Calhoun County Drainage Rules & Procedures for Subdivision Development

(Revised 1999)

Construction Plans

General Requirements

- If other agencies having authority over the proposed development have more stringent specifications than these rules and regulations then the more stringent specifications will supersede.
- Submit three (3) sets of plans covering the entire area requesting approval.
- Plan size shall be twenty-four (24) inches x thirty-six (36) inches.
- The minimum scale to be used for all but the overall sheet shall be 1" = 50’ (1" = 60’ or more not acceptable). The overall grading and drainage plan shall have a minimum scale of 1" = 100’.
- Plans shall be sealed by a licensed Professional Engineer registered in the State of Michigan.
- An overall plan shall be provided showing all phases of the development, topography, total tributary area(s) and a general indication of proposed improvements for the phase requesting approval.
- The plans must include the proprietor’s name, telephone number and address.
- Each sheet in the plans shall have the following:
    - Designer’s name, telephone number and address
    - A proper engineer’s seal
    - At least one bench mark with a reference to the datum used
    - Sheet number, date and revision date
    - North arrow and bar or graphic scale
    - Existing structures, utilities and easements
- Any inflow into a storage basin shall have a minimum fall of eighteen (18) inches to the bottom of the basin (invert-bottom'18").

Grading And Drainage Plan

- Show all existing and proposed contours at a minimum of two (2) foot intervals.
- Show flow arrows to designate runoff direction.
- Show inlet and manhole locations.
- Show erosion control measures.

- q Designate all 100 year floodplain levels with a heavy dashed line. DEQ regulated floodplains usually are predetermined. All other 100 year floodplains will need be calculated. This includes retention/detention basins and low areas that have no outlet.

- Show specifications for establishing vegetation in all areas disturbed by construction. Seasonal limitations may require seeding during the following spring. If this happens a silt fence will be required in area prone to erosion.

- Show the entire tributary area boundary on this plan for each stormwater storage area. Retention basins, detention basins and self contained low areas all have their own tributary areas.

- Unless a special variance is granted as a result of extensive engineering proof, no single retention basin tributary area shall be larger than fifty (50) acres.

- Show flood routing information; designate what would happen if the storm runoff conveyance systems were overloaded and backed up.

- Show locations of soil borings and provide soil boring logs. A minimum of one boring per acre of storage basin is required. Borings in the stormwater storage basin(s) must extend to at least two (2) feet below the proposed bottom.

- Soil classifications using USDA terminology is required.

- Provide at least one bench mark with a datum definition.

- For all stormwater storage areas show the volume, top elevation, bottom elevation inlet structure details, outlet structure details and freeboard.

- Indicate on the plans where energy dissipation (rip-rap, gabions, etc.) will be constructed.

- Inlets/manholes or intake structures shall be placed so that surface road runoff does not travel more than 300 feet. Exceptions to this rule will only be allowed if the project engineer provides proof that the 1 year storm peak flow to a particular structure is < 1 cubic foot per second (cfs).

- HDPE (High Density Poly Ethylene) smooth interior corrugated plastic pipe may be used as long as it is installed according to the pipe trench detail (Exhibit H) on Page 40 and is inspected during installation by the project engineer. HDPE pipe may not be acceptable under pavements if there is less than three (3) feet or more than eight (8) feet of cover. Class III RCP (reinforced concrete pipe) and CSP (corrugated steel pipe) gauge minimum are acceptable pipes for storm sewer.

- Inlets, manholes, piping and end section shall be specified according to Appendices C, D, E, F, G & H.

- Minimum pipe cover shall be eighteen (18) inches for twelve (12) inch pipe and more as pipe size increases. The project engineer will need to provide proof that the cover proposed is acceptable under Calhoun County Road Commission specifications.

- If side slopes of a storage basin are steeper than 4 to 1 (4 horizontal to 1 vertical) or if the stormwater is one (1) foot or deeper for more than twenty-four (24) hours a fence around the entire basin is required. Any proposed fence must be shown on the grading plan.

Construction Details And Specifications

If additional information describing the proposed construction is necessary a detail sheet is recommended.

Retention Basins

1. On-site retention will be required of all subdivisions unless a positive outlet is acquired to a natural stream approved by the DEQ or to a county drain approved by the Drain Commissioner. Retention basins can be man-made or natural. If the area is a wetland, a DEQ permit will be required. All basins must utilize the following specifications.

2. Retention basins will be designed to hold a 100 year storm event in a twenty-four (24) hour period. In Calhoun County this is five point five (5.5) inches of rainfall within 24 hours.

3. To property size the basin the following items will be taken into consideration:

a. Soil borings "required to groundwater".

b. Soil type.

c. Total tributary area.

d. Coefficiency runoff calculations of the tributary area.

e. Infiltration rate calculations.

f. Floodplain elevation for area.

g. Design of basin natural or constructed.

h. Basin must have eighteen (18) inches of fall from the invert of the inlet pipe to bottom of basin. Bottom of basin has to be at least one (1) foot above the seasonal high groundwater level set by project engineer.

i. Evaporation is not considered.

j. Use of parking lots for retaining water is prohibited.

Detention Basin

A detention basin can be used when a suitable outlet can be obtained that does not run water off from the development more than the pre-development runoff.

Fencing

All drainage basins that are subject to water standing over 1 foot deep for twenty-four (24) hours and/or less than 4 to 1 slopes shall be fenced with approved fence. A sixteen (16) foot gate will be provide at an approved location.

Hydrology and Hydraulic Calculations

Hydrology/hydraulic calculations must be submitted showing how the runoff coefficient was derived, the total tributary area(s), volume derivation, flow rate computations, etc. Any coefficients used for calculations must be justified. At no time will parking lots be used in capacity calculations of basins.

Retention Basin

Storage basins that have no outlet except infiltration and evaporation shall be designed to store a twenty-four (24) hour duration one hundred (100) year storm event. In Calhoun County this is a five point five (5.5) inch storm event. Calculations proving the runoff coefficients used that include the entire tributary area(s) (including off-site) and verify the volume of the proposed basin are required. The maximum allowable tributary area to a single retention basin shall be fifty (50) acres. The "developed" tributary area should match the "pre-developed" tributary area(s) as close as possible. No volume shall be credited until the basin bottom is one (1) foot above the seasonal high groundwater level.

Soils are very critical to the success of a retention basin. Soil borings logs for borings taken to at least two (2) feet below the proposed bottom of the retention basin must be supplied with calculations. A minimum of one (1) boring per surface acre of the top of the basin is required. These borings shall be done by a professional regularly engaged in soils investigations and must classify each soil type according to the United States Department of Agriculture classification system. Ground water level(s) must be provided. Soils with a saturated hydraulic conductivity rate < 0.52 inches per hour will disqualify the area for a retention basin. To determine the saturated hydraulic conductivity, tests can be run by a geotechnical company or literature can be provided justifying this number if the literature is acceptable to the Drain Commissioner.

Credit for soil infiltration may be granted for retention basin volume calculations only if they are based on one-half (1/2) of the most limiting saturated hydraulic conductivity of the soils in the retention area.

Evaporation is dependent upon many uncontrollable variables such as wind speed, vapor pressure, humidity, etc. Since it is so difficult to practically predict evaporation it will be ignored for retention and detention basin volume calculations.

Detention Basins

Detention basins shall be sized by assuring that the post-development runoff flow rate at the point of outlet does not exceed the pre-development runoff flow rate for a 10 year storm. Hydrology calculations showing the pre-development runoff flow rates area required. Hydraulic calculations for the outlet structure are also required. A two (2) foot freeboard is required for detention basins and no volume shall be credited until the basin bottom is one (1) foot above the seasonal high groundwater level.

Conveyance Systems

Drainage facilities within the road right-of-way will be the responsibility of whom ever the roads are dedicated to maintain.

If the development is under a 433 Agreement with the Drain Commissioner, the Drain Commissioner will have a right-of-way of the drainage facilities within the road right-of-way. The drainage facilities will meet the minimum requirements that the Drain Commissioner has established. If another municipality has more stringent rules set then those rules will take precedence.

The design engineer shall supply hydraulic calculations showing how runoff coefficients were derived. Calculations must be easy to follow, legible and accurate. Each individual tributary area to the inlet structures must be designated.

1. Pipes

All storm sewer shall be designed to pass a ten (10) year design storm, gravity flow. The roughness coefficient used for the Hazen-Williams formula calculation shall be n=0.013 unless the engineer can prove differently.

2. Open Ditches (Swales)

All open ditches shall be designed to pass a ten (10) year design storm. No overflow is allowed. Erosion concerns must be addressed with erosion control blanket, or rip-rap with a geotextile underlay unless calculations can be provided to prove the full flow velocity will not carry sediments away.

3. Catchbasins

Tributary areas to individual intake structures located in the road pavement should not generate more than one (1) cubic foot per second peak flow for a ten (10) year storm. Multiple inlets may be necessary if the flow exceeds one (1) cubic foot per second.

4. Erosion Protection

All end sections shall have erosion protection. The typical erosion protection in Calhoun County is rock rip-rap with a geotextile underlay. Calculations justifying the minimum size rock will be required.

Accepted Coefficiency Factors

Listed below are the accepted coefficiency factors for roads, roofs and driveways.

Type	*Coefficiency Factors*
Roads	
Asphalt Or Concrete With Curb-Gutters	95 -100%
Asphalt Or Concrete With Roadside Ditches	90 - 95%
Gravel Or Stone With Roadside Ditches	80 - 90%
Undeveloped Land	
Flat Pervious Soils With Vegetation	5 - 10%
Rolling Pervious Soils With Vegetation	10 - 15%
Flat Moderately Pervious Soil With Vegetation	15 - 20%
Rolling Moderately Pervious Soil With Vegetation	20 - 30%
Flat Impervious Soil with Vegetation	30 - 40%
Rolling Impervious Soil With Vegetation	40 - 50%
Any Lands Without Vegetation Add An Additional	20%
Developed Land	
Roofs, Driveways And Parking Lots That Are Asphalt Or Concrete	90 - 95%
Yards, Roadside Woods, Outlots, Playground, Swamps, Parks & Etc. Refer To Undeveloped Land	05 - 70%

Group Soil Types

A. Pervious Sand
B. Moderately Pervious Sandy Loam
C. Impervious Clay

Only with approval of the Drain Commissioner will a Group C (Impervious Soil) ever be used for retention basins.

Deed Restrictions

The Drain Commissioner has limited authority pertaining to the construction activities on individual lots after they have been purchased. It is the responsibility of the Owner/Developer to establish necessary deed restrictions to prevent future water problems on purchased lots. The Drain Commissioner requires that the following language be added to the deed restrictions for land divisions, condominiums and manufactured home parks before final approval will be given.

To prevent flooding of homes, grading and contour changes to a lot and proposed basement and daylight openings elevations into the home must be approved by the Architectural Control Committee and/or the project engineer of the development before construction has begun.

A copy of the deed restrictions will be provided to the Drain Commissioner.

433 Agreement

According to the Michigan Drain Code, MCL 200.433, the Owner and/or Developer of lands can enter into an agreement with the Drain Commissioner to make the proposed drainage system an established drain and drainage district within a development through a 433 Agreement.

The 433 Agreement shall obligate the Owner and Developer to construct any drainage facilities in accordance with the Drain Commissioner's "Drainage Rules & Regulations For Developments Within The County".

The Owner shall pay all costs of the drainage facilities including obtaining rights-of-way in and off the Owner's land. All engineering, inspection, administration and legal expenses incurred by the Drain Commissioner will also be paid by the Owner. A deposit will be required to be deposited into a maintenance fund for future maintenance of the drainage facilities as provided in MCL 280.433. The deposit requirements will be set in the preliminary approval letter (no less than $500.00 or no more than $2,500.00). The deposit will not be returned and will stay in an account until needed for maintenance by the drainage district.

Certification from a registered professional engineer will be required stating the following:

1. The lands to be developed naturally drain into the area served by the existing drain(s) and that the existing drain(s) are the only reasonably available outlet for the drainage from the lands to be developed.

2. To his/her knowledge, there is existing capacity in the existing drain to serve the lands to be developed without detriment or diminution of the drainage service provided or to be provided in the foreseeable future to the area in the existing district. This statement is made with reliance upon consultation with the Office of the Calhoun County Drain Commissioner and; upon review and approval of the construction plans by that office.

Approximately one (1) year after signing the 433 Agreement the Drain Commissioner will inspect the drainage facilities. If the drainage facilities are not working properly and are not operating as they were designed the Owner/Developer will be notified in writing and be required to fix the problem within thirty (30) days. If everything is working as it should the Drain Commissioner will send a Letter of Acceptance (Registered Mail) to the Owner/Developer. This letter will state his acceptance of the land and/or development as a county drainage district taking full responsibility for the maintenance of the facility on behalf of the land and/or lot owners of the developed land.

Owners/Developers are strongly encouraged to sign a 433 Agreement before selling any lots because the new owners of any sold lands may be required to sign the 433 Agreement or an

agreement acknowledging that they are in a drainage district being liable for an future assessment.

The Owner/Developer shall make repairs at their cost. Failure to make necessary repairs within thirty (30) days of written notice will result in the Drain Commissioner taking the appropriate action.