



WATER RESOURCES
COMMISSIONER'S STORM WATER
MANAGEMENT STANDARDS

PROCEDURES AND DESIGN CRITERIA FOR
DEVELOPMENTS & REDEVELOPMENTS
WITHIN CALHOUN COUNTY

DATE: August 2013

PREPARED BY:



CIVIL ENGINEERS, INC

Project Number 091201

&
CALHOUN COUNTY
WATER RESOURCES COMMISSIONER

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Orientation:

Certain laws of the State of Michigan and local ordinances require the review and approval of developments by the County Water Resources Commissioner. (The title Water Resources Commissioner (WRC) has replaced the Drain Commissioner in Calhoun County as it has in multiple other counties in Michigan.) The "Drain Code" allows for the WRC to create design and construction standards such as these. This document was accepted by the Calhoun County Board of Commissioners on September 5, 2013 and replaced the standards previously adopted on October 6, 2011. This document, herein called the "Standards", provides the review procedures, design criteria, applicable fees, and some of the forms used for development reviews. The goal is to have controlled growth that enhances the economy and does not negatively impact adjacent lands or the environment. Developments in Calhoun County will therefore follow these Standards and it is encouraged that all governmental agencies in Calhoun County do the same to manage storm water runoff from their developments.

In an effort to practice consistent storm water management in Calhoun County, the design criteria of these Standards is the design information established by the Battle Creek Area Clean Water Partners' (BCACWP) Technical Reference Manual (TRM). The TRM was created as part of the NPDES Phase II MS4 Storm Water Permitting process and is being used by the other permittees as well. Low Impact Development is encouraged in these Standards.

These Standards do not relieve any professionals involved with the project from their responsibilities and obligations as required by statute and standard practice of their respective professions. The WRC is attempting to provide controlled, well managed growth that impacts drainage, public health, and welfare. Individual designs and recommendations for each project by the proprietor's consultants must provide due diligence. Discretion and professional judgment standard to the industry will still be necessary.

It is suggested by these Standards that the developer and his or her licensed design professional contact the WRC to discuss drainage plans prior to preparing a submittal package. This allows for the WRC and his/her consultant, if needed, to review and interpret the Standards, and review unique site characteristics. This will save time for the developer.

Severability Clause: Any portion of these Standards found to be invalid by a court or arbitration board shall not affect the enforcement/authority of the remaining portions.

The Water Resources Commissioner reserves the right to grant variances of the Standards on an individual basis and to require more than these Standards if he/she feels it is necessary to protect the health and welfare of the public and the environment.

Statement to Municipalities:

Review of subdivision condominiums and site plans by the WRC and a Michigan Licensed Professional Engineer using these Standards will minimize the possibility of these developments causing drainage issues that often lead to the need to create a county drain. Creation of a county drain typically leads to “at large” assessments to local municipalities. Often the determination by the WRC of “benefits derived” by the local municipality would be based on how well the problem causing developments were reviewed when approved. In other words if drainage standards exist but the local municipality chooses not to use them, they are choosing to increase their benefit (and therefore assessment) relative to a possible future new drain.

Section I: Submittal & Review Procedures

In general, submittals shall consist of what is required by law and/or these Standards. Review of submittals may result in a written list of deficiencies which will need to be addressed prior to approval. The WRC may hire a consultant to assist with the review. Consultant fees shall be paid for by the applicant to the WRC.

A. Initial Design Conference-

It is strongly encouraged that a meeting take place during the concept design phase of a project so that design criteria and submittal procedures can be reviewed with the designer. This will best communicate what will need to be submitted and address unique project design features upfront. The intent of this meeting will be to make the review process as quick and easy as possible.

B. Review and Comment by the WRC-

The WRC will review and comment on submitted plans and calculations in a reasonable amount of time. This is typically within 30 days. If law requires a quicker turn-around then the time frame will be what is required. Payment of all fees is prerequisite to approval (see Section III Fees).

C. Plans-

Plans shall be submitted to the WRC's Office pursuant to State statute and in accordance with these Standards. Unless otherwise required, **three sets** of submittals shall be given to the WRC. The following check list provides what is necessary for plan submittal.

General Requirements:

- Plans shall be sealed by a Professional Engineer licensed in Michigan.
- Show a sheet number, revision date, north arrow, and graphic scale on each page.
- Provide a USGS (NGVD 88) benchmark description.
- Provide a Legend on each sheet of the plans.

Cover Sheet & General Requirements:

- Provide name, address, email, and phone number for the proprietor and engineer on the cover sheet.
- Show in large text the proposed development's name on the cover sheet, and in the border or title block of all other sheets.
- Included a location map showing section lines and numbers, town and range, roads and names, municipal boundaries, prominent water features, north arrow, legal description of the parcel to be developed, and an engineer's scale (if possible).

Overall Plan:

- Show relevant features such as adjoining roads, developments, property lines, recorded easements, adjacent property ownership, structures, railroads, power lines, utilities, watercourses, wetlands, etc. Show Liber and Pages of recorded documents within the proposed development.
- Show proposed roads, lots, buildings, parking lots, easements, parks, etc.
- Easements will be required over all storm water facilities to be dedicated to the WRC including those located within road right-of-ways. Enough space in the form of an easement needs to be reserved for the proper operation and maintenance of the storm water management system. In order to accomplish this, the following easement widths will be required at a minimum:
 - Open drains = 30 feet plus the top width of the channel, centered on the drain centerline.
 - Enclosed drains = 20' if less than 5' deep, 30' if 5 to 10' deep, 40' if 11 to 15' deep, and 50' if 16 to 20' deep, all centered on the enclosure.
 - Other facilities = sufficient easements for access and maintenance.If the WRC determines that additional space is needed these minimum widths will be increased. Reductions may also be made only at the discretion of the WRC. Structures, septic tank drain fields, pools, etc. will not be allowed within the easements. (see the Example Drain Easement form)
- Show the future phases (if there are any) of the overall development.
- Building setback lines shall be shown.
- Indicate offsite drain easements or right-of-way as proposed.

Hydrology Plan:

- Show any offsite watershed areas that drain onto the proposed development with boundaries, land use, and acreages.
- Indicate tributary areas to each storm water intake location unless a reduced version of this information is being provided with calculations.
- Indicate any phases for future growth of the development and clearly show which phase is requesting approval.
- Show contour lines at no less than 2-foot intervals for the entire watershed. If the watershed extends more than 300 feet beyond the development boundaries USGS Quadrangle Topography may be provided in place of 2-foot contours.
- Indicate the 100-year flood plain (for lakes, ponds, drainage basins, self-contained low areas, rivers, streams, and drains) contour elevations (existing and proposed).
- Designate the total tributary area to each storm water storage basin. No tributary area to a basin shall exceed 50 acres unless a variance is granted by the WRC.
- Show all existing drainage courses and structures (with proper labeling as to type, size and invert elevations).
- Indicate existing and proposed storm water drainage flow patterns using arrows.
- Show existing utility, and transportation systems along with land uses, water features, and drainage courses.
- The proposed watershed boundaries shall conform to existing watershed boundaries, natural drainage patterns and any established county drain districts. Indicate existing and proposed tributary areas.

Site Grading Plan(s) and Plan & Profiles:

- Provide at least one benchmark elevation, location, and description per sheet.

- The minimum scale used on plans shall be: 1" = 50' (1" = 60' not acceptable; over-all hydrology plan may be larger) 1" = 40' for plan and profile plans.
- Show all existing and proposed storm water conveyance items such as inlets, manholes, pipes, and swales; label elevation, sizes, types, and slopes.
- Indicate existing and proposed minimum basement opening elevations. These minimum elevations, once reviewed, may be required in the deed restrictions prior to a final approval.
- Provide a typical lot grading plan detail, with information regarding typical drainage, drainage arrows and the minimum house opening elevation (if applicable).
- Provide permanent and temporary erosion control measure locations, details and specifications.
- Show specifications for establishing vegetation in all areas disturbed by construction.
- All proposed easements shall be shown and storm water related easements shall be dimensioned. A note stating that no septic tanks or drain fields may be placed within a storm water related easement shall be provided (only if public sanitary sewer is not going to be constructed).
- Provide flood routing information to show what would happen if the conveyance systems were over loaded or plugged.
- Include typical cross-sections of swales, pipe trenches, structures, erosion control measures, etc. Indicate backfill and compaction specifications. All dimensions needed for construction shall be shown. Structure covers, pipe materials, minimum cover depths, etc. shall be noted.
- Label pipe material type, class, length, slope (%), invert elevations, and burial depth for each pipe run. Pipe material and class shall be in accordance with Road Commission's or local municipality's specifications whichever is appropriate.
- Manholes, inlets, and castings shall all meet current MDOT specifications.
- Label rim or flow line elevations for every structure.
- Place storm water intake structures every 300 feet or further if appropriate calculations are provided to show that flow to the structure is < 1 cfs for a 10-year storm.
- The minimum pipe cover shall be 18" for 12" pipe. Minimum cover for larger pipe shall meet local authority specifications or MDOT's requirements.
- Show soil boring or backhoe cut locations on the plan(s). Provide soil-boring logs for each and classify soils using USDA terminology. A minimum of one boring/cut shall be performed per acre of storage basin. The boring/cut(s) shall extend below the bottom of the proposed basin a minimum distance equal to the proposed maximum water depth in the basin. (A 5' deep basin when full needs soils information 5' below the proposed bottom of the basin.)
- For all storm water storage areas show the volume, top elevation, bottom elevation, inlet structure details, outlet structure details, and freeboard.
- Show details and specifications for emergency over flow weirs of storage basins and design them to handle the 100-year flow rate.
- Provide details and specifications for flow rate control orifices (or other similar system).
- Provide proof of adequate outlet system routing for detention basins along with permission from appropriate agencies and property owners.
- Pipes entering a storm water storage basin shall be a minimum of 12" above the bottom of the basin.
- Pipe joints and connections to structures shall be silt tight.

- Structures that intake storm water at the surface and convey it to pipes (manholes, inlets, catch basins, etc.) shall be located to assure positive drainage of all areas within the development not designated as storm water retention or detention areas.
- Flow across pavement from one side of the road to the other will not be allowed unless super elevating a curve is necessary.
- A two (2) foot minimum sump will be required for all 24" diameter inlets.
- Drops inside any manhole from inflowing pipe to the out flowing pipe shall be limited to two (2) feet.
- All outlet end sections will be provided with flared end sections and energy dissipation to assure no erosion/scour will take place. End sections shall be made of noncorrosive metal or concrete (plastic is not allowed unless a variance is granted).
- Minimum pipe size shall be 12" diameter.
- Fencing is required around all storm water management basins that have inside slopes steeper than 1 vertical to 4 horizontal, and/or hold more than 12" of water for 24 hours or more. A 12 foot double gate with lock shall be indicated for access along with details and specifications. Fencing shall meet MDOT specifications for this type of application.
- When plans have been approved, electronic file copies of the plans formatted in a way acceptable to the WRC may be required.
- If details, specifications, storage basin data, etc. need a separate sheet(s) in order to clearly explain what is proposed, then it (they) shall be included.

Miscellaneous:

- Some developments are intricate enough that plan and profile sheets and/or detail sheets will be necessary in order to communicate all information about the storm water facilities. If public sewer or water is proposed in the development, plan and profile sheets at 1" = 40' scale will be required.
- If other review agencies having authority over the proposed development have more stringent rules, then the more stringent rules will supersede these Standards.

D. Calculations-

Calculations shall be submitted in accordance with the Battle Creek Area Clean Water Partners (BCACWP) Technical Reference Manual (TRM). The manual can be obtained by contacting the WRC's Office. **Three sets** of calculations and supporting documents/drawings shall be submitted.

In some cases storm water infiltrating into the soil may "stack-up" on top of ground water and cause adverse effects to adjacent property. This is known as ground water mounding. If the proposed development has the potential to do this the WRC requires a hydro-geological study. This study must show that the ground water mounding will not negatively impact adjacent lands and structures in order for the proposed basin location to be considered. The study must be performed by a qualified professional.

E. Plats-

Preliminary Plat Approval-

Preliminary Plat approval by the WRC is required by the Land Division Act. Submittal of plans and calculations as defined above is required. Once the Preliminary Plat Plan, Construction Drawings, and Calculations are submitted for Preliminary Plat approval, the WRC has 30 days to approve or reject them per Section 114 (3) of the Land Division Act. If the proposed plat is not approved as originally submitted, the WRC will notify the proprietor in writing, setting forth the reasons for withholding approval. If the proposed Preliminary Plat as submitted meets all requirements, one approved copy of the Preliminary Plat will be returned to the proprietor. Approval by the WRC will be valid for a period of two (2) years from the date the WRC approves the Preliminary Plat. If the Final Plat has not been submitted within this period of time, the proprietor shall petition the WRC in writing for an extension stating the reasons for such extension. The WRC will then decide if the extension will be granted. If petition for extension is not made within said two (2) years the Preliminary Plat approval is voided and the approval process must start over using the then current Standards.

Final Plat Approval-

Typically the construction has been completed in accordance with the approved Preliminary Plat Plans and Final Plat Mylar are ready for signature when the Final Plat is submitted for approval.

Final Approval Submittals:

- Submit two (2) sets of prints and one (1) set of mylar of the proposed Final Plat along with fees defined in Section III.
- Submit the maintenance account deposit required by the 433 Agreement or Maintenance Agreement.
- Provide two (2) copies of the recorded easements inside and outside the plat boundaries. Liber and Page must be shown.
- Provide proposed deed restrictions.
- Provide evidence of municipal approval.
- Submit the fully executed "433 Agreement".
- Submit "As-Built" drawings sealed by a Professional Engineer on mylar. Provide electronic file (format shall be compatible with county's system) of plans once plans are approved.
- Executed Maintenance Agreement per the BCACWP TRM.

Preconstruction approval: If Final Plat approval is requested prior to the completion of construction, then the following must be provided.

- Cost opinion of construction yet to be finished
- Copies of any permits required for construction
- Payment of the appropriate fees
- All items in the above check list except as-builts
- Acceptable financial surety (cash deposit, irrevocable letter of credit, bond, escrow account)

- Provide copies of all necessary permits (wetlands, floodplain, inland lakes and streams, sedimentation and erosion control, local permits, etc.).

A final inspection of the storm water facilities by the WRC or their representative will take place and it must conclude with an acceptable result for Final Plat approval.

If the WRC approves the plat he/she will sign the certificate on the Final Plat mylar and notify the proprietor that the Final Plat has been approved by the WRC. If the WRC rejects the Final Plat, reasons for the rejection will be given to the proprietor in writing within ten (10) days after the day the Final Plat was received by the WRC.

F. Subdivision Condominiums, Land Divisions, and Site Plans-

The development of lands using Public Act 59 of 1978, as amended, (commonly known as Subdivision Condominiums), and Site Plans do not require WRC approval unless it is required by local ordinance. If the municipality of jurisdiction requires approval by the WRC then the approval process will be similar to that of the Preliminary Plat. Private storm water facilities that are never meant to be part of WRC jurisdiction will not need a 433 agreement.

Subdivision Condominiums & Land Divisions-

Approval of a Subdivision Condominium or Land Divisions by the WRC will be based on the same requirements as the Preliminary Plat approval section of these Standards. Sections I and II of these Standards shall be followed. Review times and approval periods will be the same as Preliminary Plat approval. Fees will also be the same as those required for Preliminary Plat approval (see Section III). An approval/denial letter prepared by the WRC will be sent to the municipality within 30 days of receipt of all necessary information. If approval is granted it shall be effective for two (2) years from the date of the letter.

Final approval shall be according to the same provisions as Final Plat approval.

Site Plans-

Approval of a Site Plan by the WRC will be based on review of construction plans and calculations prepared in accordance with these Standards. Review times and approval periods and fees will be the same as those required for Preliminary Plat approval. An approval/denial letter prepared by the WRC will be sent to the municipality within 30 days of receipt of all necessary information. If approval is granted it shall be effective for two (2) years from the date of the letter.

If the municipality of jurisdiction requires a Final Site Plan approval (after construction) then the WRC will review the submittal using applicable portions of the Final Plat Approval requirements of these Standards. Final approval of a Site Plan will be in writing and within 30 days of the receipt of the proper documents unless a letter of disapproval is sent to the local municipality. Fees for Final Site

Plan approval will be the same as those for Final Plat approval. If the storm water management system is to remain private no maintenance account fee will be necessary. The Storm Water Management Maintenance Agreement from the TRM if applicable will need to be fully executed prior to approval.

G. Manufactured (Mobile) Home Parks

Pursuant to Public Act 96 of 1987, as amended (the Mobile Home Commission Act) the County WRC is to review preliminary plans of proposed Mobile Home Parks to determine if the drainage outlet is acceptable. This Act does not require the submittal of detailed construction plans however it does allow each individual county to publish and enforce standards. Calhoun County has developed these Standards, which require the submission of construction plans and calculations for WRC review of preliminary plans for mobile home parks.

Manufactured Home Park Submission Requirements-

A minimum of three (3) sets of Construction Plans and two (2) sets of Design Calculations must be submitted to the WRC along with fees according to Section III. Plans and calculations shall be in accordance with the requirements of a plat submittal (see Sections I and II).

Once all appropriate information is submitted, the WRC will perform a review and prepare an approval or denial letter. The letter will be prepared within 30 days of receipt of all necessary information and will be sent to the proprietor of the proposed mobile home park. If approval is granted it shall be effective for two (2) years from the date of the approval letter. The Storm Water Management Maintenance Agreement from the TRM, if applicable, will need to be fully executed prior to approval.

Section II: Design Criteria

Design criteria to be used for developments and redevelopments can be found in the **Technical Reference Manual (TRM)** developed by the Technical Committee of the Battle Creek Area Clean Water Partners (BCACWP) and the following clarifications. Contact the WRC's Office to learn how to obtain a copy of the TRM.

Clarifications to the TRM:

1. Chapter 1, Section 1.2.2 of the TRM: saturated hydraulic conductivity shall be determined by visually classifying the site soils using USDA terminology and then using the table in Section IV-E of these Standards. The saturated hydraulic conductivity determined using this method shall be cut in half for the calculations used to determine retention basin size. This provides a factor of safety for sediment and compaction during construction. The soil boring or backhoe cut criteria in Section I, C. above will determine the location and depth of the soils exploration.
2. Areas designed for retention storage shall remain the property of the development (i.e. homeowners association for subdivisions) and shall have an easement over them for operation and maintenance by the WRC if they are going to be "publicly" maintained. Usually this is done through a "433 Agreement" (see Section IV Forms).
3. The use of underground retention/detention on new and existing developments is strongly discouraged and prohibited on drains proposed to be under the jurisdiction of the WRC. Exceptions may be granted if each of the following conditions exists:
 - a. Extensive soils information is available to at least ten (10) feet below the bottom of the proposed system and the soils are classified as sand.
 - b. A catastrophic property loss results in the need to rebuild an existing commercial facility that was not previously equipped with retention/detention, and the installation of an above ground retention/detention, facility would significantly reduce the available square footage for a replacement structure.
 - c. The provision of above ground retention/detention on an existing commercial parcel less than two acres in size would preclude development of the property under its current zoning.

Section III: Fees

The WRC incurs costs when properly reviewing submittals. Internal administrative time and consulting services are necessary. The costs associated with review of submitted plans and calculations shall be reimbursed by the developer/applicant. The following explains the amount of such review fees. All review fees are payable at the time of plan submittal. Resubmittals after the initial review shall include additional fees.

TOTAL FEE = ADMINISTRATIVE FEE + CONSULTING FEES FOR EACH STEP

Site Plan Review Fees:

The Administrative Fee will be \$300.00 unless a project is of the magnitude that more is warranted.

Consulting Review Fees will vary depending on the size and complexity of the proposed project and on the completeness of the submittal. Consulting fees typically range from \$300 to \$900 (2013). These fees can be minimized by coordinating early in the design process with the WRC and his/her consultant.

Building Permit Review Fees:

The Administrative Fee will be \$50.00 unless a project is of the magnitude that more is warranted.

Consulting Review Fees will vary depending on the size and complexity of the proposed project and on the completeness of the submittal. Consulting fees typically range from \$100 to \$900 (2013). These fees can be minimized by coordinating early in the design process with the WRC and his/her consultant.

Section IV: Forms

A. 433 Agreement and Release of Right of Way (see pages 14–19)

If the storm water management system is to become a county drain under the provisions of Section 433 of the Drain Code, then a “433 Agreement” will be necessary. This form shall be used to record the agreement.

B. Drain Easements (see pages 20-21)

Easements are required by these Standards and shall be recorded with the Calhoun County Register of Deeds using this form.

C. Irrevocable Letter of Credit (see page 22)

In some cases final approval may be given by the WRC prior to construction being complete. If so, financial assurance that construction will be completed in accordance with the approved plans and specifications, and execution of all forms and agreements will be necessary. Bonds or escrow accounts may be acceptable financial assurance. A letter of credit is also an option. This example form may be used in this case.

D. Saturated Hydraulic Conductivity (see page 23)

The infiltration calculations shall be based on using this table.

EXAMPLE 433 Agreement

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

THIS AGREEMENT, made and entered into this _____ day of _____, 20____, by and between **(insert current WRC's name), Water Resources Commissioner**, hereinafter referred to as "Water Resources Commissioner" on behalf of the proposed (insert proposed drain name) Drain Drainage District; and (insert Landowner/Developer's name) , a Michigan (insert type of Business) , as owner(s) of the land described in Exhibit A attached hereto, hereinafter referred to as "Landowner".

WITNESSETH:

Whereas, Section 433 of Act No. 40 of the Public Acts of 1956, as amended, authorizes the Water Resources Commissioner to enter into an Agreement with the Landowner and Developer, if any, to establish a drain which was constructed by the Landowner or Developer to service an area of its own land as a County Drain; and,

Whereas, Landowner, pursuant to Section 433 of Act No. 40 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 Calhoun County Water Resources 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 cost attendant to this Agreement; and,

Whereas, Landowner further understands that the Drain constructed, or to be constructed, pursuant to this Agreement, when finally accepted by the Water Resources Commissioner, will be known as the (insert drain name) Drain and that the land to be drained will be known and constituted as the (insert drain name) Drain Drainage District and will be subject to assessments, for cost of future operation, inspection, maintenance and improvement; and,

Whereas, Landowner has agreed to assume and pay all cost as set forth herein; and,

Whereas, Landowner has obtained, at its own expense, a certificate from a Registered Professional Engineer satisfactory to the Water Resources Commissioner to the effect that the drain has sufficient capacity to provide adequate drainage service without detriment to or diminution of the drainage service which the outlet currently provides. A copy of said certificate being attached hereto as Exhibit B.

Now, Therefore, in consideration of the premises and covenants of each, the parties hereto agree as follows:

1. Landowner agrees to construct and/or has constructed, at its expense, the drain in accordance with plans and specifications approved by the Water Resources Commissioner.
2. The Landowner agrees to pay the cost of construction of said drain and drainage facilities, including the acquisition of the necessary rights of way or easements, engineering, surveying, inspection, legal and administrative cost. In addition, the Landowner has deposited with the Water Resources Commissioner an amount of money equivalent to five (5%) percent of the cost of construction of the drainage facilities, not to exceed Two Thousand Five Hundred and No/100 (\$2,500.00) Dollars, which monies are to be deposited in a special drain fund to be used for future maintenance of the drain, hereinafter referred to as "(insert drain name) Drain Maintenance Fund".
3. That the Landowner shall secure at its own expense, all easements or rights of way necessary for the construction of the drain over and across the properties owned by Landowner and across such other lands as necessary for the construction of the drain from the point of beginning at the outlet of the point of ending. Said easements or rights of way shall be secured in writing and in a form acceptable to the Water Resources Commissioner. The Landowner shall be responsible for all cost for the recording of said easements, as directed by the Water Resources Commissioner. (Refer to Section IV: Forms B)
4. Landowner shall secure all necessary permits or authorizations as may be required by local, state or federal law and provide copies to the Water Resources Commissioner. The Water Resources Commissioner shall be provided copies of all correspondence and reports involving any governmental agency with respect to the drain.
5. The (insert drain name) Drain Maintenance Fund is agreed and understood as being for the sole benefit of the (insert drain name) Drain 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 Drain Code of 1956, as amended.

6. Landowner agrees to indemnify and hold harmless the Water Resources Commissioner and the (insert drain name) Drain District for any and all claims, damages, lawsuits, cost and expenses, arising out of or incurred as a result of the Water Resources Commissioner assuming responsibility for the drain under federal, state and/or local environment laws and regulations, including all future amendments to such laws or regulations and the administrative and judicial interpretation thereof, except for liability arising out of the gross negligence or intentional wrongful conduct of the Water Resources Commissioner or its agents.
7. Modification, amendments or waivers of any provision of the 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 the Water Resources Commissioner 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 the duly authorized officers as of the day and year first above written.

In The Presence Of:

(insert drain name) Drain Drainage District

Printed name: _____

(insert current WRC)
Calhoun County Water Resources Commissioner

Printed name: _____

In the Presence Of:

(insert Landowner name)

Printed name: _____

By: _____

Printed name: _____

Its: _____

STATE OF MICHIGAN)
) SS
COUNTY OF CALHOUN)

On this _____ day of _____, 20____, before me, a Notary Public in and for said County, personally appeared (current WRC), Calhoun County Water Resources Commissioner, and (Landowner signatory name) to me known to be the person described in and who executed the foregoing instrument and acknowledged the same to be his free act and deed.

Notary Public
Calhoun County, Michigan
My Commission Expires:_____

STATE OF MICHIGAN)
) SS
COUNTY OF CALHOUN)

On this _____ day of _____, 20____, before me, a Notary Public in and for said County, personally appeared (insert signatory name), to me known to be the person described in and who executed the foregoing instrument and acknowledged the same to be his free act and deed.

Notary Public
Calhoun County, Michigan
My Commission Expires:_____

Instrument Drafted by:
(insert draftee name)

When recorded return to:
The Calhoun County Water Resources Commissioner

EXHIBIT "A"

Legal description of the Drainage District for the (insert drain name) Drain.

Legal description of the route and course for the (insert drain name) Drain:

EXHIBIT "B"

I, (insert engineer name), a Registered Professional Engineer in the State of Michigan, do hereby certify to the following for the (insert drain name, use development name), Drain Drainage District in Section (insert section number) of (insert Township name):

1. The above-mentioned lands to be developed naturally drain into the area served by the existing drains and that the existing drains are the only reasonable available outlet for the drainage from the lands to be developed.
2. To my knowledge, there is existing capacity in the existing drains to serve the lands to be developed without detriment to or diminution of the drainage service provided or to be provided in the foreseeable future in the existing district.
3. This statement is made with reliance upon consultation with the Calhoun County Water Resources Commissioner and upon review and approval of the construction plans by that office.

(type Engineer name and number)

Date: _____

(provide PE seal here)

EXAMPLE DRAIN EASEMENT
FOR BLANK DRAIN
PARCEL XX-XX-XXX-XXX-XX

For and in consideration of \$1.00 and for the prospective benefits to be derived because of the locating, establishing, constructing, operating, and maintaining of the BLANK Drain, a county drain under the supervision of the Calhoun County Water Resources Commissioner, whose address is 315 West Green Street, Marshall, Michigan 49068.

GRANTOR'S NAME AND MARITAL STATUS, whose address is BLANK, who are/is the owner(s) of the land described in the attachment Exhibit A ("Landowner"), now convey and release to the BLANK Drain Drainage District ("Drainage District") an easement for purposes of maintenance and improvement of the BLANK Drain over and across land owned by them. The easement is described and depicted in the attached Exhibit A ("Easement Area").

This conveyance shall be deemed a sufficient conveyance to vest in the Drainage District an easement over said parcel of land for uses and purposes of drainage with such rights of entry upon, passage over, storing of equipment and materials including excavated earth as may be necessary or useful for the establishment, construction, operation, maintenance and improvement of said Drain.

Non-movable or permanent structures shall not be constructed by the Landowner, its agents, employees, or contractors within the specific limits of the easement area. This conveyance shall also be deemed sufficient to vest in the Drainage District an easement over said Easement Area for the clearing of the Easement Area and the spreading and/or removal of spoil and excavated materials.

This easement shall be binding upon the Landowner and the Drainage District, along with their heirs, assigns, successors in interest and successors in office and shall be deeded to run with the land in perpetuity.

Exempt pursuant to: MCLA 207.505(a) and MCLA 207.526(a)

EXAMPLE Irrevocable Letter of Credit

(Date)

Calhoun County Water Resources Commissioner
315 West Green Street
Marshall, MI 49068

IRREVOCABLE LETTER OF CREDIT No.

RE: (insert name of entity letter is from)

PROJECT: (insert project/drain name)

To Whom It May Concern:

At the request of the Calhoun County Water Resources Commissioner we hereby establish our Irrevocable Letter of Credit in your favor and authorize you to draw on us to an aggregate, the amount of (amount written out) U.S. dollars 00/100 (\$____) and we engage with that all drafts at sight drawn under and in compliance with the terms of this credit will be fully honored by us if presented at this office on or before (date), 20____ or any extended date, provided:

Any draft(s) drawn by you under this Letter Of Credit shall be accompanied by a letter executed by an authorized official (or one describing himself or herself therein as an authorized official) of the Office of Calhoun County Water Resources Commissioner stating as follows:

1. "Claims have been submitted or may be submitted to the Calhoun County Water Resources Commissioner which remain unfulfilled by the (Sub)Contractor, and the funds represented by the attached in compliance with our contract with (Sub)Contractor."
2. Drafts presented must bear on their face the clause "drawn under (bank name and address) Letter of Credit No. ____ dated _____."
3. Drafts presented no later than _____, 20____, _____ p.m. local time after which time this Letter Of Credit shall be null and void.

We hereby agree that any draft drawn and presented in conformity with the terms of this Letter Of Credit will be duly honored if presented to us on or before the time of expiration set forth herein.

Very truly yours,

Saturated Hydraulic Conductivity

In order to properly determine the ability of site soils to infiltrate water the following table shall be used.

The following information was extracted from the book Stormwater Infiltration, by Bruce K. Ferguson, 1994

<u>USDA Classification</u>	<u>Saturated Hydraulic Conductivity, K (in/hr)</u>	<u>Acceptable for Onsite Infiltration?</u>
Sand	8.27	Yes
Loamy Sand	2.41	Yes
Sandy Loam	1.02	Yes
Loam	0.52	Yes
Silt Loam	0.27	No
Sandy Clay Loam	0.17	No
Clay Loam	0.09	No
Silty Clay Loam	0.06	No
Sandy Clay	0.05	No
Silty Clay	0.04	No
Clay	0.02	No

(Saturated hydraulic conductivity from Rawls, Brakensiek and Saxton, 1982)

For design purposes the most limiting soil shall be used to determine infiltration rates. Infiltration rates shall be half of the most limiting soil layer to account for compaction and sedimentation during construction.

Section V: Glossary of Terms

As-Built Plans – Drawings prepared by an engineer or surveyor that represent conditions as they were actually constructed.

Backhoe Cuts – A good way to visually identify soil types for infiltration estimating. This is the WRC's preferred method of determining soil types. Excavation is made with a backhoe while a person with soils identification training observes and notes type, depth, structure, groundwater, etc.

Basin – A surface water runoff storage area.

Borings – Cylindrical samples of soil profile used to determine soil types, ground water level(s), and infiltration capacity. Backhoe cuts are acceptable and in many cases are a preferred alternative. USDA terminology is to be used when identifying soils.

Contractor – Any person(s) or company that actually constructs the development.

County Drain – An open or enclosed storm water conveyance system that is under the legal jurisdiction of the WRC for construction, operation and maintenance.

MDEQ – Michigan Department of Environmental Quality.

Design Flow – Projected flow through a watercourse, which will recur with a stated frequency. The projected flow for a given frequency is calculated using statistical analysis of peak flow data or using hydrologic analysis techniques.

Detention – Practices which store storm water for some period of time before releasing it to a surface water body. See also retention.

Developer – Anyone who organizes the actual development of land and may or may not be the landowner.

Development – Modifications to a property to enhance a new usage. Infrastructure construction such as roads and storm sewer is typical of a development.

Discharge – Volume of water moving out of a basin, structure, or pipe per unit time.

Easement (also known as a “Right-Of-Way”) – A legal right granted by a property owner to another entity giving that entity limited use of the property

involved for a specific purpose. The WRC secures temporary and permanent easement adjacent to storm water facilities for the purpose of construction and maintenance access.

Erosion – The wearing away of the land surface by wind, water, ice and gravity dislodging of soil particles. Evidence of erosion are gullies, rills, sediment, plumes, etc.

First Flush – The delivery of a highly concentrated pollutant loading during the early stages of a storm due to the washing effect of runoff on pollutants that have accumulated on the land.

Flood Plain – For a given flood event that area of land adjoining a continuous watercourse that has been covered temporarily by water.

Flood Routing – The planning of what runoff water would do if it exceeds the capacity of a conveyance system or storage basin. This answers the question “what would happen if an event that exceeded the design event happened?”

Groundwater – (see Seasonal High Groundwater Level)

Hydrology – The occurrence, distribution, and movement of water both on and under the earth’s surface.

Impervious Surface – Rooftops, road pavement, parking areas, and other surfaces which do not allow water to infiltrate into the ground.

Infiltration Capacity – (see Saturated Hydraulic Conductivity)
Rate at which water can enter soil with excess water on the surface.

Inlet – A 24” diameter vertical underground structure designed to accept surface runoff and transfer it into storm sewer.

Invert – The lowest (elevation) point in a conveyance system cross section. The very bottom of the inside of a pipe is its invert. Sometimes referred to as the flow line.

Manhole – A 48” (or greater) diameter vertical underground structure designed to accept surface runoff and transfer it into storm sewer.

Orifice – An opening in a wall or plate typically used to limit flow rate.

Outlet – The point, location, or structure where drainage discharges from a storage basin or conveyance system to a receiving system; also called an "outfall".

Peak Flow – Maximum flow through a watercourse which will recur with a stated frequency. The maximum flow for a given frequency may be based on measured data, calculated using statistical analysis of peak flow data, or calculated using hydrologic analysis techniques. Projected peak flows are used in the design of culverts, bridges, and dam spillways.

Permanent Soil Erosion and Sediment Control Measures – Control measures installed or constructed to control erosion and sedimentation and maintained after project completion.

Precipitation – Water that falls to earth in the form of rain, snow, hail, or sleet.

Project Engineer – A professional engineer licensed in Michigan that performs the engineering design for the development.

Proprietor – Any person, firm, association, partnership, corporation or any combination thereof that owns property proposed for development.

Redevelopment – Modifications to a property that is already developed that disturbs one acre or more of soil.

Retention – Practices which capture storm water and release it slowly through infiltration into the ground. See also detention.

Riprap – A combination of large stone, cobbles and boulders used to line channels, stabilize banks, reduce runoff velocities or filter out sediment.

Runoff – Flow of water across the land surface. The volume is equal to the total rainfall minus the rainfall that is stored, infiltrates into soils, or is taken up by plants.

Saturated Hydraulic Conductivity – The ability of water to pass through soils when completely saturated. This is the most accurate measure of infiltration.

Seasonal High Groundwater Level – The highest level of groundwater that occurs frequently enough for the water to stain the soils.

Sediment – Soil fragmental material that originates from weathering of rocks and is transported or deposited by air, water, or ice.

Sheet Flow – Runoff which flows over the ground surface as a thin even layer, not concentrated in a channel or pipe.

Spillway – The system used to transfer outlet and/or overflow water from a storm water storage basin to an acceptable discharge point.

Standards – The contents of this manual represent the storm water management criteria for the Calhoun County Water Resources Commissioner, and are considered the standards for developments and redevelopments in Calhoun County.

Stream – By MDEQ definition; "a river, creek, or surface waterway that may or may not be defined by Act 40, P.A. Of 1956: has definite banks, a bed, and visible evidence of continued flow or continued occurrence of water, including the connecting water of the Great Lakes".

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

Temporary Soil Erosion and Sediment Control Measures – Means interim control measures which are installed or constructed to control soil erosion or sedimentation until permanent soil erosion control measures are established.

Tributary Area – The total surface area that contributes runoff to a particular point.

USDA – United States Department of Agriculture

WRC – Water Resources Commissioner of Calhoun County

Water Course – Any natural or artificial water course including, but not limited to; streams, rivers, creeks, ditches, channels, canals, conduits, culverts, drains, gullies, ravines, or washes which has definite banks, a bed, and in which waters flow in a definite direction or course, either continuously or intermittently, and including any area adjacent thereto which is subject to inundation by reason of water flow or floodwater.

Weir – A device that has a crest and some side containment, and is used to measure, regulate, or restrict flow. The amount of flow that may pass over the weir is a function of the weir geometry and upstream height of water above the crest.

Wetland – An area that is regularly saturated by surface or ground water and subsequently is characterized by a prevalence of vegetation that is adapted for life in saturated soil conditions. Examples include: swamps, bogs, fens, and marshes.