minimum of 15' of space between top of bank and edge of easement.

Enclosed drains whose internal diameter is 8' or less shall have an easement of at least 20 feet centered on the centerline of the enclosure.

Enclosed drains whose internal diameter exceeds 8' shall have an easement of at least 25 feet centered on the centerline of the enclosure.

The above widths shall govern generally. However, if the engineer determines that additional easement is required for proper construction, or because of special circumstances, the reviewing engineer shall notify the proprietor or their agent.

An easement, not land ownership, is the approved method of providing access to and protection of public storm drainage facilities. No landowner shall transfer ownership to Ottawa County, the Drain Commission, the Drain Commissioner or an established Drainage District unless approved by the Drain Commissioner.

Grant all natural watercourses, drainage ditches, swales, enclosed storm drains, detention, retention facilities and county drains within the plat/site condominium as easements to the appropriate drainage district and must be shown on the final plan. Label all easements for drainage, detention, retention, or flooding, as applies. Example: Easement for Drainage Purposes to the Lowing Comstock Drain Drainage District.

Grant at least 15' open flat space around the basin above the 1% annual chance design high water level of a detention/retention basin, for access and maintenance of the basin. Provide Ingress and egress easement to maintain the basin. Grant a minimum of 15' open flat space between a public detention basin and an existing county drain to achieve equipment access and maintain both facilities.

Easements will be required downstream of a plat/site condominium when the receiving watercourse is not an established drain or lacks sufficient capacity or grade to be of ongoing service to the plat or site condominium without regular maintenance. Utilization of storm water management techniques does not eliminate this requirement. Easements will not be required through road right-of-way, however permission shall be received from the Ottawa County Road Commission to work their right-of-way. The Drain Commissioner may require downstream drain construction/maintenance prior to plat or site condominium approval.

You may enclose off-site drainage improvements located in future phases of a development in temporary/reversionary easement. Such easement may be released when developing of that land commences, superseded by the future plat documents.

If any utilities are to be located within a drainage easement, the proprietor's engineer shall present plans detailing such utilities to the Drain Commissioner for approval of location and depth. If utilities are to be located in the drain bottom they must be at least 3 feet below the design bottom, except directional boring shall be a minimum of 5 feet below design bottom, and the proprietor shall apply for and obtain a Drain Use Permit. Present such plans at the same time as drainage plans so we can review all details of construction and location.

Drain easements were validly recorded at the Drain Commissioner's Office prior to 1956. Therefore, it may be necessary to check the permanent records of the Drain Commissioner's office. The Drain Commissioner's Office utilizes Drainage District Easements, Private Easements for Drainage Purposes, Drainage Easements, Drainage Easements to the Drain Commissioner, or the Ottawa County Drain Commission within recorded plats/site condominiums for the purpose of accessing, maintaining and constructing open or enclosed drains. Any newly established easements must be in the name of the drainage district

You will find an easement form that is acceptable to the Drain Commissioner's Office in the Appendices. Submit easement documents along with proper exhibits to the Drain Commissioner's Office for review and approval. After the easement has been approved, submit the signed document to our office with a check, made payable to the Ottawa County Drain Commissioner's Office, for recording. Current recording fees are $\$14^{00}$ for the first page and $\$3^{00}$ each additional page. This office will record the document along with the proper drainage district agreement.

Restrictive Covenants

Provide Restrictive Covenants with the following:

Floor and Opening Elevation Restrictions

Provide lowest allowable floor elevations to restrict the placement of all floors to 1' or more above the high ground water elevation. Provide lowest allowable opening elevations to restrict the placement of all openings to 1' or more above the 1% annual chance (100-year) flood plain or Hydraulic Grade Line of the storm system. The proprietor's engineer shall provide both elevation restrictions to reduce the risk of structural damage and the flooding of residential interiors.

It is the responsibility of the proprietor to provide each lot a marker or monument with an N.G.V.D. elevation to use as a reference point for establishing lowest allowable floor and opening elevations.

The restrictive covenants shall state, "The lowest allowable floor elevations are set at 1' or more above the high ground water elevation. The lowest allowable opening elevations are set 1' or more above the 100-year floodplain or hydraulic gradeline of the storm system. These elevations are set to reduce the risk of structural damage and the flooding of residential interiors. A waiver from elevations may be granted by the Ottawa County Drain Commissioner following receipt of a certification from a registered professional engineer demonstrating that the proposed elevation does not pose a risk of flooding."

Easement for Surface Drainage

The restrictive covenants shall state, "Easements for Drainage are for the benefit of upland lots within the subdivision and any construction, development, or grading that occurs within these easements will interfere with the drainage rights of those upland lots. Easements for Drainage are for the continuous passage of surface drainage and each lot owner will be responsible for maintaining the surface drainage system across their property. The Ottawa County Drain Commissioner's Office does not permit structures in Drainage Easements. This includes, but is not limited to, swimming pools, sheds, garages, patios, decks, fences or other permanent structures or landscaping features. No dumping of grass clippings, leaves, brush or other refuse is allowed within a drainage easement. These items obstruct drainage, restrict flow and plug culverts. This can lead to higher maintenance costs and cause flooding situations."

Block Grading Plan

Incorporate a Block Grading Plan in the restrictive covenants of the development to ensure proper drainage. The restrictive covenants shall state, "The block grading plan shows the direction of flow for the surface drainage for all lots. It is the lot owner's responsibility to ensure that the final grading of the lot is in accordance with the block grading plan. During the final lot grading and landscaping, the owner shall take care to ensure that the installation of fences, plantings, trees, and shrubs do not interfere with nor concentrate the flow of surface drainage. No changes will be made in the grading of any lot areas used for drainage which would later affect surface run-off drainage patterns without the prior written consent of the Ottawa County Drain Commissioner for all portions of drainage system."

Footing Drains & Sump Pumps

Provide footing drain lateral in rear-yard storm sewer systems except in cases where the Drain Commissioner waives rear-yard systems.

Provide outlets for footing drain laterals for each lot. The proprietor must provide each lot with a marker or monument indicating the location of the sump pumps lateral access point. The Drain Commissioner does not warrant long-term operation or maintenance of footing drains or their laterals upstream of the cleanout.

The restrictive covenants shall state, "Laundry facilities or other similar features shall not be connected to a footing drain or sump pump system discharging to footing laterals and the storm sewer system. Laundry facilities and sewage lift pumps must discharge into the sanitary sewage disposal system."

Soil Erosion and Sedimentation Control Permits

It is the responsibility of the proprietor or their agent to contact this office to determine which lots if any need Soil Erosion and Sedimentation Control Permits.

The restrictive covenants shall state, "Each individual lot owner will be responsible for the erosion control measures necessary on each lot to keep loose soil from their construction activities out of the street, catch basins, and off of adjacent property. If any sedimentation in the street, catch basins, or adjacent lots results from construction for a particular site, it is the responsibility of that lot owner to have this cleaned up. This applies to ALL lot owners.

A Soil Erosion and Sedimentation Control Permit must be obtained from the Ottawa County Drain Commissioner's Office prior to excavation for lots _____ through _____. All conditions set forth by permit shall be met throughout construction activity until permit is allowed to expire."

The Drain Commissioner may require inclusion in the restrictive covenants language regarding lot owner(s) responsibilities to oversee decisions regarding and be fiscally responsible for the aesthetics, aquatic habitat, recreational, liability and water quality concerns related to open water bodies.

Financial Guarantee

If it is the desire of the proprietor to have the plat recorded before completing the drainage improvements, the proprietor shall enter into an agreement with the Drain Commissioner and post surety in an amount approved by the Drain Commissioner's Office to guarantee the completion of all

improvements in accordance with the Commissioner's requirements. The Drain Commissioner shall receive surety prior to approval of the final plat.

If the proprietor does not complete the approved drainage improvements as agreed, the Drain Commissioner's Office will draw on the surety and proceed to fulfill the proprietor's obligation at such time and in such manner as the Drain Commissioner may determine appropriate.

If the proprietor wishes to reduce the amount of surety, they may do so with permission from the Drain Commissioner. The amount is reducible to no less than $10,000 or the estimated cost of the work remaining to be completed, plus 10%.

30 days prior to the release of the last portion of any surety, the proprietor's professional engineer or professional surveyor shall submit one set of sealed "As Built" Drawings to the Drain Commissioner and shall certify that all work required to comply with the Drain Commissioner's Standards and Specifications has been completed. These plans shall show that the improved drains/watercourses are in accordance with the approved construction plans.

"As Built" Drawings

The proprietor's professional engineer shall submit one set of sealed "As Built" Drawings to the Drain Commissioner's Office for review and field verification. The Drain Commissioner's Office and/or their reviewing engineer have 30 days to review said sealed "As Built" Drawings. Our office will invoice the additional review back to the proprietor. After everything is acceptable and approved, we will release the Performance Surety and issue final approval.

Engineer's Certificate

The proprietor's professional engineer shall certify that the project has been constructed in accordance with the approved plan, a sample certification can be found in the appendices. Performance Sureties and final approvals will be held until an acceptable Engineer's Certificate has been received.

Site Condominium Construction Approval

Upon recommendation from the Drain Commissioner's reviewing engineer to approve the construction plans the proprietor shall also comply with the final plat approval requirements as well as the following:

Provide us with a copy of the Master Deed and state:

_____ DRAIN DRAINAGE DISTRICT

Attached as Exhibit A is an Agreement establishing the _____ Drain Drainage District, pursuant to Section 433 of Act No. 40 of the Public Acts of 1956, as amended. A copy of the recorded 433 Agreement as recorded in Ottawa County Register of Deeds Liber _____ Page _____. Attached as Exhibit B is a Maintenance Agreement outlining the maintenance responsibilities of the Association for the established Drain. A copy of the recorded Maintenance Agreement as recorded in Ottawa County Register of Deeds Liber _____ Page _____.

NOTE: When not providing a Maintenance Agreement, do not include portions referencing a Maintenance Agreement.

In addition to the above statements, add all reference to the restrictive covenants to the master deeds.

All site condominium projects reviewed by this office will be required to post a performance surety prior to the issuance of construction plan approval. Look for our surety policy in the Final Plat Approval section of this document.

Final Site Condominium Approval

After the issuance of preliminary and construction approvals, Final Approval of "As Built" Drawings and final acceptance of the drainage system is required. The proprietor's professional engineer shall submit one set of "As Built" Drawings to the Drain Commissioner's Office for review and field verification. The Drain Commissioner's Office and/or their reviewing engineer have 30 days to review said "As Built" Drawings. Our office will invoice the additional review back to the proprietor. Any Final documentation not reviewed and approved during the construction approval must be. After everything is acceptable and approved, we will release the Performance Surety and issue final approval.

Development Plan Review (All other types of projects)

New developments and additions to previous developments in Ottawa County will construct a system for the storage and controlled release of storm water runoff. Drainage systems within these developments are private drainage systems. Drain Commissioner's Office review of private drainage systems focuses on the controlled release of storm water runoff into adequate outlets and the necessary accommodation of surface water, which naturally flows from upstream areas into the area drained by the private system. Bliss/Huizenga Intercounty Drain, Drain #28, Hager Creek Watershed, Rush Creek, and Tulip Intercounty Drain have separate policy statements, which apply to all development types.

Submission of Plan

The plan must give the location of the proposed development with reference to the section and part of section in which the parcel is situated and the name of the local municipality. The plan shall show the proposed lot and building dimensions, all pertinent factors such as adjoining roads and subdivisions, railroads, high tension power lines or underground transmission lines, cemeteries, parks, sanitary sewers, floodplain areas, wetlands, natural watercourses, established drains, easements, or any other feature, the existence, location, or description of which might be of value in determining overall drainage requirements for the development. Existing and proposed contour information should be shown on the plan, unless otherwise permitted, shall be a 2' topographical survey. The plan shall be prepared, signed and sealed by a registered professional engineer.

Two prints of the plan prepared in accordance with the above standards, drainage calculations, application and plan review fee shall be submitted together. Plans will not be reviewed until fees are received. A copy of the site report furnished by the Ottawa County Environmental Health Department may be required.

After the Drain Commissioner's Office has received a complete submittal, the submittal shall be forwarded to one of our reviewing engineer's.

Review of Plan

Our reviewing engineer's have 30 days from when the Drain Commissioner's Office receives the submittal to review and comment in writing back to our office, the proprietor and their agent.

Internal drainage system designs are not subject to Ottawa County Drain Commissioner approval in private developments. The Drain Commissioner's Office reviews site plans based on the following criteria:

- Storm water detention design, per these standards;
- Storm sewer design and how it will affect neighboring lands;
- Account for upstream pass through runoff in the design and calculations.

After the reviewing engineer has sent out their comments the proprietor or their agent is expected to resubmit noting and detailing on the plan and cover letter such revisions for review and approval.

If the Drain Commissioner requires drainage easements, the proprietor on behalf of the appropriate drainage district shall acquire these easements.

Approval of Plan

Once the Drain Commissioner's reviewing engineer finds the plans acceptable, they shall notify the Drain Commissioner's Office, the proprietor and their agent in writing. Subsequent to this office being satisfied we shall prepare a letter of approval signed by the Drain Commissioner and send to the proprietor, proprietor's agent and the township.

If the proprietor finds it advantageous to make changes to the plan, incorporate the changes in the plan and resubmit for approval even though the Drain Commissioner may have already approved the original plan. Note changes on the cover letter and detail on the plan. If the proprietor does not present the final plan to the Drain Commissioner for approval within a period of two years after receiving approval of the original plan, revival of the project will require resubmitting the plan for review by the Drain Commissioner.

Maintenance Agreement

You may find your approval is contingent upon the completion of a Maintenance Agreement between the Proprietor and the Township. You may request sample Maintenance Agreements from the Drain Commissioner's Office, however verify with the Township that a Maintenance Agreement will be required and if they have specific language for you to use. If the Township does not require a maintenance agreement, provide a letter from the Township to that effect.

Fees

Administrative Fee	$50.00
Review Fee	
Less than 1 acre	$350.00
1 – 10 acres	$500.00
11 – 19 acres	$700.00
20 acres or more	$1,000.00

Deposit fees outlined above with the office of the Ottawa County Drain Commissioner at time of submittal of drainage layout on the site plan.

Fees fund the review of plans by the Drain Commissioner's engineer. If the expense to review the proposed development exceeds the amount of fees collected, the Commissioner will charge additional fees.

Relocation/Improvement/Enclosure Agreement (425 Agreement)

A Relocation/Improvement/Enclosure Agreement originated from section 425 of Michigan Drain Code (Public Act 40 of 1956) is also referred to as a 425 Agreement. A 425 Agreement is required when a property owner is relocating, improving and/or enclosing a county drain on their own property at their expense. The Drain Commissioner's Legal Counsel will draft the agreement with the owner responsible for all costs. Legal Counsel will need the following information in order to draft the agreement:

- *Current Easement Document;*
- *Current Route & Course Description of County Drain;*
- *New Easement Document;*
- *New Route & Course Description of County Drain (Exhibit Drawing and Legal Description);*
- *Legal Description of Parent Parcel;*
- *Name, Title, Address of Proprietor*
- *Name & Number of Proprietor's Engineer;*
- *Name & Number of Reviewing Engineer.*

STORM WATER MANAGEMENT CRITERIA

Pursuant to the Clean Water Act of 1974 and the Federal Water Pollution Control Act, MI Act 451 of 1994, local authorities become responsible for implementing storm water management using storm water detention/retention basins or other suitable storm water management techniques to address land use changes. The Drain Commissioner's policy recognizes that geographic location, topographic features, local requirements, aesthetics and many other factors render each land use change and its related watershed unique. The intention of this policy is to provide flexibility in type, location and configuration of storm water management techniques while still providing a safe, low maintenance, long lasting, effective water quantity and quality control useful to individual watersheds.

Drain Specifications

Design drainage systems to convey runoff from off-site land (in its existing condition) that flows through the site. Enclosed systems shall be designed with a capacity for the 10% annual chance (10-year) rainfall, and open drainage systems shall be designed with a capacity for the 4% annual chance (25-year) rainfall. If an existing open system is to be enclosed the cumulative capacity of the system (pipe and overflow swale) shall be based on the 4% annual chance (25-year) rainfall.

These policies, standards and specifications do not cover every foreseeable item of work that may be necessary in order to design and complete the drain improvements to the satisfaction of the Drain Commissioner. If it should become necessary, in the opinion of the Drain Commissioner, that additional work be performed as part of the drainage improvement, it shall be the proprietor's obligation to do so upon direction of the Commissioner.

The Drain Commissioner may consider a storm drainage system reliant on a lift pump station. Approval in writing by the Ottawa County Road Commission and by the local municipality within which the system is proposed will be required.

Drain Commissioner may require clean out, tile, enclosure or relocation of a proposed or existing storm drainage system that shall comply with the Drain Commissioner's Maintenance & Construction Policy and may require a 425 Agreement.

Open Drains

Design new open drain capacities to convey the storm water generated during a 4% annual chance rainfall (25-year recurrence interval). The proprietor's engineer for each development shall determine the amount of impervious ground cover.

Do not construct open ditch drains along plat/site condominium side lot lines without Drain Commissioner's approval.

Backyard Surface Drainage

Backyard drainage patterns must have an emergency outlet or sufficient storage capacity to protect the lowest opening of adjacent homes during a 1% annual chance (100-year) rainfall.

Design surface drainage with a minimum 1% longitudinal slope and a maximum of 300 linear feet between catch basins.

Enclosed Storm Sewers

Design all storm sewers to convey the storm water generated during a 10% annual chance rainfall (10-year recurrence interval). Perform hydraulic grade line analysis on storm sewer systems to establish low building opening elevations. Use the 1% annual chance storm event and the 1% annual chance water level at the outlet, for this purpose. Design storm sewer in such a manner, that during a 10% annual chance storm, water will not surcharge above the top of the pipe. If the design engineer provides information showing surcharging during a 4% annual chance storm (25-year recurrence interval) will be no higher than 6" below the top of castings of all catch basins within the project; surcharging above the top of the pipe during the 10-year storm may be permitted.

Do not design or construct culvert, storm sewer, or other drainage pipe that is a part of, or connected to, the storm sewer system of a plat/site condominium to function in a permanently submerged condition. Occasional surcharging as might normally be expected in rain events exceeding the system design frequency, or from a temporary high water level associated with a storm water detention (not retention) area, will be permitted.

12" diameter pipe is the minimum allowable storm sewer size. The appropriate type and class shall designate all sewer and culvert pipe on the plans. The appropriate type and class of all sewer and culvert piping shall be designated on the plans. Where storm sewers are continually subjected to internal or external hydraulic pressures, internal rubber gaskets are required. The pipe used in culverts may be reinforced concrete culvert pipe or other pipe approved for use by the Road Commission. The pipe furnished shall conform to the current specifications for reinforced concrete, storm drain and sewer pipe, A.S.T.M. designation C-76 or the specifications approved by the Road Commission.

The main trunk line of the storm sewer shall be located on the centerline of the road right-of-way (OCRC Standard.)

Lay all storm sewers in a straight line, manhole to manhole, unless otherwise approved by the Drain Commissioner. Maximum distance between manholes shall be 350 feet. Pipe curvature in the road right-of-way will also require approval of the Ottawa County Road Commission.

Basin Design Criteria

The intended design criteria included herein are baseline standards for the calculation of runoff, detention volumes, discharge rate, etc. In the absence of more detailed analysis and calculations, the Ottawa County Drain Commissioner's Office shall find only these methods acceptable. The design engineer may use computer models or other analytic tools that are available and accepted in the profession. Designs using alternate methods to those shown herein must explain and be prepared to defend their conclusions, if the resulting design is less restrictive than when using these criteria. The Drain Commissioner's Office does not permit inline retention/detention basins unless no other feasible options exist.

Retention basins are the preferred standard of the Drain Commissioner. The Drain Commissioner's Office allows dry or shallow water detention basins when native soils cannot discharge storm water runoff by seepage. We allow permanent ponds for retention/detention within residential subdivisions, but with more detailed geometric pond design and operation criteria.

The release rate of storm water from all developments shall be restricted to 0.13 cfs/ac. If the receiving watercourse(s) has insufficient capacity or requires additional protection, extended duration detention (see appendices) shall be required. The Drain Commissioner's Office shall determine locations where extended duration detention and/or phase detention is required, upon consultation with reviewing engineers, local

units of government, the State of Michigan, established watershed management groups, or any other source deemed appropriate by this office. No alternate analysis allowing greater outflows than 0.13 cfs/ac will be considered, unless the development is located in a designated non-mandated detention zone (see appendices), or sufficient evidence of receiving watercourse adequacy is provided.

Calculate required storm water storage volumes using a 1% annual chance (100-year recurrence interval) rainfall, as published in Bulletin 71 of the Midwest Climate Center, 1992: Rainfall Frequency Atlas of the Midwest. Find the relevant parts of that document on the rainfall IDF curves (see appendices).

The following shows, which impervious surfaces shall be, included in your detention requirements:

New development - Supply detention for all new surfaces.

Additional development – Additional detention shall be supplied for new surfaces.

Redevelopment – Supply detention for all newly constructed surfaces.

If the lot being developed is served by regional detention, the proprietor or their agent shall contact the Drain Commissioner's Office to assure no additional storage is required.

Some listed areas in Ottawa County are non-mandated detention zones (see appendices). The Drain Commissioner may allow, and in some cases require, excavating new floodplain in lieu of standard storm water detention. Find the required excavation volume by standard basin sizing methods. Only material excavated above the 2-year (50% annual chance) and below the 100-year (1% annual chance) floodplain elevation shall be included to balance required volumes.

Emergency overflow pathways are strongly encouraged to convey excess storm water from the development and upstream, for rainfalls in excess of the design criteria.

Retention Design Criteria

Retention basins may be required by the Drain Commissioner, even if a positive outlet is available. This preferred form of storm water management shall be utilized where the native soils and ground water table allow, or when a positive outlet is unavailable. Evidence shall be provided that the basin, subsurface soils and groundwater aquifer can safely hold and convey storm water runoff from the drainage area during a 1% annual chance rainfall event. Such evidence shall show that adjacent lands or structures are not adversely affected by the ground water mound created at the basin.

Retention basins shall use design permeability equal to ½ the nominal seepage rate as determined by approved testing methods, with a maximum 40" per hour. The design permeability shall incorporate the effects of surface restoration such as topsoil, sod, seed (i.e. prairie mix) etc.

Storm water retention volumes shall be calculated from the maximum runoff volume from the 1% annual chance rainfall, minus the volume discharged from the basin by percolation through the basin bottom and hydraulically engaged side slopes, for any and all rainfall durations, from the developed site. (Note: Percolation rate shall be determined from perk tests performed at the elevations and locations of the proposed basin's seepage surfaces.)

Required storm water storage volumes shall be determined in the same manner as with detention basins below, with Q_{out} equal to the seepage rate into the ground, rather than the 0.13 cfs/ac discharge rate. The seepage rate shall be determined by multiplying the design percolation rate (permeability) by

the surface area of seepage. For retention basin volume calculations, (converted to feet/second) Q_{out} = K' A_s where K' = 0.5 K_{field} (in/hr, converted to ft/sec), and A_s = basin seepage area (acres).

If no positive outlet is available and you cannot account for seepage in the design, you shall size the basin to hold the runoff from a 12" rainfall (approximately 2-1%, 24-hour back-to-back rainfall depths for Ottawa County.)

The Drain Commissioner's Office requires a minimum of 3-foot separation between design bottom and the highest known ground water table.

Detention Design Criteria

Calculate storm water detention volumes from the maximum runoff volume from the 1% annual chance rainfall, minus the volume discharged from the basin at the 0.13 cfs/ac rate, for any rainfall durations, from the developed site.

Required Storm Water Storage Volume, $VOL_{st} = VOL_{in} - VOL_{out} = 3600T_d [Q_{in} - Q_{out}]$

T_d = duration of 100 year rainfall (in hours), varied to find the critical storage volume

$Q_{in} = C_d \times i_{100} \times A$ (rational method determination of runoff, in cfs)

Q_{out} = 0.13 cfs/ac x A (allowed basin outflow, in cfs)

C_d = runoff coefficient for the drainage area as developed

i_{100} = 100 year rainfall intensity (in/hr) at all storm durations, T_d

A = drainage area to detention basin in acres

Example: C_d = 0.75 (avg. Commercial site); A = 20 acres; $Q_{in} = 15i_{100}$; Q_{out} = 0.13 x 20 = 2.6

Storage Vol. = $3600T_d[Q_{in} - Q_{out}]$

T_d(hr)	i_{100} (in/hr)	Q_{in}	Q_{out}	$Q_{in} - Q_{out}$	Storage Volume (c.f.)
1.0	2.89	43.35	2.60	40.75	146,700
2.0	1.78	26.70	2.60	24.10	173,500
3.0	1.31	19.65	2.60	17.05	184,100
4.0	1.06	15.90	2.60	13.30	191,500
5.0	0.89	13.35	2.60	10.75	193,500
6.0	0.77	11.55	2.60	8.95	193,300
7.0	0.68	10.20	2.60	7.60	191,500
		Check a time between the peak values: 5.0 hr and 6.0 hr			
5.5	0.83	12.45	2.60	9.85	195,000

Principal (Low Outlet) Spillway Design

Design the principal spillway to convey the allowed detention basin maximum release rate of 0.13 cfs per acre.

The standard equations for low outlet sizing are:

Orifice flow:	$Q_p = 5a(H)^{0.5}$	[reduced-size orifice plate at pipe entrance]
Pressure flow:	$Q_p = 8a[H/(K_t + fL/D)]^{0.5}$	[outlet pipe under pressure]
Full flow:	$Q_p = S^{0.5}D^{2.67}/(2.18n)$	[outlet pipe not under pressure]

Q_p = Principal spillway flow rate, in cubic feet per second

a = flow area of orifice or pipe (sf)

H = design hydraulic head (ft)

K_t = combined entrance and exit losses (= 1.0 to 1.8)

f = friction factor (approx. = $190n^2/D^{0.33}$)

L = length of pipe (ft)

D = pipe diameter (ft)

n = Manning's roughness coefficient

S = pipe slope (ft/ft)

Use the flowing full equation to determine the maximum slope of the outlet pipe needed to assure pressure or orifice flow, when designed for that hydraulic control.

Auxiliary (Emergency) Spillway Design

An auxiliary spillway and or overflow path shall be required as protection against blocked primary outlets, extreme rainfall events, etc. Size such a spillway/overflow to convey the 1% annual chance (100-year) peak flow from the contributing drainage area as developed. Include approved off-site flow-through runoff in sizing the auxiliary spillway. The Ottawa County Drain Commissioner reserves the right to waive this requirement upon presentation of relevant data from the design engineer.

Construct the auxiliary spillway of asphalt or concrete. If less stable methods, such as staked sod, erosion control fabric, etc., are proposed, the design engineer shall provide evidence that peak spillway velocities are non-erosive.

Spillway design shall extend from the berm crest to the outfall channel.

Side slopes, m, on trapezoidal and triangular spillways shall be 5 (lv:5h) for weirs designed to bear traffic.

The design equations for a spillway weir are:

Rectangular weir: $Q_a = CLH^{1.5}$

Triangular weir: $Q_a = 0.75CmH^{2.5}$

Trapezoidal weir: $Q_a = 0.75CmH^{2.5} + CLH^{1.5}$

Q_a = auxiliary spillway design flow rate (cfs)

C = discharge coefficient = 3.3 for sharp-crested weir (i.e. Sheet piling)

= 3.0 for broad-crested weir of asphalt or concrete

= 2.8 for vegetated or gravel weir (good condition)

= 2.6 for vegetated or gravel weir (poor condition)

L = horizontal spillway length

H = design depth of flow over weir

m = side slope (i.e. m = 3, for a lv:3h side slope)

Other factors may require more detailed considerations than included here. Some examples of contingent factors are side suppression of horizontal weirs for deep spillway flows (H/L > 0.20), partial submergence of the weir from downstream controls, alternate orifice procedures and composite spillway structures.

Geometric Constraints for Storm Water Management Basins

Retention Basin

All side slopes shall be 1' vertical on 4' horizontal (1v:4h) or flatter.

Dry Basin

Side slopes shall be 1v:4h or flatter.

Basin bottom longitudinal slope shall be 0.5% or steeper.

Basin bottom cross slopes shall be 1.0% or steeper.

Wet Pond

Side slopes above static water level shall be 1v:4h or flatter.

Slopes between static water level and 3' depth shall be 1v:6h or flatter.

Side slopes below 3' depth shall be 1v:3h or flatter.

Extended Duration Detention Basins

The Drain Commissioner shall determine locations where extended detention is required, upon consultation with reviewing engineers, local units of government, the State of Michigan, established watershed management groups, or any other source deemed appropriate by this office.

Extended duration detention basins shall include all, or portions, of the following features. Study greater discussion on these features in the Policy Statement for the Hager Creek Watershed.

1. Create a forebay to act as a primary settling area. Divide the forebay from the main basin by a rock check dam, gabions, or other suitable structure. The capacity of the forebay shall be equivalent to 5% of the 1% annual chance storage volume. An overflow weir between the forebay and basin shall convey the design inflow without overtopping the berm.

2. Install a multistage outlet riser to limit outflows from the basin differently for different scales of rainfall.

3. The low outlet basin volume sizing shall be based upon a 50% annual chance (2-year) rainfall event for the drainage area after development. The allowed discharge from the low outlet shall be limited to 0.05 cfs per impervious acre. In no case shall the low outlet discharge exceed 0.13 cfs per gross acre.

4. The high outlet basin volume sizing shall be based upon a 1% annual chance (100-year) rainfall event. The allowed cumulative discharge from the low and high riser outlets shall be limited to 0.13 cfs/ac.

5. If the allowable discharge from above requires an outlet opening less than 4" in diameter control discharges by a riser with a stone filter covering the smaller holes to prevent clogging. 24" in diameter is the minimum size allowed for a riser pipe.

6. Size an auxiliary (emergency) spillway to convey the 1% annual chance (100-year) peak flow from the contributing drainage area as developed. Include approved off-site flow-through runoff in sizing the auxiliary spillway.

Outlet Specifications

Discharges into established drains or natural watercourses shall be designed to enter the drain or water course at an angle of 90º or less, as determined by the upstream centerline. Erosion protection such as headwalls, armor and/or sod may be required at storm drainage crossings and/or outlets.

Footing or Sump Pump Laterals

Connection to a Conveyance System

Connect footing or sump pump laterals (hereinafter referred to as "laterals") to a storm sewer conveyance system in the rear yards of the development where such a system is required.

Where a rear yard conveyance system is not required, laterals may be connected to a storm sewer in the road ROW. In this case, the most desirable connection point is the back of a catch basin, followed by the side of a manhole. The least desirable connection point is a blind connection to the pipe, and this may be done only if all other options are unavailable.

Design Requirements

Core and seal connections to catch basins and manholes with non-shrink grout. Grout shall be smooth with the interior wall of the structure. Wrap the connection in non-woven geotextile fabric. Use flexible boot connectors meeting ASTM C923 as an alternative.

Make blind connections into a corrugated polyethylene pipe with a factory-supplied polyethylene saddle tee, or reducing tee, meeting AASHTO M294, Type S, and a coupler meeting ASTM D5926 and C1173. Make blind connections to reinforced concrete pipe using a flexible tap saddle with stainless steel bands and a coupler meeting ASTM D5926 and C1173. The Drain Commissioner's Office will not allow a grouted connection into the side of the pipe. The lateral pipe shall be cut flush with the inside wall of the mainline pipe and shall not cause obstruction of flow. Wrap all such connections with non-woven geotextile fabric.

Laterals shall be PVC Schedule 40 pipe per ASTM D1785, except as otherwise noted below. The portion of the lateral in the right-of-way and private utility easement shall be minimum 4" diameter if serving a single lot, or minimum 6" diameter if serving two lots. The stub of the lateral upstream of the cleanout shall be 4" diameter only.

Where laterals cross private utility easements, they shall be a minimum of 4.0' deep, or if less than 4.0' deep shall be installed using ductile iron pipe and couplers within the utility easement. Ductile iron pipe shall be cement-lined or flexible-lined, meeting ASTM A746, and couplers shall meet ASTM D5926 and C1173. As an alternative, Install PVC Schedule 40 pipe in a ductile iron sleeve.

Place a clean out on the lateral at the rear (private property side) of the private utility easement. If the lateral serves two lots, the cleanout shall be immediately downstream of the 6"x 4"x 4" wye. Encase the access point of the clean out in an iron monument box similar to the EJIW #1570.

Location and Layout

Since private utility companies typically place infrastructure such as transformers and risers on common lot lines, take care to avoid conflict with proposed utilities when placing laterals on common lot lines. Whenever possible, place laterals at lot lines where risers and transformers are not proposed to be located. Coordination with utility companies during the planning stage is valuable in minimizing conflict.

Alternatively, install laterals at the center of each lot, and in certain cases, this may be required.

Off-Site Drainage

The proprietor's engineer shall provide evidence that the existing receiving stream has the capacity to carry the storm water runoff from the land within the overall watershed, excluding the land to be developed, during a 10% annual chance storm, in addition to the detained storm water runoff from the developed land during a 1% annual chance storm.

Otherwise, to manage the storm water runoff leaving said development, the proprietor's engineer shall provide plans and design calculations. The proprietor's engineer formulates the method to address storm water runoff, review and approval or rejection by the Drain Commissioner's Office is required.

The most common method of adequately controlling the storm water runoff leaving a developed site is to store excess runoff generated by the development. Storm water detained before leaving the site shall meet the guidelines of the Drain Commissioner's Storm Water Management Policy. Additional water quality measures may be required.

The Drain Commissioner's office evaluates the use of off-site storm water management features to address retention, detention, floodplain excavation, etc. on a site-specific basis.

Easement Specifications

Said easement areas shall also be top dressed with a minimum of 2 - 3" of topsoil or approved compost material. Apply proper seed mix over the entire easement area using appropriate perennial type seed, annual seeds alone will not suffice. Upon completion of seeding, apply either mulch in the form of mulch blanket, hydro mulch or approved alternative.

The Drain Commissioner may require the determination of floodplain or wetland extents. There is no filling allowed on these lands without the prior approval of this office and of the MDEQ. Grant easement to the appropriate drainage district for all existing and new floodplain within a given development.

Policy Statements

BLISS CREEK AND HUIZENGA DRAINAGE DISTRICTS

Storm Water Detention

Comply with storm water detention criteria outlined in the Bliss Creek Watershed Management Plan (1995) and the Huizenga Watershed Management Plan (1995). The specific criteria contained in the guidelines of each Drain Commissioner's office shall apply for projects within their respective counties. This includes a "no detention zone" for the Bliss Creek Watershed north of Jackson Street and Canal Street. The City of Wyoming's Storm Water Management Plan provides for a combination of regional and on-site detention.

Floodplain Protection and Mitigation

All existing flood plains in the Bliss Creek and Huizenga Drain Watersheds are assumed critical whether or not they are contiguous to the main channel and tributary drains, unless the developer can demonstrate that no impact to adjacent parcels or storm water discharge would occur from the loss of flood plain.

The developer is required to delineate the extent of the 100-year floodplain subject to review by the Intercounty Drainage Board.

Mitigation of the loss of floodplain shall meet the following criteria.

- Replacement of the loss of floodplain at 1.5-to-1 ratio. This applies to floodplain associated with rainfall events up to 100-year frequency.
- Storm water detention does not apply toward the mitigation volume.
- Mitigation grading volume shall be computed above the seasonal high ground water level only.
- The inflow and outflow rates to the mitigation area shall be consistent with pre-development rates.
- The mitigation-grading plan shall provide for an equivalent volume of storage for floodplains associated with more frequent events (i.e., 10- and 25-year frequency).
- Up to 50 percent of the mitigation volume may be used for snow storage.
- The proximity of the floodplain mitigation shall provide for an equivalent hydrologic impact to the receiving stream and adjacent parcels.

In lieu of the construction of the additional mitigation volume between a 1-to-1 to a 1.5-to-1 ratio, the developer shall have the option of contributing a fee of $20,000 per acre-foot of mitigation volume to the Intercounty Drainage Board for use on flood control within the watershed.

Drafted by FTC&H for the Bliss and Huizenga Intercounty Drainage Board

DRAIN #28 DRAINAGE DISTRICT

(North of James Street, Holland Twp.)

Storm water detention volume required will be the maximum runoff from a 100-year rainfall for any and all duration from the proposed developed area, less that volume discharged during the same duration at the approved release rate.

All new development shall be required to mitigate the loss of floodplain based on the following criteria:

- The proprietor's engineer is required to delineate the extent of the 100-year flood plain if riparian to the established drain or its branches and submit this delineation to the Drain Commissioner's engineer for review and approval.
- Replacement of lost floodplain is required at a 1.25-to-1 ratio for rainfall events up to a 100-year frequency. In lieu of the construction of the additional mitigation volume between a 1-to-1 to a 1.25-to-1 ratio, the developer shall have the option of contributing a fee of $20,000 per acre-foot of mitigation volume to the Drain #28 Drainage District for use on flood control within the watershed.
- Storm water detention does not apply toward floodplain mitigation volume.
- Floodplain mitigation volume will be computed above the seasonal high water table.

In other parts of this watershed Ottawa County Drain Commissioner's Office Storm Water Management Criteria remain in effect except as amended above.

Drafted by Prein & Newhof, P.C. for the Ottawa County Drain Commission.

HAGER CREEK WATERSHED

(Including parts of the NW ¼ of section 16, NE ¼ of section 17, SE ¼ of section 8, and the SW ¼ of section 9, Georgetown Township)

Extended Detention Basins

Extended storm water detention is required within the Hager Creek Watershed.

The extended detention basin shall be a two-stage design, see example in Appendices.

In-line detention shall not be permitted.

All inlets, outlets, and overflow structures shall be designed to have non-erosive velocities or have adequate protection against erosion and scour. Maximum velocities are given as follows:

Lining Type	Maximum Permissible Velocity (ft/s)
Bare soil	2
Well-vegetated soil	4
Erosion-resistant lining	8

All other requirements for detention basin design shall apply to extended detention basins.

Forebay

All extended detention basins shall have a forebay to capture sediment.

The forebay shall be a separate basin, which can be formed by rock check dam, gabions, or other suitable structure.

The capacity of the forebay shall be equivalent to 5% of the 100-year flood control volume.

The overflow weir between the forebay and detention basin shall convey the design discharge from the inlet pipe(s) without overtopping the berm.

Stream Protection/Water Quality Volume

The initial stage (lower design water elevation) shall be sized to store the stream protection volume (V_{sp}) defined as the routed volume of runoff from the 1.5-year, 24-hour rainfall event (2.16 inches) with post-development conditions. The minimum required stream protection volume is given by the equation:

$$V_{sp} = 5{,}000 \text{ cft per impervious acre}$$

The maximum release rate to detain this volume for at least 24 hours is 0.05 cfs per impervious acre.

The stream protection volume incorporates the water quality volume (V_{wq}) to treat the "first flush of storm water runoff which typically carries with it the highest concentration of pollutants. Separate design criteria for water quality volume are not required.

Flood Control Volume

The flood control volume (V_{fc}) shall be sized to detain the 100-year rainfall event with a maximum release rate of 0.13 cfs per acre.

The flood control volume must be provided for all acreage contributing to the detention basin.

The forebay and stream protection volume may be included as part of the required flood control volume.

Outlet Design

The multiple-stage outlets may be designed using the orifice equation, rearranged to solve for area.

$$A = \frac{Q}{5\sqrt{H}}$$

Where
- A = Required area (sq-ft)
- Q = Required outflow (cfs)
- c = Orifice Coefficient (approximately 0.6)
- 2g = Two times the gravitation constant (g = 32.2 ft/s)
- H = Height of design high water level above center of orifice, unless tailwater elevation is higher than center of orifice.

Other outlet devices shall have full design calculations provided for review.

The outlet from the initial stage shall be designed to prevent clogging.

1. Pipes or orifice plates shall have a minimum diameter of 4 inches.

2. Riser pipes with holes or slits less than 4 inches in diameter shall have a stone and gravel filter placed around the outside of the pipe. 24" in diameter is the minimum size allowed for a riser pipe.

Drafted by FTC&H on behalf of the Ottawa County Drain Commission and the Ottawa County Parks and Recreation Commission. Subject to approval by the Georgetown Township Board.

RUSH CREEK DRAINAGE DISTRICT

(12th Ave. upstream to Rush Creek's intersection with Buttermilk Creek)

Compensating excavation will be required for fills that exceed 10 percent of the storage volume available within the flood plain. Filling more than 10 percent of the storage volume will result in a measurable increase in Rush Creek 100-year flood elevation and will not be permitted by the Ottawa County Drain Commission or the State Flood Plain Regulatory Authority. (reference document entitled "Effects of Reduction in Flood Plain Storage on Rush Creek" dated July 12, 1989 prepared by Bruce Menery, P.E., MDEQ, Land and Water Management Division.)

TULIP INTERCOUNTY DRAINAGE DISTRICT

(Revised February 11, 2003)

Effects and Purposes

These standards provide for the establishment of design criteria for storm water controls and facilities within the Tulip Intercounty Drainage District (herein after referred to as DISTRICT), and recognize the need for approval of the Tulip Intercounty Drain Board (herein after referred to as BOARD) in connection with development within the Watershed. As set forth below, such approval may be obtained by a developer for a development site partly or wholly within the Watershed by the developer's commitment to construct acceptable storm water management facilities and/or by the developer's submission of an acceptable drainage plan and/or by payment of Storm Water Management Contributions, when acceptable to the BOARD, in lieu of construction of Storm Water Management facilities.

The purposes of these standards are to minimize flooding, property damage, erosion, nuisances, and to improve drainage and water quality within the Tulip Intercounty Drain (herein after referred to as DRAIN) Watershed.

The basis of these standards arises from the following findings of the BOARD:

The BOARD manages and maintains certain existing drainage facilities in the Watershed, which have been developed over a number of years for the purposes of collection, storage and conveyance of storm water.

These standards are necessary and essential to manage storm water drainage facilities in connection with new development within the Watershed to minimize flooding and to improve drainage from new development.

It will be necessary to construct improvements to and extensions of the existing Storm Water Management System within the Watershed to minimize flooding from new development, to minimize existing periodic flooding from existing development or natural causes, to minimize property damage,

to minimize erosion, to minimize nuisances, to improve water quality, and to defray the cost of such improvements and extensions through the acceptance of Storm Water Management Contributions in connection with certain new development.

Definitions

For purposes of these standards the words and phrases set forth below shall have the meanings provided. Words used in the singular shall include the plural, and in the plural, the singular. Words used in the present tense shall include the future tense. The word "shall" is mandatory and not discretionary. The word "may" is permissive. Words not defined in this Section or elsewhere in these standards shall be given their common, ordinary meaning unless the context requires otherwise.

DEVELOPER means any individual, sub-divider, firm, association, syndicate, partnership, corporation (public or private), trust, or any other legal entity (public or private), intending or proposing to effect the development of land where for self or for another.

DEVELOPMENT SITE means any land on which work is performed or proposed to be performed which will alter its existing storm water drainage characteristics. For purposes of these standards, a development site shall be considered any land improvement not contained or listed in the exemptions below.

DRAINAGE PLAN means a submittal to the BOARD for the review by the Board's Professional Engineer/Consultant which provides information on the location of the development, the development tributary area to each point of discharge from the development site, indication of the method used to calculate the peak discharge rate, hydrologic and hydraulic calculations for the development and any upstream tributary area, calculation of the final peak discharge rate, calculation of any facility or structure size and configuration, the plan of action to be taken to meet the peak discharge criteria, a development drainage drawing showing all drainage related facilities and structures with existing and final grades, an implementation plan for construction of any and all facilities and structures needed to carry out the overall drainage plan, and any other similar information required by relevant watershed or Storm Water Management plan referred to in these standards. The BOARD may require the drainage plan to define the alignment and boundary of the natural drainage courses, existing and proposed drainage facilities, or sub-drainage areas on the land in question, and to include drawings, profiles, and specifications for the construction of channels, conduits, reservoirs, culverts, bridges, and other drainage facilities reasonably necessary to ensure that storm water, including drainage from other lands which will contribute runoff to the property, will be adequately drained, stored, or otherwise controlled. A schedule of the estimated dates of completing construction for storm water facilities shown on the plan shall also be included. Ownership and maintenance responsibility of the proposed storm drainage facilities shall be clearly defined. A plan for the proper maintenance of privately owned facilities shall be included

STORM WATER MANAGEMENT CONTRIBUTIONS mean fees, money or other contributions approved by the BOARD contributed by the developer as provided in these standards for the purpose of defraying the costs of the Storm Water Management System. These Storm Water Management Fees are paid by the developer, at the BOARD'S option, in lieu of constructing drainage facilities.

TULIP INTERCOUNTY DRAINAGE DISTRICT or DISTRICT means the drainage district for the Watershed established pursuant to Chapter 21 of the Drain Code of 1956, as amended, the funds of which are administered by the BOARD.

TULIP INTERCOUNTY DRAIN or DRAIN means the storm water drain or conveyance system established pursuant to Chapter 21 of the Drain Code of 1956, as amended, which is continuously or periodically maintained or administered by the BOARD.

WATERSHED means all property within the natural topographic boundaries of the DRAINAGE DISTRICT as generally described in the Appendices, which is incorporated herein by reference.

Exemptions

These standards shall apply to any development site within the Tulip Watershed which requires approval of a plat, a site condominium, a site development plan, building permit, or any other permit for work which will alter storm water drainage characteristics of the development site, provided, however, that these standards shall not apply to the following:

The construction of, or additions, extensions, or modifications to individual single-family or two-family detached residential structures located outside mobile home parks.

The installation or removal of individual mobile homes within a mobile home park. This exemption shall not be construed to apply to the construction, expansion, or modification of a mobile home park.

Plowing, tilling and drainage for the purposes of agricultural production and the construction of any agricultural buildings not requiring building permits.

Public streets and right-of-way approved on or before the effective date of these standards (January 26, 1999).

Development Site Standards

A developer shall not alter the storm water drainage characteristics of a development site or any portion thereof except in accordance with a drainage plan approved pursuant to these standards or as otherwise permitted under these standards.

Federal, State and Local Requirements

Nothing in these standards shall be construed to relieve the developer from complying with all federal, state and local requirements for design and construction of drainage facilities or from complying with all applicable laws, ordinances, rules or regulations. The BOARD recommends building and/or occupancy permits be issued only when a development site plan is in compliance with Tulip Storm Water Management Standards.

Criteria

All development sites west of M-40 will be required to construct a system for storage and the controlled release of storm water runoff. All development sites east of M-40 that abut the DRAIN will be required to provide either increased floodplain storage or deposit the cost of designing and constructing, including engineering field inspection, an acceptable storm water detention system to the account of the DISTRICT. Those development sites east of M-40 that do not abut the DRAIN and will discharge to a branch drainage system that has adequate capacity either shall deposit the estimated cost of designing and constructing an acceptable storm water detention system to the account of the DISTRICT or they shall construct increased floodplain storage along the DRAIN on off-site land. The funds deposited to the DISTRICT'S account shall be used to design and construct improvements to and extensions of the existing Storm Water Management System within the

Watershed to minimize flooding from new development, to minimize existing periodic flooding from existing development or natural causes, to minimize property damage, to minimize erosion, to minimize nuisances, to improve water quality and to provide a sound scientific basis for such activities through study and survey of the existing DRAIN.

Storm Water Management Design and Criteria shall meet the criteria of the respective County that the development is in.

Developments East of M-40

The purpose of Storm Water Management west of M-40 is to insure that the flow of the DRAIN is maintained at or below the existing flow prior to development. However, as development occurs closer to the outlet of the DRAIN, Storm Water Management might delay the time storm water discharges from the site to the point where it will increase the total peak flow for the DRAIN. Therefore, it is in the best interest of the entire DISTRICT if the storm water from development east of M-40 discharges prior to the time that the DRAIN reaches its peak flow. Since it is also the BOARD'S desire to be fair and equitable to all parties, while at the same time doing everything possible to maintain or lower flood levels within the DISTRICT, new development sites east of M-40, next to the DRAIN, may have an option, exercised by the BOARD'S sole discretion, of construction of increased flood plain storage, or of depositing of an amount of money necessary to design and construct an acceptable Storm Water Management System to the DISTRICT'S account, using the same rules as for the area west of M-40. If increase floodplain storage is provided, it shall be equal to the volume of storm water detention required for the rest of the DISTRICT and shall be measured between the 2 year floodplain elevation and the 100 year floodplain elevation. The floodplain elevation used shall be approved by the Michigan Department of Environmental Quality.

All development sites east of M-40 that are not next to the DRAIN shall either deposit the cost of constructing an acceptable Storm Water Management System, including the cost of the land for the system, to the District's account or shall construct acceptable increased floodplain storage next to the DRAIN on off-site land, as long as the drain or storm sewer system that will carry the site's storm water runoff to the DRAIN has adequate capacity of its own. If the development site's receiving drain or storm sewer system does not have adequate capacity, an on-site Storm Water Management System may be required or the receiving stream may be required to be improved to the capacity needed to pass the total required design flow. All floodplain storage areas shall be within easements in the name of the Tulip Intercounty Drain Drainage District.

Developments Abutting the Tulip Intercounty Drain

All development sites abutting the DRAIN shall include an easement for the DRAIN, in the name of the Tulip Intercounty Drain Drainage District, in care of the Drain Commissioner in whose county the land is located. The easement shall be at least equal to 100' of land on each side of the DRAIN. For development sites east of M-40, the easement shall include sufficient additional land to construct increased floodplain storage.

NOTE: The BOARD reserves the right to require the Developer to furnish additional calculations acceptable to the BOARD including, but not limited to, a comparison of the site's discharge hydrograph to the hydrograph for the DRAIN at the point of discharge. The decision on the need for additional calculations shall be by recommendation of the BOARD'S engineer(s).

Permanent Sedimentation Basins

Permanent sedimentation basins shall be installed on all sites that do not have storm water detention basins (or ponds) at the outlet end of the site's storm sewer system. However, the peak discharge rate from the basin shall reach the drain at the 60% to 70% drain lag time, depending on the accuracy of determining said lag time. The sedimentation basin shall be approvable by the BOARD'S engineer(s).

Development Within the One Hundred Year Flood Plain

It is the BOARD'S position that it is not advisable to place fill within the 100 year floodplain area. However, if the developer shows that it is not feasible to develop a site without placing fill below the 100 year floodplain elevation and the Michigan Department of Environmental Quality approves fill, there shall be a mitigating amount of cut below the 100 year floodplain in an area close to the proposed development, within the same hydraulic drainage area. The amount of cut shall be equal to at least one and a quarter (1.25) times the amount of fill placed below the 100 year floodplain elevation, unless the developer's engineer shows that the incoming and outgoing rate of flow to the flood storage area is approximately equal to the rate prior to development. The BOARD'S reviewing engineer(s) shall make the final decision as to the acceptability of the location of the cut.

Fees

The minimum engineering review fee for development sites within the Tulip Intercounty Drain Drainage District shall be based on the fee structure of the respective County. If the actual cost of the BOARD'S consultant(s) to review the proposed development exceeds the fees collected, additional fees will be charged based on the current actual hourly rate charged to the BOARD by their consultant(s).

SPECIAL NOTE: It should be noted that the compliance to the above standards does not relieve the developer from obtaining any and all other permits or approvals from other reviewing agencies, such as from local units of governments and from State agencies such as the Michigan Department of Environmental Quality.

Drafted by William E. Chappell, P.E. of Driesenga & Associates for the Tulip Intercounty Drainage Board (Effective January 26, 1999)

APPENDICES

APPENDIX A – Drainage Easement Sample

DRAINAGE EASEMENT

_____ DRAIN DRAINAGE DISTRICT

IN CONSIDERATION OF LESS THAN ONE HUNDRED DOLLARS ($100.00), _____, whose address is _____ (hereafter referred to as the "Grantor"), conveys and releases to Ottawa County Drain Commissioner on behalf of the _____ Drain Drainage District, whose address is 414 Washington Street, Room 107, Grand Haven, Michigan 49417 (hereafter referred to as the "District"), an irrevocable easement in which to construct, maintain, improve, repair, replace, and/or remove drains, over, across, under and through the following parcel of land situated in the Township/City of _____, Ottawa County, Michigan, and legally described as follows:

Parent parcel description

(hereafter referred to as the Parent Parcel), the easement to be located as follows:

Easement description

The conditions of this easement are such that:

1. The District's rights and obligations are limited to the maintenance, improvement, repair, and replacement of the drainage facilities, in accordance with the provisions of the Drain Code. The cost of which may be assessed to the benefiting properties as shown in Exhibit A.

2. The Grantor shall retain all other property rights and obligations, including turf maintenance. No permanent structures, construction, fences, shrubs, or decorative landscaping of any kind or nature shall be placed within the easement described above. If the District shall, in the exercise of its rights, disturb the easement, then the District shall only be obliged to restore the ground to its original grade, place 2 - 3" of top soil, seed, fertilizer and mulch.

3. Should the District in the reasonable discharge of its obligations be required to enter upon the Parent Parcel it shall have the right to do so. If the District shall, in the exercise of its foregoing powers, disturb the Parent Parcel described, then the District shall restore it to its original condition.

4. Prior to each exercise of rights granted herein, the District shall make reasonable efforts to serve notice on the Grantor of its intent to enter upon the easement. In cases of emergency no prior notice need be given.

5. By this conveyance the Grantor releases the District from any and all claims for damage arising from or incidental to the exercise of any of the foregoing powers.

This Grant of Easement is intended to run with the land and shall be binding upon and shall inure to the benefit of the parties hereto, their respective heirs, personal representatives, successors and assigns, and may not be amended or modified without written approval of the Drain Commissioner on behalf of the District. Any amendment or modification to this Grant of Easement shall be by an instrument in recordable form executed by both the Grantor and the District and recorded at the office of the Ottawa County Register of Deeds.

APPENDIX B – Detention Basin Easement Sample

DETENTION BASIN EASEMENT

_____ DRAIN DRAINAGE DISTRICT

This indenture, entered into this _____ day of _____, _____ by _____ _____, whose address is _____ _____ (hereafter referred to as the "Grantor"), and PAUL GEERLINGS, OTTAWA COUNTY DRAIN COMMISSIONER, 414 Washington Avenue, Room 107, Grand Haven, Michigan on behalf of the _____ Drainage District, a public body corporate, hereafter referred to as the "District".

WITNESSETH:

WHEREAS, the Grantor is developing certain property located in the City/Township of _____, County of Ottawa, State of Michigan, to be known as _____.

WHEREAS, the Grantor, in order to develop said property in the manner it desires, finds it necessary to construct a storm water detention basin for the benefit of the property and to give the District certain easement rights therein.

NOW THEREFORE, in consideration of the respective covenants contained herein, the parties agree as follows:

1) In consideration of less than one hundred dollars ($100.00), the receipt of which is hereby acknowledged, the Grantor does hereby grant and convey to the District, an easement for storm water detention over, across and within the following described land in the Township/City of _____, County of Ottawa, State of Michigan, described as shown in Exhibit A:

2) The Grantor agrees for itself, it's heirs, administrators, successors, and assigns, that it shall be the property owner's responsibility to maintain the easement area grounds including the removal of debris in such a manner that the proper functioning of the detention basin is not interfered with, and that the property owner will not make any changes in size, shape, storage capacity, rate of flow, rate of outflow, or changes in any other characteristics of the detention pond without the prior written approval of the district, which approval can only be given by the way of amendment to this instrument properly recorded. In addition, no buildings, construction, fences, shrubs, or decorative landscaping of any kind or nature shall be placed within the described easement.

3) The District may perform maintenance, improvement, and control of the hydraulic functioning of the detention basin pursuant to MPA 40, DRAIN CODE OF 1956, as amended, on successor statute. Cost for maintenance by the _____ Drain Drainage District may be charged against the property owners within the drainage district pursuant to MPA 40, DRAIN CODE OF 1956, as amended, or its successor statute. <u>The property owner on whose parcel the easement rests is responsible for the turf maintenance</u>.

4) The Grantor, it's heirs, administrators, successors, and assigns, shall save and hold the District, it's officers, employees, and agents harmless and indemnify the District against any claim or suit which seeks damages for an injury, death, or damage resulting from the construction, operation and existence of the detention pond.

5) The District may maintain the detention basin outlet in accordance with the provisions under MPA 40, Drain Code of 1956, as amended. It is further understood that a provision of these statutes allow the District to levy special assessments to the properties in the plat if it so chooses.

6) In the event the basin grounds are not properly maintained, or changes are made to the easement area pursuant to paragraph 2, which impair the function of the detention basin or drainage easement, the District may order the property owner(s), upon whose property the changes are located, or improper maintenance has occurred, to make the necessary repairs or maintenance immediately. If such ordered repairs or maintenance are not completed within five (5) days, the District may perform such maintenance or have such repairs made at the property owner's expense. All costs incurred by the District shall be billed to the property owner(s) and shall become a lien against the property(ies) in accordance with MPA 40, Drain Code of 1956, as amended.

APPENDIX C – Drainage District Agreement (433 Agreement) Use for New Drain & District

AGREEMENT FOR THE ESTABLISHMENT OF A COUNTY DRAIN AND COUNTY DRAINAGE DISTRICT PURSUANT TO SECTION 433 OF ACT NO. 40 OF THE PUBLIC ACTS OF 1956, AS AMENDED

_____ DRAIN DRAINAGE DISTRICT

THIS AGREEMENT, made and entered into this _____ day of _____, 20___, by and between PAUL GEERLINGS, OTTAWA COUNTY DRAIN COMMISSIONER, 414 Washington Avenue, Room 107, Grand Haven, Michigan, hereinafter referred to as "Drain Commissioner" on behalf of the proposed _____ Drain Drainage District; and _____, whose address is _____, hereinafter referred to as "Landowner".

WITNESSETH:

WHEREAS, Section 433 of Act Number 40 of the Public Acts of 1956, as amended, authorizes the Drain Commissioner to enter into an Agreement with Landowner to establish a drain which was constructed by the Landowner to service an area on lands owned by Landowner as a County Drain; and

WHEREAS, Landowner, pursuant to Section 433 of Act No. 40 of the Public Acts of 1956, as amended, wishes to provide drainage service to its own lands and has requested same to be established and dedicated as a county drain under the jurisdiction of the Ottawa County Drain Commissioner; and

WHEREAS, Landowner has been advised and understands and agrees to assume the total cost of the construction of the drain to include engineering, inspection, easement acquisition, legal and administrative expenses and costs related or associated with this Agreement; and

WHEREAS, Landowner understands that the Drain constructed, or to be constructed, pursuant to this Agreement, when finally accepted by the Drain Commissioner, will be known as the _____ Drain (See Exhibit A for route and course description) and that the lands owned by the Landowner described in Exhibit B will be known and constituted as the _____ Drain Drainage District; and

WHEREAS, Landowner further understands that as the owner of the lands included in this Agreement in the Township/City of _____ in which said Drain and the lands to be drained thereby are located, that these above described lands will hereafter be subject to assessments for the cost of construction, operation, inspection and maintenance of the Drain; and

WHEREAS, Landowner has agreed to assume and pay all costs as set forth herein; and

WHEREAS, Landowner has obtained, at Landowner's own expense, a certificate from a registered professional engineer satisfactory to the Drain Commissioner to the effect that the existing drain is the only reasonably available outlet for the drain and that there is sufficient capacity in the existing outlet for the proposed drain to serve as an adequate outlet, without detriment to or diminution of the drainage service which the outlet presently provides. A copy of said certificate is attached hereto as Exhibit C.

NOW, THEREFORE, in consideration of the premises and covenants of each, the parties hereto agree to as follows:

The Drain Commissioner agrees to establish the _____ Drain as a County Drain, subject to the provisions of this Agreement, upon the completion of the construction and inspection of the Drain. The route and course of the Drain is legally described in Exhibit A. The _____ Drainage District shall be established and composed of the lands legally described in Exhibit B.

Landowner agrees that construction of the drainage facilities shall comply with the standards and specifications of the Ottawa County Drain Commissioner's Office and in compliance with all generally accepted construction methods.

Landowner agrees hereto to assume all costs of the project set forth in the above mentioned plans, specifications and project designs. Said cost shall include all costs set forth in this Agreement, to specifically include:

> Actual expenses incurred by the Drainage District for inspection of the construction of the Drain. If the inspection determines there are deficiencies with the drainage facilities, landowner agrees to correct said deficiencies at his/her expense.
>
> The establishment of a permanent maintenance fund in an amount of 5% of the construction cost but not to exceed $2,500.00. Said payment shall not relieve the subject property from any future assessments levied pursuant to the Drain Code of 1956, as amended. The Landowner shall deposit said Balance Due with the Drainage District, to be used only for the purposes herein set forth and agreed upon.

The foregoing payment of the cost of the project is agreed and understood as being for the sole benefit of the Drainage District at large or part thereof, and that such payment shall not relieve the subject property from any future assessments levied pursuant to the Michigan Drain Code of 1956, as amended, for construction improvements and/or maintenance of the Drain arising by virtue of proper and legal petitions and hearings and procedures thereon.

The Landowner shall provide the Ottawa County Drain Commissioner and/or the Drainage District at the time of approval with a Bond or Letter of Credit in the sum of 110% of the remaining construction cost of the Drain, to remain in effect until final acceptance of the project by the Drainage District.

It is agreed that the Landowner shall convey to the Drainage District a map and description of the Drainage District and such easement or rights-of-way as may be necessary to accomplish the purposes herein set forth and do so without charge therefore.

The Landowner further agrees to provide, without charge, one (1) set of "As Built Plans" of the Drain, which shall include design calculations showing flow rates, imperviousness factors, drainage district and sub-

districts, easements and right-of-way locations, and any other data needed by the Drainage District for proper drain operation.

Landowner shall secure all necessary permits or authorizations as may be required by local, state or federal law and provide copies of all correspondence and reports involving any governmental agency with respect to the Drain.

Landowner agrees that said lands shall hereafter be liable for assessments levied for all costs incurred by the Drainage District, including for the operation, maintenance and improvement of the Drain, as provided in the Drain Code of 1956, as amended.

Landowner agrees to indemnify and hold harmless the Drain Commissioner for any and all claims, damages, lawsuits, costs and expenses arising out of or incurred as a result of the Drain Commissioner assuming responsibility for the Drain under federal, state and/or local laws, standards, specifications and the administrative and judicial interpretation thereof.

Modification, amendments or waivers of any provisions of this Agreement may be made only by the written mutual consent of the parties.

This Agreement shall become effective upon its execution by the Landowner and by the Drainage District and shall be binding upon the successors and assigns of each party.

IN WITNESS WHEREOF the parties hereto have caused this agreement to be executed by their duly authorized officers as of the day and year first above written.

APPENDIX D – Drainage District Agreement Extension (433 Agreement Extension) Use For Extending Drain & District

AGREEMENT FOR THE EXTENSION OF A COUNTY DRAIN AND COUNTY DRAINAGE DISTRICT PURSUANT TO SECTION 433 OF ACT NO. 40 OF THE PUBLIC ACTS OF 1956, AS AMENDED

_____ DRAIN DRAINAGE DISTRICT

THIS AGREEMENT, made and entered into this _____ day of _____, _____, by and between PAUL GEERLINGS, OTTAWA COUNTY DRAIN COMMISSIONER, 414 Washington Avenue, Room 107, Grand Haven, Michigan, hereinafter referred to as "Drain Commissioner" on behalf of the _____ Drain Drainage District; and _____ whose address is _____ _____, hereinafter referred to as "Landowner".

WITNESSETH:

WHEREAS, the _____ Drain is an established county drain under the jurisdiction of the Ottawa County Drain Commissioner pursuant to Act No. 40 of the Public Acts of 1956, as amended; and

WHEREAS, Section 433 of Act Number 40 of the Public Acts of 1956, as amended, authorizes the Drain Commissioner to enter into an Agreement with Landowner to extend the _____ Drain, with said extension constructed by the Landowner to service an area on lands owned by Landowner as a County Drain; and

WHEREAS, Landowner, pursuant to Section 433 of Act No. 40 of the Public Acts of 1956, as amended, wishes to provide drainage service to its own lands and has requested same to be established and dedicated as a part of the _____ Drain under the jurisdiction of the Ottawa County Drain Commissioner; and

WHEREAS, Landowner has been advised and understands and agrees to assume the total cost of the construction of the drain to include engineering, inspection, easement acquisition, legal and administrative expenses and costs related or associated with this Agreement; and

WHEREAS, Landowner understands that the Drain constructed, or to be constructed, pursuant to this Agreement, when finally accepted by the Drain Commissioner, will be known as the _____ Drain (See Exhibit A for route and course description of entire drain as extended) and that the lands owned by the Landowner described in Exhibit B will be included in the _____ Drain Drainage District (See Exhibit B for description of drainage district as extended; and

WHEREAS, Landowner further understands that as the owner of the lands included in this Agreement in the Township/City of _____ in which said Drain and the lands to be drained thereby are located, that these above described lands will hereafter be subject to assessments for the cost of construction, operation, inspection and maintenance of the Drain as extended; and

WHEREAS, Landowner has agreed to assume and pay all costs as set forth herein; and

WHEREAS, Landowner has obtained, at Landowner's own expense, a certificate from a registered professional engineer satisfactory to the Drain Commissioner to the effect that the existing drain is the only reasonably available outlet for the drainage from the lands to be added and that there is sufficient capacity in the existing outlet for the proposed drain to serve as an adequate outlet, without detriment to or diminution of the drainage service which the outlet presently provides. A copy of said certificate is attached hereto as Exhibit C.

NOW, THEREFORE, in consideration of the premises and covenants of each, the parties hereto agree to as follows:

The Drain Commissioner agrees to establish the drainage system as described in Exhibit A as an extension of the _____ Drain, subject to the provisions of this Agreement, upon the completion of the construction and inspection of the Drain. The route and course of the entire Drain extension is legally described in Exhibit A. The _____ Drain Drainage District shall be established and composed of the lands legally described in Exhibit B.

Landowner agrees that construction of the drainage facilities shall comply with the standards and specifications of the Ottawa County Drain Commissioner's Office and in compliance with all generally accepted construction methods.

Landowner agrees hereto to assume all costs of the project set forth in the above mentioned plans, specifications and project designs. Said cost shall include all costs set forth in this Agreement, to specifically include:

> Actual expenses incurred by the Drainage District for inspection of the construction of the Drain. If the inspection determines there are deficiencies with the drainage facilities, landowner agrees to correct said deficiencies at his/her expense.
>
> Replenish the permanent maintenance fund in an amount not to exceed $2,500.00 and/or 5% of the construction cost. Said payment shall not relieve the subject property from any future assessments levied pursuant to the Drain Code of 1956, as amended. The Landowner shall deposit said Balance Due with the Drainage District, to be used only for the purposes herein set forth and agreed upon.

The foregoing payment of the cost of the project is agreed and understood as being for the sole benefit of the Drainage District at large or part thereof, and that such payment shall not relieve the subject property from any future assessments levied pursuant to the Michigan Drain Code of 1956, as amended, for construction improvements and/or maintenance of the Drain arising by virtue of proper and legal petitions and hearings and procedures thereon.

The Landowner shall provide the Ottawa County Drain Commissioner and/or the Drainage District at the time of approval with a Bond or Letter of Credit in the sum of 110% of the remaining construction cost of the Drain, to remain in effect until final acceptance of the project by the Drainage District.

It is agreed that the Landowner shall convey to the Drainage District a map and description of the Drainage District and such easement or rights-of-way as may be necessary to accomplish the purposes herein set forth and do so without charge therefore.

The Landowner further agrees to provide, without charge, one (1) set of “As Built Plans” of the Drain, which shall include design calculations showing flow rates, imperviousness factors, drainage district and sub-districts, easements and right-of-way locations, and any other data needed by the Drainage District for proper drain operation.

Landowner shall secure all necessary permits or authorizations as may be required by local, state or federal law and provide copies of all correspondence and reports involving any governmental agency with respect to the Drain.

Landowner agrees that said lands shall hereafter be liable for assessments levied for all costs incurred by the Drainage District, including for the operation, maintenance and improvement of the Drain, as provided in the Drain Code of 1956, as amended.

Landowner agrees to indemnify and hold harmless the Drain Commissioner for any and all claims, damages, lawsuits, costs and expenses arising out of or incurred as a result of the Drain Commissioner assuming responsibility for the Drain under federal, state and/or local laws, standards, specifications and the administrative and judicial interpretation thereof.

Modification, amendments or waivers of any provisions of this Agreement may be made only by the written mutual consent of the parties.

This Agreement shall become effective upon its execution by the Landowner and by the Drainage District and shall be binding upon the successors and assigns of each party.

IN WITNESS WHEREOF the parties hereto have caused this agreement to be executed by their duly authorized officers as of the day and year first above written.

APPENDIX E – Register of Deeds Requirements

This document is for reference only and should not be generated for filing purposes.

All legal documents must be recorded with the Ottawa County Register of Deeds. Therefore, it must abide by the following recording requirements:

1. Signatures must be original and names must be typed, stamped or printed beneath all written signatures in black ink. MCLA 565.201(a)(e)

2. No discrepancy in the names shall exist between the printed names of such person, as appears either in the body of the instrument, the signature, the acknowledgment or jurat. MCLA 565.201(b)

3. Instruments conveying or mortgaging any interest in real estate shall state the marital status of any male grantors. MCLA 565.221

4. The addresses of all parties must appear on any instrument by which title to any interest therein is conveyed, assigned, encumbered or other wise disposed of. MCLA 565.201(a)(f)

5. The name and address of the person who drafted the document must appear on documents executed in Michigan. MCLA 565.201 (a), 565.203

6. The Notary certificate shall include the name, title and company as shown in the signature block of the signature being notarized.

7. A certified copy of the death certificate or proof of death must be recorded when the instrument of conveyance states “survivor” in the grantor’s section. MCLA 565.48

8. The first page must have a 2 ½” top margin. All other sides and pages must have a ½” minimum margin. The type size shall be no smaller than 10 point. MCLA 5858

9. Recording fees are $14.00 for the first page of each new document and $3.00 each additional page within the document. Recording fee checks shall be made payable to the Ottawa County Drain Commissioner’s Office unless you will be recording the document yourself with the Register of Deeds, than checks need to be made payable to the Ottawa County Register of Deeds.

APPENDIX F – Engineer's Certification Samples

The following must be an exhibit in any of our 433 Agreements where the engineer certifies that the receiving watercourse is capable of handling the water leaving the site in question and that the water drains naturally to the receiving watercourse or is the only reasonable outlet.

The Engineer's Certificate must be signed and sealed by a register professional engineer.

ENGINEER'S CERTIFICATE

I, _____, a Professional Engineer, do certify that:

The lands to be developed naturally drain into the area to be served by the constructed or to be constructed drain, or that the said drain is the only reasonably available outlet for drainage from lands to be developed.

To my knowledge, there is existing capacity in the existing outlet to serve the lands to be developed without detriment or diminution of the drainage service provided or to be provided in the near future.

_____

Date:
PE License #_____

The following certificate must be submitted to the Drain Commissioner's Office with "As Built" Drawings prior to a development receiving Final Approval or relinquishing any performance sureties.

The Engineer's Certificate must be signed and sealed by a register professional engineer.

ENGINEERS CERTIFICATE
FOR STORM WATER SYSTEMS

DATE: _____

PROJECT NAME: _____

MUNICIPALITY: _____ SECTION: _____

I hereby certify that the construction of the storm water system improvements is complete.

Exception(s) _____

_____

_____.

And that:

I have personally directed the supervision and inspection of the construction.

All improvements to date have been installed in accordance with the approved construction plans and the current standards and specifications of the Ottawa County Drain Commissioner and MDEQ.

The construction materials meet the aforementioned specifications.

_____

Date:
PE License #_____

APPENDIX G – Rational Method Runoff Coefficients, Cd

Land Use Description	10% annual chance design	1% annual chance design
Open Water	1.00	1.00
Concrete or asphalt surfaces	0.90	1.00
Roof covered surfaces	0.90	1.00
Gravel surfaces	0.50	0.60
Natural surfaces		
Sandy soil, < 2% slope	0.10	0.12
Sandy soil, 2% to 7% slope	0.15	0.18
Sandy soil, > 7% slope	0.20	0.24
Heavy soil, < 2% slope	0.17	0.20
Heavy soil, 2% to 7%	0.22	0.26
Heavy soil, > 7% slope	0.30	0.36
Normal ranges of C for the following land uses:		
Commercial and Industrial	0.50 - 0.95	0.60 - 1.00
Multifamily Residential	0.40 - 0.75	0.48 - 0.90
Single Family Residential	0.25 - 0.50	0.30 - 0.60
Rural Residential & Agricultural land	0.15 - 0.30	0.18 - 0.36

Composite runoff coefficients are determined by averaging the proportions of the above land uses. For example, a 10 acre site on heavy soils with a 1% slope, with 2 acres of pavement/roof, 1.5 acre of gravel parking and a 1 acre pond:

C = [2 x 0.90 + 1.5 x 0.50 + 1 x 1.00 + 5.5 x 0.17]/10 = 0.45 for 10% annual chance design

C = [2x 1.00 + 1.5 x 0.60 + 1 x 1.00 + 5.5 x 0.20]/10 = 0.50 for 1% annual chance design

APPENDIX H – Rainfall Frequency Tables & Chart

Bulletin 71 Rainfall Depth - Duration - Frequency Tables for Ottawa County, Michigan

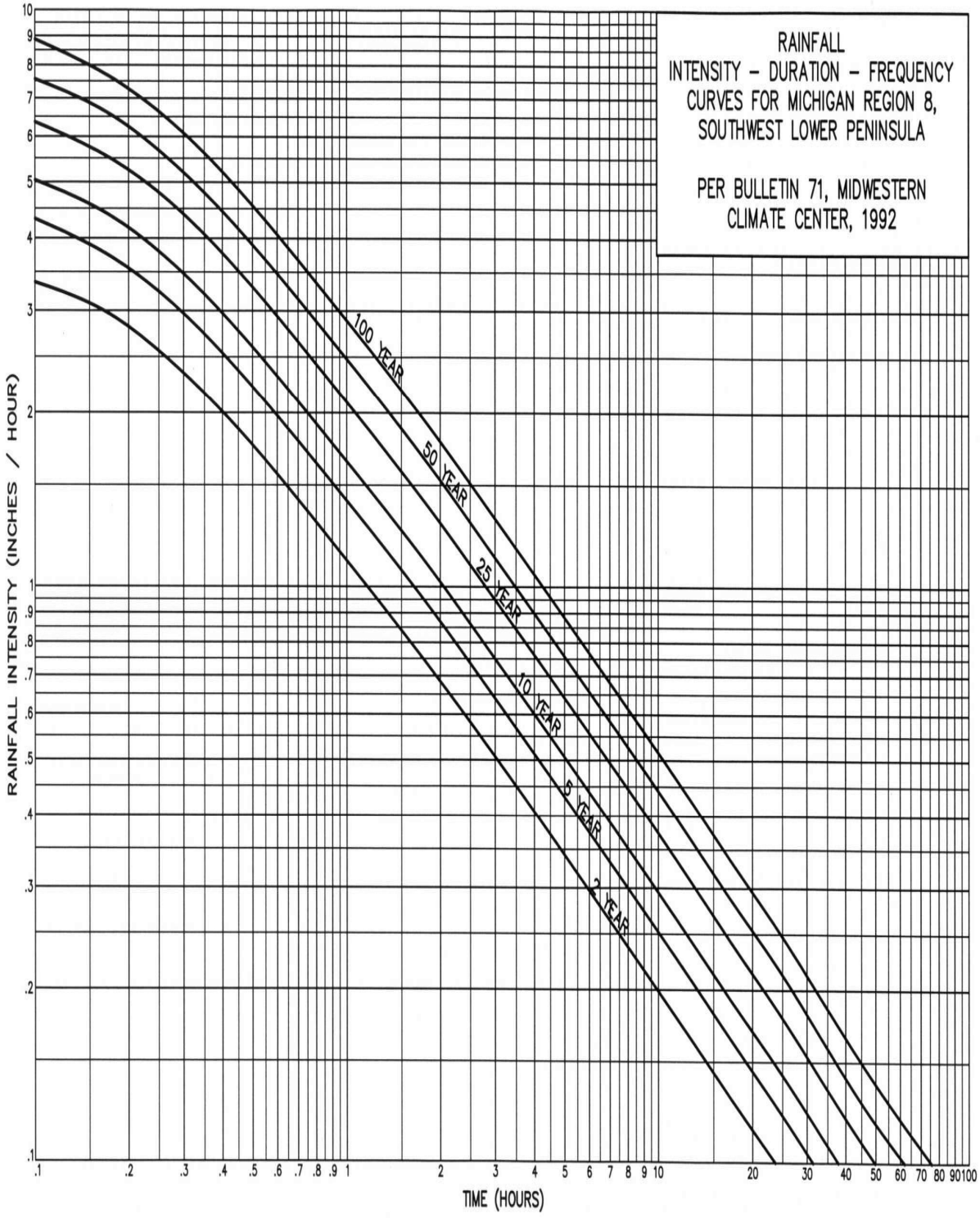
Rainfall Depth (inches) for given recurrence interval

Duration	50% annual chance (2 year)	10% annual chance (10 year)	4% annual chance (25 year)	1% annual chance (100 year)
5 min.	0.28	0.42	0.53	0.74
10 min.	0.50	0.74	0.93	1.29
15 min.	0.64	0.95	1.20	1.66
30 min.	0.88	1.30	1.65	2.28
1 hour	1.11	1.65	2.09	2.89
2 hour	1.37	2.04	2.58	3.57
3 hour	1.52	2.25	2.85	3.94
6 hour	1.78	2.64	3.34	4.61
12 hour	2.06	3.06	3.87	5.35
24 hour	2.37	3.52	4.45	6.15

Bulletin 71 Rainfall Intensity - Duration - Frequency Tables for Ottawa County, Michigan

Rainfall Intensity (in/hr) for given recurrence interval

Duration	2 year	10 year	25 year	100 year
5 min.	3.36	5.04	6.36	8.88
10 min.	3.00	4.44	5.58	7.74
15 min.	2.56	3.80	4.80	6.64
30 min.	1.76	2.60	3.30	4.56
1 hour	1.11	1.65	2.09	2.89
2 hour	0.68	1.02	1.29	1.78
3 hour	0.51	0.75	0.95	1.31
6 hour	0.30	0.44	0.56	0.77
12 hour	0.17	0.26	0.32	0.44
24 hour	0.10	0.15	0.18	0.26


RAINFALL
INTENSITY – DURATION – FREQUENCY
CURVES FOR MICHIGAN REGION 8,
SOUTHWEST LOWER PENINSULA
PER BULLETIN 71, MIDWESTERN
CLIMATE CENTER, 1992
100 YEAR
50 YEAR
25 YEAR
10 YEAR
5 YEAR
2 YEAR
RAINFALL INTENSITY (INCHES / HOUR)
TIME (HOURS)
10
9
8
7
6
5
4
3
2
1
.9
.8
.7
.6
.5
.4
.3
.2
.1
.1 .2 .3 .4 .5 .6 .7 .8 .9 1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100

APPENDIX I - Non-Mandated Detention Zones

(unless required by other federal, state or local standards and specifications), In the following zones:

Storm water retention/detention is the standard for all development in Ottawa County unless the design engineer can adequately satisfy one of the following conditions:

- Verify that the receiving water(s) possess capacity to convey the increased flows safely and with no negative downstream impacts due to increased flow rates, water levels or velocities;
- Verify that the peak flow of the receiving water(s) will not be increased by the proposed development;
- Verify that the proposed development is listed below as a designated non-detention zone.

Although satisfying one or more of the above criteria may relieve a developer from installing storm water detention, the Drain Commissioner reserves the right to water quality improvement features, or specify that additional flood plain storage volume be excavated in lieu of detention. The required volume of increased flood plain storage will be equivalent to that calculated by the standard detention basin methodology, and will be measured in the field as the volume excavated below the 1% annual chance and above the 50% annual chance flood plain elevations of the adjacent water course. No detention is required when outletting directly into the Grand River, Spring Lake or their connecting bayous (sedimentation/water quality basin required). Furthermore, no detention is required for the following jurisdictions at the stated outlet locations when outletting directly into:

Allendale Township

Ottawa Creek east of 40th Avenue (sedimentation/water quality basin required)

Crockery Township

Crockery Creek, riparians downstream of Fitzgerald St. in Section 23

Georgetown Township

Rush Creek, riparians downstream of its intersection with Bliss Creek in Section 24

Bliss Creek, north of Jackson St. subject to Bliss Creek Policy Statement

Grand Haven Township

Vincent Drain downstream of 168th Avenue

Holland City

Lake Macatawa (sedimentation/water quality basin required)

Macatawa River, riparian properties beginning within Section 26, downstream to Lake Macatawa (floodplain protection/enhancement preferred)

Macatawa River, riparian properties beginning within Section 26, downstream to Lake Macatawa (floodplain protection/enhancement preferred)

Tulip Intercounty east of M-40 subject to Tulip Intercounty Policy Statement

Holland Township

Lake Macatawa (sedimentation/water quality basin required)

Macatawa River, riparian properties beginning within Section 26, downstream to Lake Macatawa (floodplain protection/enhancement preferred)

Macatawa River, riparian properties beginning within Section 26, downstream to Lake Macatawa (floodplain protection/enhancement preferred)

Tulip Intercounty east of M-40 subject to Tulip Intercounty Policy Statement

Park Township

Lake Macatawa (sedimentation/water quality basin required)

Harlem Drain, riparian properties beginning at the intersection of Drain 21/31 and the Harlem, Section 13, Park Township, downstream to Lake Macatawa

Polkton Township

Deer Creek, riparians downstream of Mill Road in the NW corner of Section 1

Port Sheldon Township

Pigeon Lake

Pigeon River, properties beginning within Section 14 downstream to Pigeon Lake

Tallmadge Township

Sand Creek riparians downstream of its intersection with Little Sand Creek in Section 27

APPENDIX J - GIS Digital Submission Requirements

The following *separate layers* should be included:

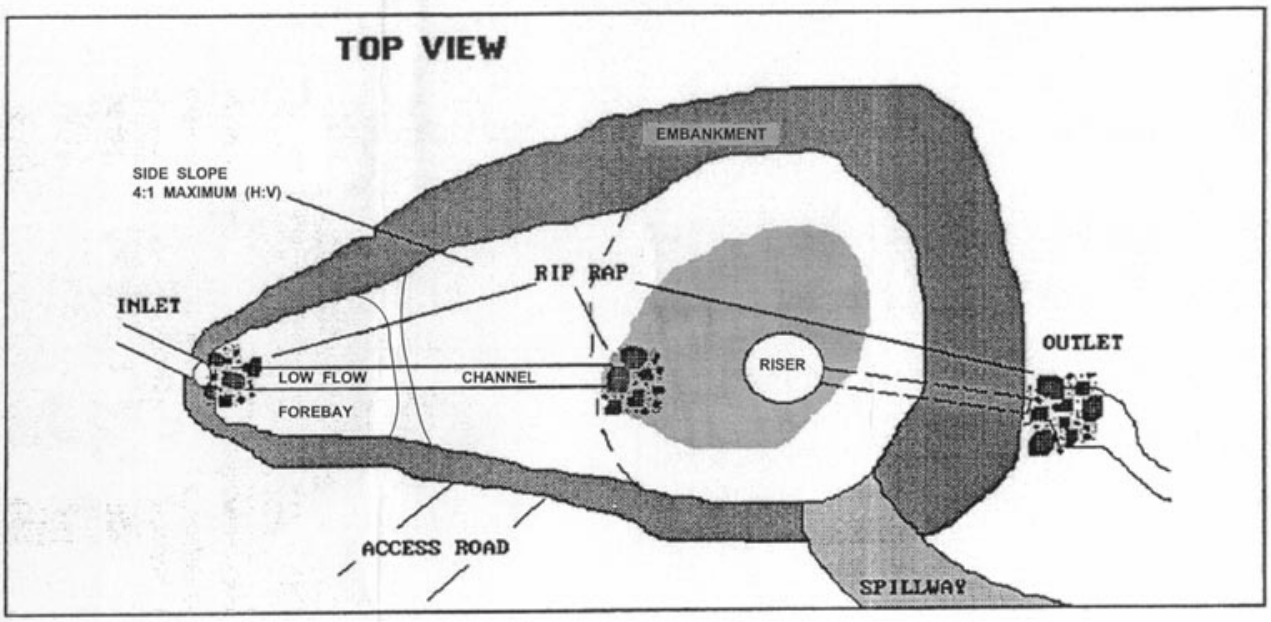
1. Lot Numbers
2. Lot Lines
3. Lot Dimensions
4. Right-of-Way Dimensions
5. Right-of-Way Names
6. Subdivision Boundaries
7. Water/Storm/Hydrants/Sewer Lines/Culverts
8. Easements
9. Easement Dimensions
10. Contours
11. Any other features of value in determining overall drainage requirements

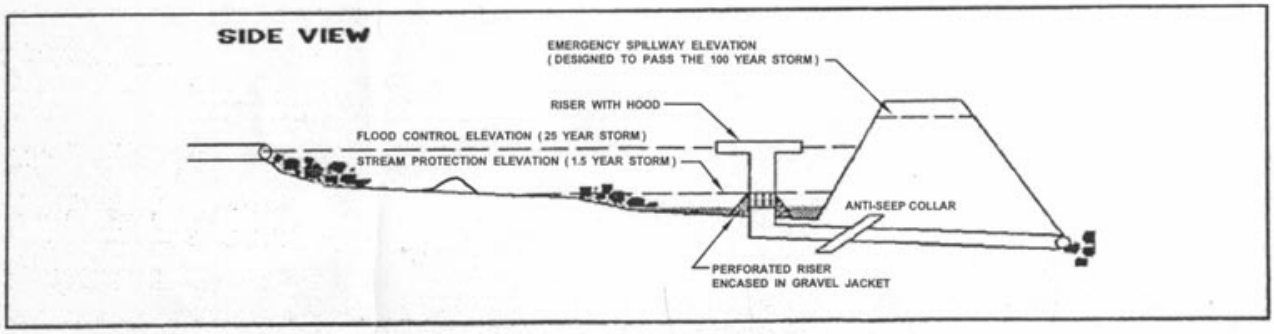
Technical Notes:

1. All lines must be snapped closed. (no dangles, overstrikes, or understrikes)
2. All files should be in a .dxf format
3. Lot and Right-of-Way dimension layers should have nothing more than leaderlines
4. Layers should have a reasonable label of what can be found on each layer
5. To insure the files come intact they should be zipped
6. E-mail (gisdept@co.ottawa.mi.us), Diskettes or CD are acceptable ways to receive the files
7. Hatching should all be on one layer with no other items
8. Layout design and any tables should be in one layer

APPENDIX K – Extended Duration Detention Basin Sample

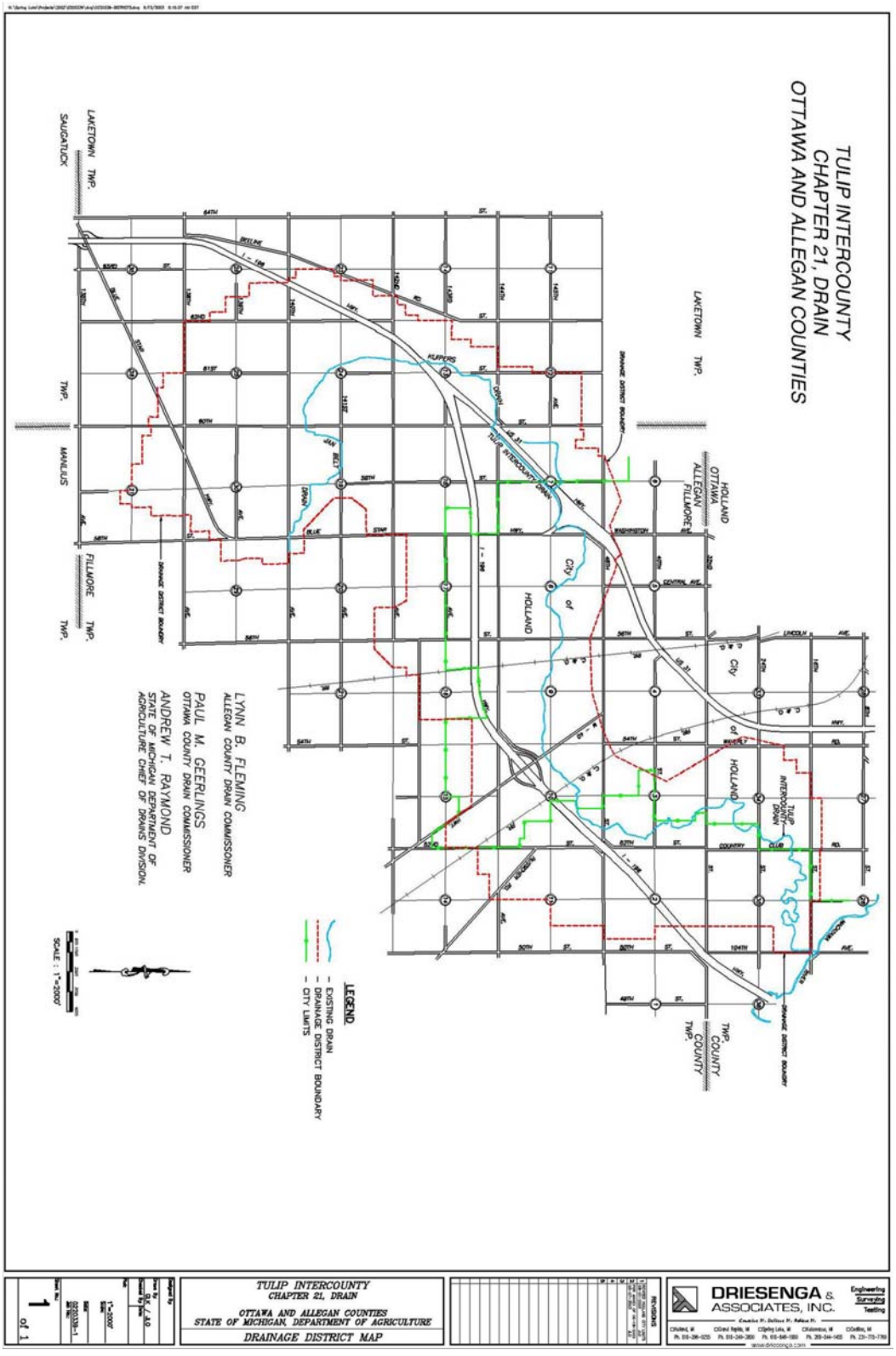
Exhibit 1
Typical 2 Stage Extended Detention Basin





SOURCE: GUIDE BOOK OF BMPS FOR MICHIGAN WATERSHEDS, MDEQ (MODIFIED FOR OTTAWA COUNTY DRAIN COMMISSIONER)

APPENDIX L – Tulip Intercounty Drainage District Map



APPENDIX M – Application for Drain Commissioner's Approval

APPLICATION FOR

DRAIN COMMISSIONER'S APPROVAL

(Michigan Land Division Public Act 591 of 1996, Act 96, P.A 1987
and when requested by local government)

Please fill out the attached permit application, include two prints prepared by a professional engineer, storm water control calculations, any additional information that will help with the review and the appropriate fees. Please note that this application will not be processed unless all the correct information has been submitted.

Your application and storm water management plan will be reviewed by one of our reviewing engineer's, an on-site inspection will be made and if no additional information is needed a letter of response will be sent to you for your review and comment. Once all issues are addressed the Drain Commissioner will send out a letter of approval. Review of application and plan can take up to 30 days upon receipt of complete application.

If you have any questions or are in need of assistance in filling out the application, please contact April Abbatoy at (616) 846-8114.

Please make check payable to: **Ottawa County Drain Commission**

Mail or bring in all necessary information to:

April Abbatoy
Development Coordinator
Ottawa County Drain Commissioner's Office
414 Washington Street, Room 107
Grand Haven, MI 49417

09/27/05

DRAIN COMMISSIONER'S APPROVAL
PERMIT APPLICATION

Project Name _____

Development Type:

PLAT	**SITE CONDO**	**PARCEL SPLIT**
APARTMENT COMPLEX	**CONDOMINIUMS**	**DUPLEXES**
MOBILE HOME PARK	**CHURCH**	**SCHOOL**
COMMERCIAL/BUSINESS PARK	**COMMERCIAL**	**INDUSTRIAL**
INDUSTRIAL PARK	**OTHER** _____	

# of Acres _____ # of Lots/Units (if applicable) _____

Distance to nearest County Drain/Watercourse _____

Name of County Drain/Watercourse _____

Project Location:

Township/City _____ Section _____ Quarter Section _____

Project Address: _____ Parcel #: _____

Submit a location map showing all major cross streets around the site.

DEVELOPER _____

Mailing Address _____

City/State/Zip _____

Contact Person _____ Ph. # _____

ENGINEER _____

Mailing Address _____

City/State/Zip _____

Contact Person _____ Ph. # _____

FEES (see attached fee schedule for correct fees):

Administrative Fee $_____ Review Fee $_____

FEE SCHEDULE

Preliminary Plans (Plats & Site Condos)
- Administration Fee $200.00
- Review Fee ..... $10.00 per lot (min. of $200.00)

Construction Plans (Plats & Site Condos)
- Administration Fee .....$0.00 (due w/ preliminary submittal)
- Review Fee
  - Open Storm Drain..... $0.25 per foot
  - Rear Yard Drainage Patterns w/ drainage easement ..... $0.25 per foot
  - Enclosed Storm Drain..... $0.60 per foot
  - Detention/Retention Ponds (greatest distance across)..... $0.60 per foot

Development Plans (All other types of projects)
- Administration Fee $50.00
- Review Fee
  - Less than 1 acre..... $350.00
  - 1 - 10 acres $500.00
  - 11 - 19 acres $750.00
  - 20 acres or more $1,000.00

NOTE: It may be necessary to obtain a Soil Erosion & Sedimentation Control Permit and/or Drain Use Permit. Please contact this office if you need help determining whether you need the additional permits (616) 846-8220.

APPENDIX N - Submittal Checklists for Drainage Approval

OTTAWA COUNTY DRAIN COMMISSION

PRELIMINARY PLAN REVIEW SUBMITTAL

CHECKLIST FOR _____

Application

Administration Fee ($200)

Preliminary Review Fee ($10 ea. lot, min. $200)

Two sets of Preliminary Plans (the plans shall include the following:)

- Project Name
- Location Map
- Township, Section, Quarter Section
- Label neighboring properties
- Existing contour information
- Proposed contour information
- Scale (1" = 100' or better)
- Developer (name, address & phone #)
- Engineering Firm (name, address & phone #)
- Identify County Drains/natural watercourses/manmade drainage ditches
- Existing drainage easements
- Lots layout
- Lot dimensions
- Development dimensions

Upstream & downstream culvert sizings

Revision Date(s)

OTTAWA COUNTY DRAIN COMMISSION

CONSTRUCTION PLAN REVIEW SUBMITTAL

CHECKLIST FOR _____

Preliminary Approval (____/____/____) (if applicable)

Application (plats & site condominiums should have submitted with Preliminary Plans)

Administration Fee ($50 or $200 for plats & site condominiums, should have submitted with Preliminary Plans)

Review Fee (see fee schedule)

Soil Borings Information (when necessary)

Drainage Calculations

Two sets of Construction Plans, include the following:

- Project Name
- Location Map
- Township, Section, Quarter Section
- Label neighboring properties
- Signed Engineer's Seal
- Existing contour information
- Proposed contour information
- Scale (1" = 100' or better)
- Developer (name, address & phone #)
- Engineering Firm (name, address & phone #)
- Identify County Drains/natural watercourses/manmade drainage ditches

- Existing drainage easements
- Proposed drainage easements
- Lot dimensions
- Building dimensions
- Revision Date(s)
- Erosion & Sedimentation Controls

Any additional information that may be helpful in the review process

OTTAWA COUNTY DRAIN COMMISSION

SITE CONDOMINIUM CONSTRUCTION/FINAL APPROVAL

CHECKLIST FOR _____

Preliminary Approval (____/____/____)

Construction Plan Review Fees (25¢ per foot, open drain & swales; 60¢ per foot, enclosed drain & basin)

Soil Borings Information (when necessary)

Drainage Calculations

Two sets of Construction Plans, include the following:

- Project Name
- Location Map
- Township, Section, Quarter Section
- Label neighboring properties
- Signed Engineer's Seal
- Existing contour information
- Proposed contour information
- Scale (1" = 100' or better)
- Developer (name, address & phone #)
- Engineering Firm (name, address & phone #)
- Identify County Drains/natural watercourses/manmade drainage ditches
- Existing drainage easements

Proposed drainage easements

Lot dimensions

Building dimensions

Revision Date(s)

Erosion & Sedimentation Controls

Any additional information that may be helpful in the review process

Construction Plan Review Letter (all items have been addressed to the satisfaction of our reviewing engineer)

Copy of the Final Plan

433 Agreement

Future Maintenance Money (5% of the cost of storm system or a maximum of $2,500)

Easement Documents (for all drainage easements on-site & off-site)

Recording Fees (433 Agreement, Easement Documents) ($14 first page, $3 ea. additional page)

Master Deeds (required verbiage, block grading plan, min. opening & basement floor elevations)

Digital Final Plan emailed to Ottawa County GIS (gisdept@co.ottawa.mi.us)

Value for the drainage system (i.e. contractor's bid sheet)

Letter of Credit (to be replaced by AS BUILTS & Engineer's Certificate prior to it's expiration)

OTTAWA COUNTY DRAIN COMMISSION

FINAL PLAT SUBMITTAL

CHECKLIST FOR _____

Preliminary Approval (____/____/____)

Construction Plan Approval (____/____/____)

All Fees have been Paid

Copy of the Final Plat

Digital Final Plat emailed to Ottawa County GIS (gisdept@co.ottawa.mi.us)

433 Agreement

Future Maintenance Money (5% of the cost to construct the storm system with a maximum of $2,500)

Value for the drainage system (i.e. contractor's bid sheet)

Easement Documents (when not shown on final plat)

Recording Fees (433 Agreement, Easement Documents) ($14 first page, $3 ea. additional page)

Restrictive Covenants (required verbiage, block grading plan, min. opening & basement floor elevations)

Letter of Credit (may be submitted temporarily in place of AS BUILTS Drawings & Engineer's Certificate)

AS BUILTS Drawings

Engineer's Certificate

GLOSSARY

As Built Plans
Revised construction plans drawn in accordance with all field changes.

Base Flow
The portion of stream flow that is not due to rainfall runoff or snowmelt, usually generated by ground water seepage or discharges from lakes or wetlands.

Best Management Practice (BMP)
A practice or combination of practices that best prevent or reduce storm water runoff quantity or quality impacts.

Buffer Strip
A zone where plantings capable of filtering storm water are established or preserved, and where construction, paving and chemical applications are prohibited. Generally established adjacent to open watercourses.

Catch Basin
A storm water inlet structure designed to collect and convey water into a storm sewer system, designed so that sediment falls to the bottom of the catch basin below the pipe elevation.

Check Dam
1) An earthen, aggregate or log structure, placed in conveyance channels to reduce runoff velocity, promote sediment deposition, and enhance infiltration.
2) A log or gabion structure placed perpendicular to a stream to enhance aquatic habitat.

Design Storm
A rainfall event of specified size, duration and return frequency, (e.g., a 10 year storm is a storm that is exceeded once every 10 years). A Design Storm is typically used to calculate the runoff volume and peak discharge rate for sizing conveyance systems (streams, pipes, etc.), detention basins and/or retention basins.

Detention Basin
A constructed or natural basin that temporarily stores water before discharging into a conveyance system. Basins can be classified into four groups:

Dry Detention Basin
A basin that remains dry except for short periods following large rainstorms or snowmelt events. This type of basin is least effective at removing pollutants.

Extended Dry Detention Basin
A dry detention basin that has been designed to increase the length of time that storm water will be detained, typically between 24 - 40 hours. This type of basin is less effective than a wet

basin at removing nutrients such as phosphorus and nitrogen, unless a shallow marsh is incorporated into the lower stage of the design.

Wet Detention Basin

A basin that contains a permanent pool of water that will more effectively remove nutrients in addition to other pollutants.

Extended Wet Detention Basin

A wet detention basin that has been designed to increase the length of time that storm water will be detained, typically between 24 - 40 hours.

Drain Use Permit

A permit issued by the Ottawa County Drain Commissioner for any work done within a county drain or drain easement such as crossing, cleaning out or relocating.

Easement

A legal right, granted by a property owner to another entity, allowing that entity to make limited use of the property involved for a specific purpose. The Drain Commissioner secures temporary and permanent easements over and adjacent to county drains for the purpose of construction and maintenance access. Easements are recorded on the title to the land and transfer with the sale of land. Also known as a right-of-way.

Engineer

Professional Engineer hired by the Drain Commissioner to review projects on his behalf.

Freeboard

The vertical distance from the top of an embankment to the maximum water elevation encountered during the design storm. This space is required as a safety margin in a pond, basin or channel.

French Drain

A sub grade drain consisting of a trench filled with aggregate to permit water movement through the trench and into the soil. The trench may also contain perforated pipe to enhance the efficiency of the system.

Invert

The elevation of the bottom interior surface of a conduit at any given cross section.

Non-point Source Pollution

Storm water conveyed pollution that is not identifiable to one particular source, and occurs at locations scattered throughout the drainage basin. Typical sources include erosion, agricultural activities, and runoff from urban lands.

One Hundred Year Flood (100-year flood)

The flood that has a 1 percent chance of being equaled or exceeded in any given year.

Ordinary High Water Mark

The line between upland and bottomland that persists through successive changes in water level, below which the presence of water is so common or recurrent that the character of the soil and vegetation is marked differently from the upland.

Peak Discharge
The maximum rate of storm water flow, referenced to a specific design storm event.

Plunge Pool
A small permanent pool located at either the inlet to, or outfall from a BMP. The primary purpose of the pool is to dissipate the velocity of storm water runoff.

Professional Engineer
Professional Engineer registered or licensed in the State of Michigan.

Professional Surveyor
Professional Surveyor registered or licensed in the State of Michigan.

Proprietor
Any person, firm, association, partnership, corporation (or any combination) who submits a site plan for drainage review, (may also be referred to as developer or owner.)

Release Rate
The maximum allowed rate of discharge in volume per unit time (i.e. cubic feet per second) from a detention facility.

Retention Basin
A storm water management facility designed to capture runoff that does not discharge directly to a surface water body. The water is "discharged" by infiltration or evaporation.

Runoff Coefficient, C
The ratio of the amount of water that is NOT absorbed by the surface to the total amount of water that falls during a rainstorm. (i.e. C = 0.67 implies $^2/_3$ of rainfall runoff, $^1/_3$ is absorbed, or otherwise held.)

Sheet flow
Runoff which flows over the ground surface as a thin, even layer, not concentrated in a channel.

Swale
A natural depression or wide shallow ditch used to convey, store and/or filter runoff.

Underdrain
Perforated pipe installed to collect and remove excess rainfall infiltration into the ground. Also installed to control the maximum elevation of groundwater.