CHAPTER 2

LEGAL POLICY AND PROCEDURE

NOTE: All questions and comments should be directed to the Drainage Specialist, Design Support Area.

Revised January 2006

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2.1 INTRODUCTION/PURPOSE

Laws and regulations applicable to the drainage to and from highway facilities are discussed in this chapter. The intention is to provide information on drainage law and provide guidance on the design engineer's responsibilities. This chapter should not in any way be treated as a basis for legal advice or to make legal decisions from. This chapter is not intended as a substitute for legal counsel.

The following generalizations, given in Chapter V of the Highway Drainage Guidelines by AASHTO (1992), should be considered:

- A goal in highway drainage design should be to perpetuate natural drainage, insofar as practical.
- The courts look with disfavor upon infliction of damage that could reasonably have been avoided, even where some alteration in flow is legally permissible.
- The basic laws relating to the liability of governmental entities are undergoing radical change, with a trend toward increased governmental liability.
- Drainage laws are also undergoing change, with the result that older and more specific standards are being replaced by more flexible standards which tend to depend on the circumstances of the particular case.

The most important consideration for highway designers in the matter of water rights is that proposed work in the vicinity of a natural stream should not impair quality or significantly change the flow rate of the stream.

In water law matters, designers should recognize that the State is generally held to a higher standard than a private citizen. In general, designers should not address a question of law without the aid of legal counsel. Whenever drainage problems are known to exist or can be identified, drainage or flowage easements or other means of avoiding future litigation should be considered, especially in locations where a problem could be caused or aggravated by the proposed construction activity.

It is often helpful in the planning and location phase of a project to document the history and present status of existing drainage conditions, patterns, or problems and supplement the record by photographs and descriptions of field conditions.

2.2 DEFINITIONS

2.2.1 Types of Watercourses (updated January 2004)

Michigan's complied laws (MCL) and their respective Administrative Rules provide various definitions of watercourses in Michigan. These laws and rules outline regulated watercourses for specific public purposes and will be briefly discussed here. Michigan Department of Transportation (MDOT or the Department) either discharges its drainage, i.e., stormwater, to these "public" watercourses or secures the right to convey its drainage across private lands to a public watercourse via drainage or flowage easements. See Chapter 8, Stormwater Storage Facilities, Section 8.1.1, on storage overview and acceptable drainage outlets.

Drain - When used under Michigan's Drain Code, MCL 280.3, "…shall include the main stream or trunk and all tributaries or branches of any creek or river, any watercourse or ditch, either open or closed, any covered drain, any sanitary or any combined sanitary and storm sewer or storm sewer or conduit composed of tile, brick, concrete or other material, any structures or mechanical devices, …pumping equipment…any levee, dike, barrier, or a combination of any or all of the same …for the purpose of drainage…" Therefore, a "county drain" or "intercounty drain" can be a natural or artificially constructed water conveyance system.

Drainage Course - By Administrative Rule R 281.817, is any conveyance other than the defined "inland lake and stream. " This would be the natural flow of water over the land as caused by the topography.

Easement - MDOT secures its right-of-way (R.O.W.) for public use either by statutory (law), fee (purchase), or easement (purchase of a specific rights of use from a land owner). County drains are normally obtained by "easement. "

Inland Lake or Stream - Is defined under MCL 324.30101 as "…a natural or artificial lake, pond, or impoundment; a river, stream, or creek which may or may not be serving as a drain as defined by the Drain Code of 1956, 1956 PA 40, MCL 280.1 to 280.630; or any other body of water that has definite banks, a bed, and visible evidence of a continued flow or continued occurrence of water…"

River - Under Michigan's Natural Rivers Act, is defined under MCL 324.30501, to "…means a flowing body of water or a portion or tributary of a flowing body of water, including streams, creeks, or impoundments and small lakes thereon. "

2.2.2 Classification of Waters

State drainage laws originating from common law, or case law, first classified the water in question, then applied the appropriate check to obtain a decision.

The first step in the evaluation of a drainage problem is to classify the water as surface water, stream water, floodwater, or groundwater. These terms are defined below. Once the classification has been established, the rule that applies to the particular class of water determines responsibilities with respect to disposition of the water.

- Surface Waters - Surface waters are those waters which have been precipitated on the land from the sky or forced to the surface in springs, and which have then spread over the surface of the ground without being collected into a definite body or channel.
- Stream Waters - Stream waters are former surface or groundwaters, which have entered and now flow in a well-defined natural watercourse, together with other waters reaching the stream by direct precipitation or rising from springs in the bed or banks of the watercourse. A watercourse in the legal sense refers to a definite channel with bed and banks within which water flows either continuously or intermittently.
- Floodwaters - Floodwaters are former stream waters which have escaped from a watercourse (and its overflow channels) and flow or stand over adjoining lands. They remain floodwaters until they disappear from the surface by infiltration or evaporation or return to a natural watercourse.
- Groundwaters - In legal considerations, groundwaters are divided into two classes, percolating waters and underground streams. The term "percolating waters" generally includes all waters that pass through the ground beneath the surface of the earth without a definite channel. The general rule is that all underground waters are presumed to be percolating. To take them out of the percolating class, the existence and course of a permanent channel must be clearly shown. Underground streams are waters passing through the ground beneath the surface in permanent, distinct, well-defined channels.

2.3 ROLE OF THE DESIGNER/PROJECT MANAGER

The designer or Project Manager has a two-fold responsibility for the legal aspects of highway drainage. First, the designer should know the legal principles involved and apply this knowledge to the design and secondly, he should work closely with the legal staff of the organization, as necessary, in the resolution of drainage cases. The duties of the designer include direct legal involvement in the following areas:

- Conduct investigations, advise, and provide expert testimony on the technical aspects of drainage claims involving existing highways, and

- Provide drainage design information during R.O.W. acquisition to assist appraisers in evaluating damages and provide testimony in subsequent condemnation proceedings, when necessary.

2.4 ORDER OF LAW SUPREMACY AND RELATED PUBLICATIONS

The descending order to law supremacy is Federal, State, and local, and, except as provided for in the statutes or constitution of the higher level of government, the superior level is not bound by laws, rules, or regulations of a lower level. State permit requirements are an example of law supremacy. Federal agencies do not secure permits issued by State agencies, except as required by Federal law. Many laws of one level of government are passed for the purpose of enabling that level to comply with or implement provisions of laws of the next higher level. In some instances, however, a lower level of government may promulgate a law, rule, or regulation that would require an unreasonable or even illegal action by a higher level. An example is a local ordinance that would require an expenditure of State funds for a purpose not intended in the appropriation. Many such conflicts in the laws of different levels of government involve constitutional interpretation and must be determined case by case by the courts. Such conflicts should be referred to the Assistant Attorney General for Transportation before any action is taken.

There are numerous publications on the legal aspects of drainage and water laws. For additional information on the legal aspects of highway drainage, the reader is referred to the following publications:

- *Highway Drainage Guidelines*, American Association of State Highway and Transportation Officials, Washington, D.C., 1982. Chapter V - The Legal Aspects of Highway Drainage, which also includes a glossary of legal definitions.

- *Legal Research Digest*, Transportation Research Board.

2.5 POLICY AND PROCEDURES

MDOT policy and guidelines have been outlined in various instruments such as Assistant Attorney General memos, Attorney General Opinions, State Executive Order, legislation, memos, and correspondence with other public agencies and counsel. Specific MDOT policy is provided via Guidance Documents and is based on directions provided either by the Transportation Commission or the Director. Design guidelines provided in this manual and other design manuals are the standards by which a policy is carried out or placed in action.

2.5.1 General Procedures

At the time the line and grade of new roadways or the extent and limits of a widening or reconstruction project are determined, a careful engineering study and design must be made concurrently for surface and subsurface drainage. Highway drainage design involves two basic operations: estimating peak flows of runoff and designing a conveyance system.

Detailed hydrologic and hydraulic design guidelines are presented in the following chapters of this Drainage Manual. For additional information, contact the Design Engineer - Hydraulics.

2.5.2 Legal Precedent to Discharge Surface Water

The legal precedent concerning the drainage of surface waters was established by the Michigan Supreme Court in 1906 in *Tower vs. Township of Somerset*, 143 Mich. 195, 201:

> "Highway commissioners have the right to have the surface water, falling, or coming naturally upon the highway through the natural and usual channel upon and over the lower lands, and may construct drains or ditches for that purpose." Reference Farnham on Waters and Water Rights, p. 969.

Common law lays out the following drainage requirements:

- The owner of a lower or servient estate is obligated to receive surface water from the upper or dominant estate in its natural flow.

- The owner of the lower or servient estate may not fill his lands in such a way as to retard the natural flow of surface water or cause it to impound upon the upper owner's land.

- The owner of the dominant estate has no right to divert, concentrate, or increase the velocity of the natural surface water. Public authorities do not have the right to divert surface water that would, in the natural state, disperse over a large area and cast such in concentrated form upon the lands of the abutting owner to cause his property damage without compensation to him.

Under Michigan's Constitution, Article 7, Section 16:

> "The legislature may provide for laying out, construction, improvement, and maintenance of highways, bridges and culverts... "

As noted below, the "maintenance of highways" includes drainage.

ACT 283, Public Acts of 1909 (MCL 225.1) created a State highway department and commissioner whose responsibilities were transferred to the Michigan Department of Transportation (MDOT) by Act 286, Public Acts of 1964 (MCL 247.802). Specifically, Act 283 provided MDOT the authority for the "…construction of drains…" (MCL 225.2b).

ACT 51, Public Acts of 1951 (MCL 247.651 – 247.675), State Trunk Line Highway System, provides for the classification of all public roads, streets, and highways. It defines the purpose for which Michigan Transportation funds may be allocated. Regarding drainage Section 10c (MCL247.660c states for both maintenance and preventive maintenance includes "...drainage..."

The control of drainage to MDOT R.O.W. is outlined in Section 14 of MDOT's Construction Permit Manual. Act 200, Public Acts of 1969 (MCL 247.324) states:

> "Permits for driveways shall be granted in conformity with rules promulgated by the highway authority which shall be consistent with the public safety and based upon the traffic volumes, drainage requirements and character of the use of the land adjoining the highway and other requirements in the public interest."

Rule R247.224(f) states:

> "Altered natural drainage shall not be permitted to flow onto the highway right-of-way unless special provisions are approved by the Department."

Michigan's Land Division Act, Act 288 of 1967 (MCL 560.105(d) addresses the approval of preliminary and final plats as it relates to safety of entrances and "drainage" as required by the Department under promulgated rules. The administrative rule on drainage is R 560.204 and refers to the Department's "drainage policy and guide. "

2.5.3 Types of Right-of-Way Easements or Conveyance for Drainage

See Right-of-Way chapter, Road Design Manual (RDM), Section 5.08.

2.5.4 Drainage Considerations

Drainage of stormwater, either to or from State trunkline R.O.W., may involve the use of public or private stormwater conveyance systems. Acceptable drainage outlets include natural watercourses, county drains, and storm sewers or ditches owned by other public agencies. (See Section 2.2.1 and Chapter Eight, Section 8.1.1.) Whenever a

stormwater conveyance system from a State trunkline project is connected into an existing public or private stormwater conveyance system outside of MDOT R.O.W. (not allowed in combined sewers), a written agreement on the design, construction, and future operation and maintenance of the stormwater system must be obtained from the owner of the system.

Projects that may impact intracounty and intercounty drainage districts (see Section 2.5.5) require the Project Manager to coordinate the work with the MDOT Drainage Coordinator (Utilities Drainage Roadside Supervising Engineer) and the Region/TSC Drainage Coordinator. The Project Manager is responsible for contacting the Design Engineer - Governmental and Railroad Coordination for the development of any agreements. Hydrologic and hydraulic analyses are needed to determine the impact of the connection on the stormwater system(s) and must be reviewed and approved by the Design Engineer - Hydraulics.

2.5.4.1 Drainage Conditions and Participation with Local Agencies/Private Entities

The Project Manager must be aware of the various drainage conditions that may necessitate participation costs and agreements with local agencies, county drain commissions, drainage boards, and private entities. When cooperative drainage projects with local agencies or private entities are found to be more economical than separate projects for the participating parties, an equitable sharing of cost must be agreed upon in a written agreement. In all cooperative drainage projects, stormwater conveyance systems shall be designed according to the design guidelines in the current Department Design Manuals or other mutually acceptable design procedures.

The following conditions may be encountered by a project:

Condition No. 1, New MDOT System
MDOT intends to build a new storm sewer that will not involve another owner’s stormwater conveyance system. MDOT shall secure sufficient R.O.W. to place, maintain, and protect against unauthorized use, its own independent outlet sewers, or retention/detention facilities.

Condition No. 2, Additional Drainage Area
MDOT intends to build a new storm sewer and the local agency requests MDOT to increase the proposed pipe sizes to accommodate drainage areas not naturally contributing to the highway R.O.W.

The local agency shall submit a resolution requesting additional capacity in the MDOT stormwater conveyance system. The resolution must provide for the local agency to participate in the increased construction and future operation and maintenance costs to the MDOT stormwater system. The local agency must provide a plan showing the proposed drainage area to be accommodated and the computations for the expected

stormwater runoff chargeable to them based upon current MDOT criteria (see Section 2.5.4.2).

Condition No. 3, Local Sewer Separation Projects and Treatment of Stormwater
A municipality, county drainage district or drainage board, or private entity desires a drainage improvement of an existing or proposed stormwater conveyance system. This system may be in an area where MDOT has no programmed construction projects for improvement and requests MDOT to participate in the proposed drainage improvement, sewer separation, or stormwater treatment project. MDOT will cooperate and give financial support to needed improvements based on the participation costs outlined in Section 2.5.4.2.

The process to participate in the eligible cost for these projects is as follows:

1. Request to Participate.

   A letter from the local agency requesting participation must be sent to the Region Engineer and copied to the MDOT Drainage Coordinator.

   The MDOT Drainage Coordinator will notify the Design Engineer - Hydraulics/ Hydrology of the pending request. The Design Engineer - Hydraulics will determine adequate capacity for MDOT stormwater runoff and the participation in the projects costs based on Section 2.5.4.2. The local agency must also provide a detailed engineer's cost estimate for MDOT participation. Any cost feasible alternative may be investigated by MDOT.

2. Approval to Participate

   The MDOT Drainage Coordinator will notify the local agency by letter of MDOT's decision to participate. The costs incurred after the date of letter approving MDOT's participation will be eligible for reimbursement at the determined participation percentage based on contribution of flow. Review of the project plans and hydraulic analysis is required for development of an agreement that will cover MDOT's participation percentage in the construction costs and future operation and maintenance of the system.

3. Determine Funding Source

   The Region is responsible for programming and requesting funding for the project and notifying the MDOT Drainage Coordinator of available funds. MDOT project costs are eligible for Federal funds from the date of MDOT's approval to participate. Dependent upon scope and timing of the project, funds from the drain assessment fund may be used.

4. MDOT Review, Agreement and MDOT Construction Permit Coordination

   The local agency must provide final plans and specifications and the hydraulic analysis for participation costs as outlined in 2.5.4.2 to the Design Engineer - Hydraulics for review and approval. The Design Engineer - Hydraulics/ Hydrology

will be responsible to contact the Design Engineer - Governmental and Railroad Coordination for the drafting of the cost participation agreement.

If the project involves construction within MDOT right of way, the local agency must submit to the Region/TSC Utilities Permits Engineer an application for a construction permit. The Region/TSC Utilities/Permits Engineer must receive notice of plan approval from the Design Engineer - Hydraulics and the execution of the cost participation agreement from the Design Engineer - Governmental and Railroad Coordination.

The participation agreement will cover the final estimated participation percentages and estimated costs for construction and future operation and maintenance. It is the intent to have a fully executed agreement prior to the construction start. If local agency schedules and contract obligations require them to start prior to the fully executed agreement, the letter submitted to them acknowledging MDOT participation (step 2 above) will establish when costs are eligible for reimbursement. If federal funds are used, the project is processed under the exempt status, regardless of costs (see FHWA letter dated June 3, 1994). Contract requirements not applicable under these municipally let contracts are:

- Wage rate (23 U.S.C. 113).
- EEO (23 CFR 230).
- MBE (49 CFR 23).
- Required contract provisions (23 CFR 633).

Condition No. 4, Replace or Improve Existing System
When MDOT intends to replace or improve an existing open or closed stormwater conveyance system, the Project Manager must make an analysis of the potential drainage impacts to and from abutting properties. MDOT will accept the existing contributing drainage from abutting property to the R.O.W. Provisions for increased runoff due to commercial or industrial development of abutting property or for inclusion of additional runoff from abutting property will be at the private party's or local agency's cost (see Section 2.5.4.2).

2.5.4.2 Participation Agreements and Costs

Agreements - Terms governing the construction, operation, and maintenance of all cooperative sewer projects will be outlined in an agreement. The Project Manager is responsible for contacting the Design Engineer - Governmental and Railroad Coordination for the development of any new agreements or to find any past or existing agreements.

Costs - For MDOT construction projects with local authority participation costs for construction of a stormwater conveyance system, the Project Manager will obtain the participation costs according to either “flow share” or “equivalent runoff acres” methods outlined below.

In cooperative drainage projects done by others, the engineering and contingency costs shall be 25 percent of the estimated construction cost. This figure is subject to adjustment on final billing based on actual costs.

The actual cost is the expense of furnishing and placing the trunk sewer, including manholes, and construction of open channel conveyance systems. Incidental items not required for the road project will be included in the total actual cost. Items such as tree removal, maintaining traffic, and other incidentals, which would be required because of the road project or the MDOT sewer construction, will not be included.

Flow Share -The total cost shall be divided between MDOT and the local agency or a private entity in proportion to the peak flow rate each party is contributing to each section of storm sewer. The design flow condition shall be based on the same storm frequency (see Figure 2, Sewer Participation Sketch, on following page). If the local agency is a county drainage district or drainage board established under the Drain Code, the costs shared are based on a pro rata share of stormwater runoff per the promulgated rules established under Section 14a of Act 51, Public Acts of 1951 as amended (see Design Engineer - Hydraulics). (See Appendix 2-D.)

The participation cost should be based on the same frequency storm runoff quantities as used in the Department's design. If there is a difference in the frequencies used, the stormwater quantity from the local authority may be physically restricted at the junction of the local and Department facilities. An agreed rate of runoff would be metered into the Department's facility by using structural controls such as retention basins, sewer size, or orifices.

If different storm frequencies are used by the respective stormwater systems, the runoff quantity computed for the local authority may be multiplied by a factor to equal the recurrence interval of the local authority and the Department, based on the following table:

Table 2-1 Recurrence Interval Factors*

* Source: Rule 9 for Section 14a of Act 51, P.A. 1951.

Recurrence Interval	Factor
50 percent chance (2-year) storm	1.0
20 percent chance (5-year) storm	1.3
10 percent chance (10-year) storm	1.6
2 percent chance (50-year) storm	2.2

For Example: When a local authority's flow (Q) contribution to a storm drainage facility is based on a 10 percent chance (10-year) storm frequency in conjunction with a Department storm frequency 2 percent chance (50-year), the local authority's flow would have to be multiplied by 2.2/1.6 to determine construction costs from the comparative flows.

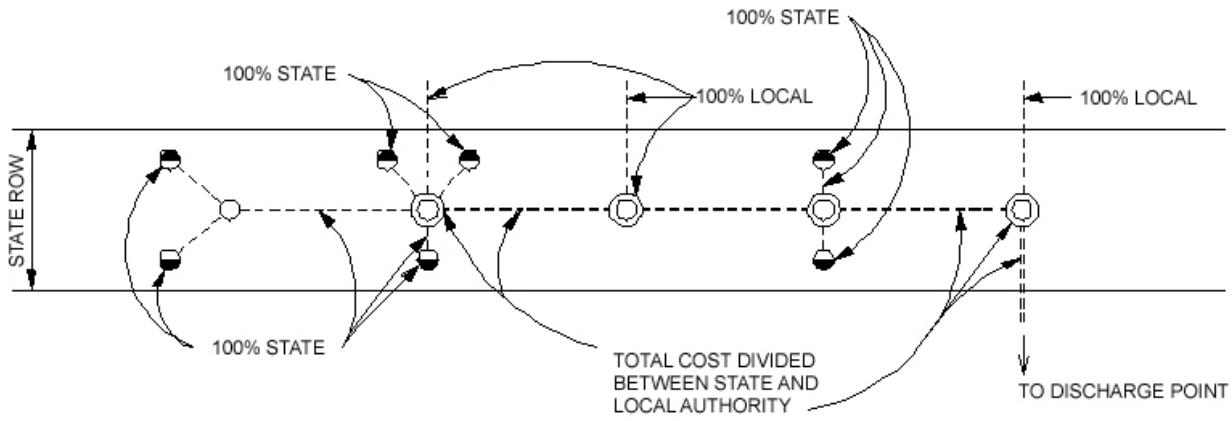

Figure 2-1 Sewer Participation Sketch

Equivalent Runoff Acres -The pro rata share of stormwater runoff from the landowner, public corporation, and roadway authority's parcel of land shall be determined for the contributing drainage area based on the equivalent runoff acres. This method is usually applicable to county drain projects. Compute the equivalent runoff acres (E) using the formula:

$$E = CA$$

where: **E** = equivalent runoff acres
C = runoff coefficient
A = contributing drainage area

Stormwater runoff based on equivalent runoff acres shall be determined for the entire contributing drainage area. Compute the average runoff coefficient for individual parcels. Ranges of runoff coefficients for various land surfaces are provided in Table 2-2, Range of Runoff Coefficients for Various Land Surface Types.

Equivalent runoff acres (E) may be affected by the installation of stormwater detention/retention facilities. Equivalent runoff acres would then be based on the existing, pre-development conditions. Cost of the construction of such facilities is based on supplemental benefit (see explanation of "Supplemental Benefits" in this section).

Table 2-2 Range of Runoff Coefficients for Various Land Surface Types

Type of Surface	Runoff Coefficient
Concrete or Asphalt Pavement	0.8 - 0.9
Commercial and Industrial	0.7 - 0.9
Gravel Roadways and Shoulders	0.5 - 0.7
Residential - Urban (Less than 1/2-acre lots)	0.5 - 0.7
Residential - Suburban (Greater than or equal to 1/2-acre lots)	0.3 - 0.5
Undeveloped	0.1 – 0.3
Berms	0.1 - 0.3
Agricultural - Cultivated Fields	0.15 - 0.4
Meadow, Pasture, Forested Areas	0.1 - 0.4

Lower runoff coefficients should be selected for flat slopes and or permeable soils, whereas higher values should be selected for steeper slopes and less permeable soils or surfaces.

Supplemental Benefits - Supplemental benefits may be derived from the installation of facilities, structures, or mechanical devices jointly determined to be necessary by the landowner or public corporation and MDOT. These costs of supplemental benefits are determined separately from the cost of the stormwater conveyance system and outlined in an agreement between MDOT and the local agency or private entity (see explanation of "Agreements" in this section).

2.5.5 Intracounty and Intercounty Drainage Systems for State Trunkline Stormwater

When a project involves drainage to a intracounty or intercounty drain, it is the responsibility of the Project Manager to coordinate the submittal of plans (required by law under the Drain Code) to the County Drain Commissioner or Drainage Board, with the MDOT Drainage Coordinator (Utilities Drainage Roadside Engineer) and the respective Region/TSC Drainage Coordinator(s). Resolution of any drainage issues by the Project Manager and Region representative must be approved by the MDOT Drainage Coordinator. (Reference Appendix 2-D.)

An intracounty or intercounty drainage district is a public corporation and, as such, has all the legal characteristics attributable to corporations.

Any project that may change the amount of stormwater flow to an intracounty or intercounty drainage district stormwater system will require hydrologic and hydraulic analyses. Such a change may impact MDOT apportionment within the Drainage District and must be reviewed and approved by the Design Engineer - Hydraulics.

The Project Manager should be aware that County Drain Commissioners are reluctant to transfer stormwater from one drainage district to another drainage district. Such a transfer will require an agreement between MDOT and the County Drain Commissioner or Drainage Board. If it is necessary to transfer stormwater between drainage districts, the issue must be resolved with the County Drain Commissioner by the Region/TSC Drainage Coordinator and MDOT Drainage Coordinator as early in the design process as possible.

Copies of all correspondence with County Drain Commissioners should be sent to both the MDOT Drainage Coordinator (Utilities Drainage Roadside Engineer) and Region/TSC Drainage Coordinator(s).

2.5.6 Relocation of Existing Drainage Course

The relocation of an existing drainage course for highway construction should be avoided. Where it is necessary for construction and/or economic reasons, an existing drainage course may be relocated after mutual agreements between the Department, the Michigan Department of Environmental Quality (MDEQ), and, if applicable, the local drainage board (may require a drainage easement in the name of the county drainage district) or property owner are reached. MDEQ permit(s) may be required. The relocation of a drainage course will require a detailed hydraulic analysis. The Project Manager must coordinate with the Design Engineer - Hydraulics for either conducting this analysis or review and approval of the analysis. The Design Engineer - Hydraulics/Hydrology will coordinate review by MDEQ through the Bureau of Planning.

2.5.7 Relocation of Field Tile Drains

Field tiles, that would affect a construction project, must be identified early to reduce problems that may originate in the design. The following steps should be used to provide consistent treatment for disrupted tile systems.

The Bureau of Planning involvement early in the project:
The Bureau of Planning will provide, as part of its public meeting format, the Department's policy for treating drain tiles disrupted by the proposed MDOT project. By early identification of these tile systems, many of the systems can be addressed in preliminary design and can be made a part of the R.O.W. purchase agreement.

Design's process for known field tile disruptions:
The following procedural steps shall be used when it has been determined that the proposed MDOT project will impact existing tile fields.

1. All existing tile fields identified during the early planning process shall be plotted on base plans. Any environmental impact document should be checked for identifying any field tile location.

2. Base plans showing the known information on field tile drain systems shall be transmitted to the Region/TSC Drainage Coordinator for submittal to the County Drain Commissioner's office. The Region/TSC Drainage Coordinator will then make a request for any additions or corrections to the field tile drain that are required. This must be completed prior to the Plan Review Meeting.

3. Plans shall be updated to include any additions or corrections of the existing facilities provided by the County Drain Commissioner's office.

4. Provide Real Estate Support Area with a proposed option for correcting known drainage tile systems with the final R.O.W. submittal. The following is in order of design preference. (See RDM, Section 5.20.)

   a) Continue the drainage under the roadway with an appropriate size replacement pipe.

   When the replacement pipe is within the influence of the roadway, use the current culvert and sewer specifications. Manholes shall be placed outside of the R.O.W. for cleanout purposes. Individual tiles shall be collected in a header and conveyed across the R.O.W. at a minimal number of locations.

   b) Collect the flow from the existing field tile in a header and outlet it into the highway ditch using a minimal number of outlet locations.

   The Real Estate Support Area will include in its appraisal the cost for reconstructing the drainage located outside the R.O.W. An offer that excludes the work necessary within the R.O.W. and the cleanout structures at the R.O.W. line will be presented to the parcel owner. The offer will include the right of the Department to enter the property (Grading Permit) to construct the manholes, outlet headers, and crossing pipe. The ideal situation occurs when the horizontal and vertical information are known. However, when inadequate information is available for proposing exact actions to correct drainage problems, the Real Estate Support Area will then have an appraisal made based on the best available information. (See RDM, Section 5.08.)

   The design plans will include the header, crossing pipe, and drainage structures just outside the right-of-way lines, and the crossing pipe within the right-of-way.

5. Every effort shall be made by the Real Estate Support Area to include the tile field in the R.O.W. settlement. If the Real Estate Support Area cannot settle the tile fieldwork, the work will be included in the project plans. The Real Estate Support Area must, however, have secured a right of entry to perform the work required outside of the R.O.W.

2.5.8 Design Procedures for Unknown Field Tile Location

The Design will provide, on the note sheet, miscellaneous quantities of drainage structures, drainage structure covers, and 8-inch, 10-inch, and 12-inch-diameter pipe for use when tile fields are encountered during construction that had not been identified in the plans. The Construction and Technology Division must obtain written permission from the property owner prior to any alteration of the tile field system on private property.

2.6 DRAINAGE DESIGN OVERVIEW

Water is not associated with jurisdictional boundaries. It is incumbent on the designer to know how water enters the R.O.W., how it is conveyed across or through the R.O.W., and where it is discharged. Today, designers are responsible to know how to address both the quantity of water and the potential impact on water quality associated with specific land use for transportation purposes.

The designer should be aware of the following:

- Legal precedent to discharge surface water (see Section 2.5.8).
- Various types of public and private "watercourses" and their legal standing.
- MDOT's legal right and authority regarding drainage to and from its R.O.W. to these watercourses.
- How drainage rights are presented on construction plans.
- The coordination needed with other public agencies. (See Section 2.5.4.2.)

2.7 GENERAL DESIGN GUIDANCE

This manual sets forth the design process that represents "standard engineering practice." The following are considerations in the drainage design process.

- It is the designer's responsibility to provide an adequate drainage structure that addresses flood hazards, construction and maintenance issues, and meets environmental mitigations and permit conditions. The designer is not required to provide a structure that will handle all conceivable flood flows under all possible site conditions.
- The detail of design studies should be commensurate with the risk associated with the potential flood encroachment and address all other economic, engineering, social, or environmental concerns.
- The predicted value of the 1 percent chance (100-year) or base flood serves as the present engineering standard for evaluating flood hazards and is the basis for regulating floodplains under the "State Flood Hazard Management Plan," Executive Order 1977-4, (see Appendix 2-F) and the requirements of the National Flood Insurance Program (see Appendix 2-C). The designer must make a professional judgment as to the degree of risk that is tolerable for the base flood on a case-by-case basis.
- It is standard engineering practice to use the predicted value of the 1 percent chance (100-year) flood as the basis for evaluating flood hazards; however, flows larger than this value may be considered for complex, high-risk, or unusual cases that require special studies or risk analyses.

2.7.1 Location and Flood Hazards

The primary drainage consideration for facility location in highway planning is the evaluation of the impact of floodplain encroachments for a stream crossing. Hydraulic and environmental considerations of highway river crossings and encroachments are presented in the FHWA Highways in the River Environment, Training and Design Manual (1990). The Manual provides 13 hypothetical examples of typical river environments and identifies possible local, upstream, and downstream effects of highway encroachments. Twelve case histories of actual river crossings in the United States, which illustrate the qualitative response of various types of encroachments, are discussed.

Flood flow characteristics at a highway stream crossing should be carefully analyzed to determine their effect on the highway, as well as to evaluate the effects of the highway on the conveyance of the flood flow or floodway. Such an evaluation can assist in determining those locations at which construction and maintenance will be unusually expensive or hazardous. Thus, it is important to identify the flood hazards prior to any highway involvement to determine if the flood hazard will be increased, decreased, or the same with and without the proposed highway improvement. Flood hazards should include effects to private property both upstream and downstream, i.e., overtopping

floodwaters diverted onto previously unaffected property. Satisfactory solutions often can be obtained by making only minor changes in selected routes to take advantage of better natural hydraulic features at alternate sites.

2.7.2 Construction and Maintenance

Construction Best Management Practices (BMPs) are essential to maintain and/or improve water quality. Chapter 9, Stormwater BMPs, gives guidance on how to choose correct BMPs for each construction site and where to obtain design information.

Many serious construction issues arise because important drainage and water-related factors were overlooked or neglected in the planning and location phases of the project. With proper planning, many problems can be avoided, or cost-effective solutions developed to prevent damages. Such issues involve:

- Soil erosion,
- Sediment deposition,
- Timing of project stages,
- Protection of fish habitat,
- Protection of irrigation systems and continued use during construction,
- Contamination of pumping and distribution facilities by accidental release of hazardous materials,
- Protection of streams, lakes, and rivers, and
- Protection of wetlands.

Analysis of available data, proper scheduling of work, and other aspects involved in the early planning and location studies can alleviate many of these issues encountered in the construction of drainage facilities.

Planning and location studies should consider potential erosion and sedimentation problems that may impact highway drainage facilities on completion of highway construction. Installation of Stormwater Best Management Practices (see Chapter 9) and Storage Facilities (see Chapter 8) may require operation and maintenance. Also, a particular location may require frequent and expensive maintenance due to drainage; alternate locations should be considered unless the potentially high maintenance costs can be reduced by special design. Experience in the area is the best indicator of maintenance problems, and interviews with maintenance personnel could be extremely helpful in identifying potential drainage problems. Reference to highway maintenance and flood reports, damage surveys, newspaper clippings, and interviews with local residents could be helpful in evaluating potential maintenance problems.

2.7.3 Interagency Coordination and Environmental Clearances

Coordination between concerned agencies during the project planning phase will help produce a design that is satisfactory to all. Substantial cost savings and other benefits frequently can be realized for highway and water resource projects through coordinated planning among the Federal, State, and local agencies that are engaged in water-related activities (such as flood control and water resources planning). Interagency cooperation, through the instruments of regional planning, is an important element for serving the public interest.

For all projects, environmental studies are performed. The environmental studies should comply with all Federal, State, and local laws and regulations related to environmental quality and should identify all environmental impacts of the project, both positive and negative. If the project under study requires a Federal action, the NEPA rules relating to environmental studies must be followed.

It is important to document the environmental considerations for the proposed project including any alternatives that will receive consideration. Encroachments onto adjacent areas (including environmental encroachments) should be avoided whenever possible. Identifying environmental considerations early in the planning process can prevent problems as the design and construction of the project proceeds.

Each construction project is subject to one of three types of early preliminary engineering (EPE) analysis during the planning phase depending on the nature of the project and the anticipated social, economic, and environmental impacts and necessary mitigation. These reviews establish the environmental clearances required from Federal, State, and/or local resource agencies. The clearance process is discussed in Chapter 10 of the Road Design Manual. Expected mitigation measures will be incorporated into the contract documents during the design phase for implementation in the construction phase.

The basic review level is **Categorical Exclusion (CE)**. This review considers actions that individually or cumulatively do not involve significant environmental impacts. They are actions that do not:

- Induce significant impacts to planned growth or land use,
- Require the relocation of significant numbers of people,
- Have a significant impact on any cultural, natural, recreational, historic, or other resources,
- Involve significant air, noise, or water quality impacts, and
- Have a significant impact on travel patterns.

The next level of review is an **Environmental Assessment (EA)**. This review is considered a decision document; the assessment is performed when there is uncertainty as to the significance of the impacts of a particular project. The assessment

considers the project need, alternatives considered, impacts, and comments and coordination with the Federal Highway Administration (FHWA) and the public. If a finding of no significant impact is received from FHWA, the project proceeds. If significant impacts are found, the project moves to the Environmental Impact Statement process.

The highest, most comprehensive level of review is an **Environmental Impact Statement (EIS).** This review considers multiple studies and analyses with extensive involvement of environmental resource agencies throughout the review. The EIS process is a comprehensive environmental analyses of (1) Purpose of and need for the project; (2) The potential transportation solutions by considering corridors with various alignments, and (3) A detailed environmental analyses of a recommended alternative. The final EIS reports on the environmental impacts and mitigation necessary for the particular project. A Record of Decision is required from the FHWA for a project to proceed.

2.7.4 Intra-agency Coordination and Environmental Permits

Intra-agency coordination and environmental permits are discussed in Chapter 10 of the Road Design Manual.

Specific Federal, State, and local permits needed for a highway project must be identified in the environmental clearance document early in the EPE phase (planning stage). For Federal permits, applications should be filed with the Coast Guard for the construction of bridges over navigable waters and with the Corps of Engineers for other construction. See Section 2.8 on Federal laws. MDOT's Environmental Clearance process is outlined in Chapter 10 of the Road Design Manual.

Prior to initiating design work, the designer must review the environmental document with the Region Environmental Permit Coordinator to identify regulatory commitments, constraints, and any permits required. Permits, as required, should be obtained before construction begins and preferably before detailed plans are prepared.

Natural Resources and Environmental Protection (NREPA) Act, Public Act 451 of 1994, as amended, specific parts of NREPA are discussed in Chapter 10 of RDM, and noted below and discussed in Section 2.7.3.

- Inland Lakes and Streams, Part 301 and Administrative Rules R 281.811 - R 281.846.
- Wetland Protection, Part 303, and its Administrative Rules R 281.921 - R 281.925.
- Floodplains and Floodways, Part 31 and its Administrative Rules R 323.1311 - R 323.1329.
- Great Lakes Submerged Lands, Part 325.

- Dam Safety, Part 315.
- Shorelands Protection and Management, Part 323.
- Sand Dunes Protection and Management, Part 353.
- Great Lakes Submerged Lands, Part 325.
- Section 404 of Clean Water Act.
- Navigation Clearances, Coast Guard, Sections 9 and 10, Rivers and Harbors.
- Water Resource Protection (Stormwater construction and municipal permits discharge permits), Part 31 and its Administrative Rules (Part 21) R 323.2161 - R 323.2190.
- County Drain Coordination, Drain Code (see Appendix 2-D).

2.8 FEDERAL LAW

Federal law consists of the Constitution of the United States, Acts of Congress, regulations which government agencies issue to implement these acts, Executive Orders issued by the President, and case law. Acts of Congress are published immediately upon issuance and are cumulated for each session of Congress and published in the United States Statutes At Large. Compilations of Federal Statutory Law, revised annually, are available in the United States Code (USC) and the United States Code Service (USCS).

The Federal Register, which is published daily, provides a uniform system for making regulations and legal notices available to the public. Presidential Proclamations and Executive Orders, Federal agency regulations and documents having general applicability and legal effect, documents required to be published by an act of Congress, and other Federal agency documents of public interest are published in the Federal Register. Compilations of Federal regulatory material revised annually are available in the Code of Federal Regulations (CFR).

2.8.1 Drainage

Federal law does not deal with drainage per se, but many laws have implications which affect drainage design. These include laws (see Appendix 2-B) concerning:

- Flood insurance and construction in flood hazard areas:
  - Executive Order 11988 Floodplain Management, as amended by Executive Order 12148
  - National Flood Insurance Act (P.L. 90-448)
- Navigation and construction in navigable waters:
  - Sections 9 and 10, River and Harbors Act of 1899
- Water pollution control:
  - Federal Water Pollution Control Act (1972), as amended by Clean Water Act (1977 and 1987)
- Environmental protection
- Protection of fish and wildlife:
  - Fish and Wildlife Coordination Act
  - Endangered Species Act of 1973 as amended
- Coastal zone management:
  - Coastal Zone Management Act of 1972.

Federal agencies formulate and promulgate rules and regulations to implement these laws, and highway hydraulic engineers should attempt to keep informed regarding proposed and final regulations.

2.8.2 Significant Transportation Laws Related to Highway Drainage

Some of the more significant Federal laws affecting highway drainage are listed below with a brief description of their subject area.

- *Department of Transportation Act (80 Stat. 941, 49 U.S.C. 1651 et seq.).* This Act established the Department of Transportation and set forth its powers, duties, and responsibilities to establish, coordinate, and maintain an effective administration of the transportation programs of the Federal Government.
- *Federal-Aid Highway Acts (23 U.S.C. 101 et seq.).* The Federal-Aid Highway Acts provide for the administration of the Federal-Aid Highway Program. Proposed Federal-aid projects must be adequate to meet the existing and probable future traffic needs and conditions in a manner conducive to safety, durability, and economy of maintenance and must be designed and constructed according to standards best suited to accomplish these objectives and to conform to the needs of each locality.
- *Federal-Aid Highway Act of 1970 (84 Sta. 1717, 23, U.S.C. 109 (h)).* This Act provided for the establishment of general guidelines to ensure that possible adverse economic, social, and environmental effects relating to any proposed Federal-aid project have been fully considered in developing the project. In compliance with the Act, the Federal Highway Administration issued process guidelines for the development of environmental action plans. These guidelines are contained in the Federal-Aid Highway Program Manual, Volume 7, Chapter 7, Section 1 (FHPM 7-7-1), and in 23 CFR 795 et seq.
- *Federal-Aid Highway Act of 1966 (80 Stat. 766), amended by the Act of 1970 (84 Stat. 1713), 23 U.S.C. 109 (g).* This Act required the issuance of guidelines for minimizing possible soil erosion from highway construction. In compliance with these requirements, the Federal Highway Administration issued guidelines which are applicable to all Federal-aid highway projects. These guidelines are included in FHPM 6-7-1-1, 6-7-3-1, and 6-7-3-2. Regulatory material is found in 23 CFR 650.201.
- *The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991* provided authorization for highways, highway safety, and mass transportation for six years. The act intended to develop a National highway system that is economically efficient and environmentally sound. It created a foundation for the Nation to compete in the global economy and move people and goods in an energy efficient manner. Under the Act, state and local governments have been given more flexibility in determining transportation solutions, whether transit or highways and the tools for enhanced planning and management systems to guide them in making the best choices. Funding for the new technologies, as well as activities for enhancing environment and safety, is also available.
- *Transportation Equity Act for the 21st Century (TEA-21)*. This Act authorized highway, highway staffs, transit, and other surface transportation programs for six years. Building on the Intermodal Surface Transportation Efficiency Act

(ISTEA), TEA-21 continued the flexibility in the use of funds, an emphasis on measures to improve the environment, and a focus on a strong planning process.

2.8.3 Navigable Waters Regulations

The Congress of the United States is granted constitutional power to regulate "commerce among the several states." A part of that power is the right to legislate on matters concerning the instrumentalities of interstate commerce such as navigable waters. The definition of navigable waters expands and contracts depending on the breadth required to adequately carry out the Federal purpose. The result is that Congress can properly assert regulatory authority over at least some aspects of waterways that are not, in themselves, subject to navigation.

2.8.4 Federal Agencies

Basically four Federal agencies carry out existing Federal regulations.

- Coast Guard - The Coast Guard (USCG) has regulatory authority under Section 9 of the Rivers and Harbors Act of 1899, 33 U.S.C. 401 (delegated through the Secretary of Transportation in accordance with 49 U.S.C. 1655 (g)) to approve plans and issue permits for bridges and causeways across navigable rivers. As outlined in 23 CFR 650, the area of jurisdiction of the USCG and FHWA is established as follows:

  The FHWA has the responsibility under 23 U.S.C. 144(h) to determine if a USCG permit is not required. This determination shall be made at an early stage of project development so that any necessary coordination can be accomplished during environmental processing.

  The USCG has the responsibility:

  - to determine whether or not a USCG permit is required for the improvement or construction of a bridge over navigable waters, except for the exemption exercised by FHWA as stated above, and
  - to approve the bridge location, alignment, and appropriate navigational clearances in all bridge permit applications.

  For more information related to navigational clearances for bridges, see the Federal-Aid Highway Program Manual 6-7-1-1.

- U.S. Army Corps of Engineers (USACE) - The USACE has regulatory authority over the construction of dams, dikes, or other obstructions (which are not bridges and causeways) under Section 9 (33 U.S.C. 401). The USACE also has authority to regulate Section 10 of the River and Harbor Act of 1899 (33 U.S.C. 403) which prohibits the alteration or obstruction of any navigable waterway with the excavation or deposition of fill material in such waterway. Section 11 of the River

and Harbor Act of 1899 (33 U.S.C. 404) authorizes the Secretary of the Army to establish harbor lines. Work channelward of those lines requires separate approval of the Secretary of the Army, and work shoreward requires Section 10 permits.

Section 404 of the Clean Water Act (33 U.S.C. 1344) prohibits the unauthorized discharge of dredged or fill material into waters of the United States, including navigable waters; such discharges require a permit. The term "discharges of fill material" means the addition of rock, sand, dirt, concrete, or other material into the waters of the United States incidental to construction of any structure. The USACE has granted Nationwide General Permit for 26 categories of certain minor activities involving discharge of fill material. Under the provisions of 33 CFR 330.5(a)(15), fill associated with construction of bridges across navigable waters of the United States, including cofferdams, abutments, foundation seals, piers, temporary construction, and access fills are authorized under the Nationwide Section 404 Permit providing such fill has been permitted by the U.S. Coast Guard under Section 9 of the River and Harbor Act of 1899 as part of the bridge permit. Therefore, formal application of the USACE for a Section 404 Permit is not required unless bridge approach embankment is located in a wetland area contiguous to said navigable stream. The USACE has Section 404 regulatory authority over streams the Coast Guard has placed in the "advance approval" category. This category of navigable streams is defined as navigable in law but not actually navigated other than by logs, log rafts, rowboats, canoes, and motorboats. Notably, this regulation does not apply to the actual excavation or "dredging of material," provided this material is not reintroduced into any regulated waterway including the one from which it was removed.

Section 404 of the Clean Water Act (33 U.S.C. 1344) requires any applicant for a Federal permit for any activity that may affect the quality of waters of the United States to obtain water quality certification from MDEQ.

- Federal Highway Administration - The Federal Highway Administration has the authority to implement the Section 404 Permit Program (Clean Water Act of 1977) for Federal-aid highway projects processed under 23 CFR 771.115 (b) categorical exclusions. This authority was delegated to the Federal Highway Administration by the USACE to reduce unnecessary Federal regulatory controls over activities adequately regulated by another agency. This permit is granted for projects where the activity, work or discharge is categorically excluded from environmental documentation because such activity does not have individual or cumulative significant effect on the human environment.

- Environmental Protection Agency (EPA) - The EPA is authorized to prohibit the use of any area as a disposal site when it is determined that the discharge of materials at the site will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas, wildlife, or recreational areas (Section 404 (c)), Clean Water Act (33 U.S.C. 1344). Also EPA is authorized under the Section 402 of the Clean Water Act (33 U.S.C. 1344) to administer and issue a

"National Pollutant Elimination Discharge System" (NPDES) permit for point source discharges, provided prescribed conditions are met.

EPA, or a state under the delegated authority, issues NPDES permits for point source discharges from large municipal separate storm sewer systems (MS4) (serving a population of 250,000 or more) and from medium separate storm drain systems (serving a population of 100,000 or more but less than 250,000). Furthermore, highway construction activities are classified as industrial activities. EPA, or a state under the delegated authority, issues an individual or a general permit for stormwater discharge associated with industrial activities involving any disturbance of one acre (as of March 10, 2003) or more.

National Pollutant Discharge Elimination System (NPDES) - The regulatory permit program that controls the quality of treated sewage discharge from sewage treatment plants as established in 40 CFR Part 125 pursuant to the Clean Water Act, 33 U.S.C. 1342 (23 CFR 650). In compliance with this regulation, the following factors shall apply to the design of sewage treatment facilities for highway safety rest areas:

- The NPDES construction permit shall be obtained prior to approval of plans, specifications, and estimate and authorization for the advertisement of bids.

- Sewage treatment shall be accomplished at the site as may be necessary to meet effluent limitations. Any effluent shall be monitored in accordance with the standards established by the NPDES permit.

The 1992 Energy and Water Development Appropriation Act provides guidance to use the 1987 Manual of the USACE in the delineation of wetlands. This allows more flexibility in the definition and determination of wetlands.

When the designer becomes involved in obtaining approvals from the Federal agencies, he/she should be aware that these agencies do not always work in concert. Quite often they will not be in agreement with each other. This can result in significant project delays unless early coordination efforts are initiated and diligently pursued. These conflicts between Federal agencies occur as a result of their having different rules; some are "regulators" while others are "resource" motivated. For this reason, they will have different goals and, in some instances, definitions of such things as wetlands. When conflicts occur, it is best to quickly determine which agency has primary responsibility and attempt to satisfy their needs.

2.8.5 Executive Orders

Presidential Executive Orders have the effect of law in the administration of programs by Federal agencies. While Executive Orders do not directly apply to State highway department, these requirements are usually implemented through general regulations.

2.8.5.1 Executive Order 11988 - Floodplains

Executive Order 11988, May 24, 1977, requires each Federal agency, in carrying out its activities, to take the following actions:

- To reduce the risk of flood loss, minimize the impact of floods on human safety, health, and welfare, and restore and preserve the natural and beneficial values served by floodplains, and
- To evaluate the potential effect of any actions it may take in a floodplain and ensure its planning programs reflect consideration of flood hazards and floodplain management.

These requirements are contained in the Federal-Aid Highway Program Manual (FHPM), Volume 6, Chapter 7, Section 3, Subsection 2, and were published in the Federal Register, April 26, 1979, (44 FR 24678), and in 23 CFR 650, Subpart A.

2.8.5.2 Executive Order 11990 - Wetlands

Executive Order 11990, May 24, 1977, orders each Federal agency :

- To take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values to wetlands,
- To avoid undertaking or providing assistance for new construction in wetlands unless the head of the agency finds that there is no practical alternative and all practical measures are taken to minimize harm which may result from the action, and
- To consider factors relevant to the proposal's effects on the survival and quality of the wetlands.

These requirements are contained in 23 CFR 771 FAPG Part 771 - Environmental Impact and Related Procedures.

2.9 STATE LAW

2.9.1 Common Law and Statutory Law

State drainage law is derived mainly from two sources: common law and statutory law.

Common law is that body of principles which is developed from immemorial usage and custom and which receive judicial recognition and sanction through repeated application. These principles were developed without legislative action and are embodied in the decisions of the courts.

Statutory laws of drainage are enacted by legislatures to enlarge, modify, clarify, or change the common law applicable to particular drainage conditions. This type of law is derived from constitutions, statutes, ordinances, and codes.

In general, the common law rules of drainage predominate unless they have been enlarged or superseded by statutory law. In most instances where statutory provisions have been enacted, it is possible to determine the intent of the law. If, however, there is a lack of clarity in the statute, the point in question may have been litigated for clarification. In the absence of either clarity of the statute or litigation, a definitive statement of the law is not possible, although the factors that are likely to be controlling may be indicated.

2.9.2 Basic Concepts

There are two major rules that have been developed by the courts regarding the disposition of surface waters. One is known as the civil law rule of natural drainage. The other is referred to as the common enemy doctrine. Modification of both rules has tended to bring them somewhat closer together, and in some cases the original rule has been replaced by a compromise rule known as the reasonable use rule.

Much of the law regarding stream waters is founded on a common law maxim that states "water runs and ought to run as it is by natural law accustomed to run." Thus, as a general rule, any interference with the flow of a natural watercourse to the injury or damage of another will result in liability. This may involve augmentation, obstruction and detention, or diversion of a stream; however, there are qualifications.

In common law, flood waters are treated as a "common enemy" of all people, lands, and property attacked or threatened by them.

In groundwater law, the "English Rule," which is analogous to the common enemy rule in surface water law, is based on the doctrine of absolute ownership of water beneath the property by the landowner.

2.9.3 Surface Waters

The civil law rule is based on the perpetuation of natural drainage. The rule places a natural easement or servitude upon the lower land for the drainage of surface water in its natural course. The natural flow of the water cannot be obstructed by the servient owner to the detriment of the dominant owner. In the State of Michigan, courts have accepted the general rule of natural flow. This means that natural surface waters created by rain or snow must be allowed to flow unrestricted onto lower land holdings over the natural water courses. As a general rule, landowners may not artificially concentrate or increase the velocity of the surface waters.

Under the common enemy doctrine, surface water is regarded as a common enemy which each property owner may fight off or control as he/she will or is able, either by retention, diversion, repulsion, or altered transmission. Thus, there is not cause of action even if some injury occurs causing damage. In most jurisdictions this doctrine has been subject to a limitation that one must use his/her land so as not to unreasonably or unnecessarily damage the property of others.

Under the reasonable use rule, each property owner can legally make reasonable use of his/her land, even though the flow of surface waters is altered thereby and causes some harm to others. However, liability attaches when his harmful interference with the flow of surface water is "unreasonable." Whether a landowner's use is unreasonable is determined by a nuisance-type balancing test. The analysis involves several questions.

- Was there reasonable necessity for the actor to alter the drainage to make use of his/her land?
- Was the alteration done in a reasonable manner?
- Does the utility of the actor's conduct reasonably outweigh the gravity of harm to others?

2.9.4 Stream Waters

Where natural watercourses are unquestioned in fact and in permanence and stability, there is little difficulty in application of the rule. Highways cross channels on bridges or culverts, usually with some constriction of the width of the channel and obstruction by substructure within the channel, both causing backwater upstream and acceleration of flow downstream. The changes in regime must be so small as to be tolerable by adjoining owners, or there may be liability of any injuries or damages suffered.

Surface waters from highways are often discharged into the most convenient watercourse. The right is unquestioned if those waters were naturally tributary to the watercourse and unchallenged if the watercourse has adequate capacity. However, if all or part of the surface waters have been diverted from another watershed to a small watercourse, any lower owner may complain and recover for ensuing damage.

Considering floodwaters as a common enemy, permits all affected landowners, including owners of highways, to act in any reasonable way to protect themselves and their property from the common enemy. They may obstruct its flow from entering their land, backing or diverting water onto lands of another without penalty, by gravity or pumping, by diverting dikes or ditches, or by any other reasonable means.

Floodwaters shall not cause harmful interference, which is defined as causing an unnaturally high stage or unnatural direction of flow on a river or stream that causes, or may cause, damage to property, a threat to life, a threat of personal injury, or a threat to water resources.

2.9.5 Groundwater

A further interpretation of "reasonable" in relation to highway construction would view the excavation of a deep "cut section" that intercepts or diverts underground water to the detriment of adjacent property owners as unreasonable. There are also cases where highway construction has permitted the introduction of surface contamination into subsurface waters and thus incurred liability for resulting damages.

2.9.6 Statutory Law

The inadequacies of the common law or court-made laws of drainage led to a gradual enlargement and modification of the common law rules by legislative mandate. In the absence of statute, the common law rules adopted by State courts determine surface water drainage rights. If the common law rules have been enlarged or superseded by statutory law, the statute prevails. In general, statutes have been enacted that affect drainage in one way or another in the subject areas described below.

2.9.7 Eminent Domain

In the absence of an existing right, public agencies may acquire the right to discharge highway drainage across adjoining lands through the use of the right of eminent domain. Eminent domain is the power of public agencies to take private property for public use.

Article 10, Section 2 of the Michigan Constitution of 1963, grants the State the right of eminent domain, which allows taking of property for public purposes. It is important to remember, however, that whenever any property is taken under eminent domain, the private landowner must be compensated for his/her loss.

County governments have the right of eminent domain to construct, operate, repair, or maintain any floodway, reservoir spillway, levee or diversion, or other flood control improvements. Similarly, any levee or drainage district, through its Board of Directors, has eminent domain powers as long as it is declared necessary by the Chief of Engineers, United States Army, for the location, construction, operation, or maintenance

of any levee, channel rectification, drainage canal, floodway, reservoir, spillway, or diversion to be constructed by the United States Government.

2.9.8 Water Rights

The water right which attaches to a watercourse is a right to the use of the flow, not ownership of the water itself. This is true under both the riparian doctrine and the appropriation doctrine. This right-of-use is a property right, entitled to protection to the same extent as other forms of property, and is regarded as real property. After the water has been diverted from the stream flow and reduced to possession, the water itself becomes the personal property of the riparian owner or the appropriator.

- Riparian Doctrine - Under the riparian doctrine, lands contiguous to watercourses have prior claim to waters of the stream solely by reason of location and regardless of the relative productive capacities of riparian and nonriparian lands.
- Doctrine of Prior Appropriation - The essence of this doctrine is the exclusive right to divert water from a source when the water supply naturally available is not sufficient for the needs of all those holding rights to its use. Such exclusive right depends upon the effective date of the appropriation, the first in time being the first in right.

Michigan is a Riparian Doctrine State.

Generally, the important thing for highway designers to keep in mind in the matter of water rights is that proposed work in the vicinity of a stream should not impair either the quality or quantity.

2.9.9 Drain Code and Agricultural Drainage Laws

See Appendix 2-D on Michigan's Drain Code as discussed in "County Drains and Road Guidelines."

2.9.10 Environmental Laws and Permits

MDEQ is the agency responsible for administering the State statutes and corresponding administrative rules for construction activities at the land and water interface. Permit coverage (and USACE jurisdiction) shall be sought by completing the joint permit application form. MDOT permit applications will be completed and submitted by the MDOT Region Environment Permit Coordinator and submitted to MDEQ. Refer to Chapter 10 of RDM for further discussion. Relevant parts of the Natural Resources and Environmental Protection Act (NREPA), Public Act 451 of 1994, as amended, that require permits are discussed in the following sections.

2.9.10.1 Inland Lakes and Streams (Part 301)

Part 301 (Inland Lakes and Streams) of the NREPA, Public Act 451 of 1994, requires an Inland Lakes and Streams Permit from MDEQ for construction in, over, or adjacent to inland lakes or streams.

An inland stream is defined as a watercourse with definite banks, a bed, and visible evidence of a continued flow or continued reoccurrence of water.

An inland lake is defined as any body of water which has a water surface area of five acres or greater.

Part 301 protects Michigan's inland lakes and streams from construction activities. Specific requirements address projects that occur below the ordinary high water mark of a lake or stream. Based on past MDEQ permit conditions, the following features may be applicable for replacement bridge/culvert projects:

- Structures that fully span the watercourse (abutments placed at or outside the stream banks).
- Fewer spans.
- Restoring the stream bottom with a natural material. No hard bottom (i.e., culvert bottom) is preferred. When a culvert is needed, MDEQ has requested the bottom be recessed so a natural material covers the bottom.
- Headwalls versus long extensions at each end.
- Distance of at least 4.5 feet from average water surface to low chord of structure (to facilitate passage of small boats and canoes).

2.9.10.2 Wetland Protection (Part 303)

Part 303 (Wetland Protection) of the NREPA, Public Act 451 of 1994, requires a State Wetland Permit from MDEQ for construction in wetland areas. Any unavoidable wetland impacts resulting from construction activities in a regulated wetland must be properly mitigated on a no net loss basis. Wetland mitigation plans are to be developed and coordinated with MDEQ during the project development stage.

A wetland is defined as land characterized by the presence of water at a frequency and duration sufficient to support, and under normal circumstances does support, wetland vegetation or aquatic life and is commonly referred to as a bog, swamp, or marsh. Consult with Region/Central Office staff, if necessary, for wetland designation.

2.9.10.3 Floodplain and Floodways (Part 31)

Part 31 Floodplain and Floodways (Water Resources Protection) of the NREPA, Public Act 451 of 1994, as amended, requires a Floodplain Permit from MDEQ for construction

in a floodplain of any river or stream having a contributing drainage area in excess of two square miles upstream of the crossing.

In addition, MDOT must comply with the Governor's State Executive Order 1977-4, "State Flood Hazard Management Plan," which establishes flood standards and design requirements (see Appendix 2-E). The Order requires MDOT watercourse crossings to pass the 1 percent chance (100-year) storm flow.

A floodplain is defined as an area of land adjoining a river or stream that will be inundated by a 1 percent chance (100-year) flood.

Part 31 seeks to ensure that watercourse encroachments do not create a harmful interference to the discharge or stage characteristics of a watercourse, thereby protecting against damage to property, a threat to life, a threat to personal injury and/or pollution, or an impairment or destruction of the water or other natural resources.

Specific Requirements: In general, a licensed Professional Engineer in Michigan will need to certify, by conducting a hydraulic analysis, that a waterway crossing (bridge or culvert) construction or reconstruction project does not produce a harmful interference. Additional details of this certification are listed in Chapter 6, Appendix C, including a suggested report format.

2.9.10.4 Great Lakes Submerged Lands (Part 325)

Part 325 (Great Lakes Submerged Land) of the NREPA, Public Act 451 of 1994, requires a Great Lakes Submerged Land permit from MDEQ for any dredging, filling, or related construction activities in, over, or adjacent to any of the Great Lakes.

2.9.10.5 Dam Safety (Part 315)

Part 315 (Dam Safety) of the NREPA, Public Act 451 of 1994, requires a Dam Safety permit from MDEQ for construction, enlargement, repair, reconstruction, alteration, removal, or abandonment of any dam in the State of Michigan.

A dam is defined as any structure, which impounds 6 feet or more of water or has a backwater area of 5 acres or more. Consult with MDEQ Dam Safety Program staff to confirm dam identification.

2.9.10.6 Section 404C (Federal)

MDEQ has been delegated authority to administer Section 404 for inland lakes and streams. USACE has maintained jurisdiction of the Great Lakes and connecting waters. These projects will require permits from both MDEQ and USACE. MDEQ is the responsible agency for coordinating Federal permits under the joint permit system with the USACE. This coordination is authorized under the Federal 404 Permit Program of the Clean Water Act. Section 404 permits are required for watercourses with a flow

greater than 5 cubic feet per second or if work is proposed in wetland areas listed on USACE's jurisdiction maps.

The full text and updates of the NREPA, Public Act 451 of 1994, as amended, and the associate Administrative Rules can be found on MDEQ's Web site maintained by the Land and Water Management Division at the following address:

http://www.michigan.gov/deq
go to Water link
go to Wetland's Protection
go to Laws and Rules link

2.9.10.7. Natural Rivers (Part 305)

See the MDNR website for the project requirements regarding natural rivers.
www.michigan.gov/dnr/0,1607,7-153-10367_11855---,00.html

2.9.11 Exemptions to MDEQ Environmental Permits

The following activities are exempt from MDEQ environmental permits noted above. Source of information is the Land and Water Management Division permits (source, www.michigan.gov/deq).

2.9.11.1 General Exemptions (Updated Ocotber 2008)

The installation, repair, replacement, or maintenance of cross road culverts on drainage courses with a drainage area of less than 2 square miles, which serve only to convey stormwater runoff or equalize the water level at both ends of the culvert when such culverts will not result in adverse impacts to regulated wetlands, lakes, or floodplains.

The construction, repair, replacement, or maintenance of road ditches which serve to convey stormwater runoff from the road R.O.W. in such manner that it does not materially change the drainage pattern, drain adjacent wetlands, extend below the ordinary high water mark (OHWM) or an adjacent stream, and is not part of a stream system.

There will be no change to weir flow elevations in the floodplain, other than the possible replacement of a 4-inch maximum wearing course above the original design surface of the roadway.

The construction, installation, repair, replacement, or maintenance of standard stormwater runoff appurtenances (auxiliary structures), provided that such structures are placed in a manner that they will not obstruct stream or flood flow, will not impact adjacent wetlands, and do not extend below the OHWM. Examples of these structures include:

- Manholes
- Catch basins
- Headwalls

Riprap protection on stream banks above the OHWM, provided the riprap does not exceed an average of 2 cubic yards per running foot along the shoreline and a maximum of 300 cubic yards.

If repair and maintenance of retention/detention basins is required and occurs on a regulated dam (6 feet in height and surface area of 5 acres at design stage), a permit may be needed under Part 315, Dam Safety.

2.9.11.2 Culvert Maintenance Exemptions

The following culvert maintenance activities are exempt from the Land Water Management Division (LWMD) permit requirements:

- In-kind, in-place repairs and maintenance, excluding structure replacement, to any previously permitted culverts, provided the watercourse, streambed, and adjacent banks are not altered.
- In-kind, in-place repairs and maintenance, excluding structure replacement, to any existing culverts installed before January 9, 1973, provided the watercourse, streambed, and adjacent banks are not altered.
- Replacement, maintenance, or installation of culvert linings involving only equalizer culverts in a drainage course where two wetland areas are bisected by an existing roadway and where such activity will not result in adverse impacts to regulated wetlands.
- Extension of equalizer culverts that connect two wetland areas bisected by an existing roadway in order to meet current safety standards, where the extension does not extend beyond the existing footprint of the roadway, and where the existing culvert has not drained, flooded, or created any other significant environmental impacts to the associated wetlands (such as tree die-off, etc.). The footprint of the road is measured from backslope to backslope. If no backslope exists, the footprint ends at the existing toe-of-slope.
- Clean out in the immediate vicinity of equalizer culverts connecting and/or adjacent to wetland areas, where the clean out will not create an adverse impact to adjacent wetlands. Placement of fill material to accept guardrail flare installations, provided fill is outside any adjacent regulated lakes, streams, floodplains, or wetlands. In-kind, in-place replacement of guardrails.

2.9.11.3 Bridge Exemptions (updated January 2004)

Common Exemptions for Bridge Projects:

- Small watersheds (currently less than 2 square miles when measured at the downstream project limits).
- One-time exemptions for short bridge extensions (less than 24 feet).

- Deck replacements and deck resurfacing.

The following items are exempt from LWMD permit requirements, provided materials can be prevented from falling into the watercourse during construction:

- In-kind, in-place repairs and maintenance, excluding structure replacement, to any previously permitted bridges provided the watercourse, streambed, and adjacent banks are not altered.
- The removal and replacement of ties and stringers on railroad bridges using materials that do not exceed the original dimensions.
- Maintenance or restoration of bridges through sandblasting and/or painting, provided all operations are conducted in accordance with current MDOT specifications.
- Widening of bridge decks, provided it meets both of the following conditions:
  - The work can be done on existing abutments or piers.
  - The replacement is designed with an equal or greater hydraulic capacity, the existing bridge or culvert and approaches do not cause harmful interference, and deletion of existing auxiliary openings and road overflow areas is not planned.
- Removal, restoration, replacement in-kind, and maintenance of bridge appurtenances, including:
  - Steel bridge beams, providing materials are not allowed into the water.
  - Bridge decks.
  - Guardrail sections.
  - Fascia repair.
  - Joint repair.
  - Crack sealing.
  - Bridge pin and hanger repair.
  - Concrete repairs above the water surface, provided the work can be done from barges or waders, and the repair is in-kind, in-place and does not require the placement or storage of materials or equipment in the water, floodplain, or wetlands.
  - Bridge railing.
    Light fixtures, signs, fencing, etc., provided these materials do not hang below the underclearance elevation of the bridge.
- Resurfacing or overlay of an existing bridge deck and approaches when such resurfacing will not increase the original design roadway profile elevations in the floodplain by 4 inches, and provided a harmful interference to flood flow has not or will not occur.
- Hydro-demolition of bridge decks provided that slurry and other materials are prevented from entering the water, floodplain, or wetlands.

Any of the above bridge work must be conducted in a manner so that all of the following apply:

- Removal of bridge abutment and piers is not part of the project.
- There will be no change to weir flow elevations in the floodplain, other than the possible replacement of a 4-inch maximum wearing course above the original design surface of the roadway.
- The span of the bridge does not change.
- The underclearance elevation does not change.
- Navigation of the waterway is not impeded by the existing structure or proposed activity.
- Temporary work will not require the placement or storage of materials or equipment in the water, floodplain, or wetlands.

2.10 LOCAL LAW

Local governments (cities, counties, improvement districts) have ordinances and codes which require consideration during design. For example, zoning ordinances can have a substantial effect on the design of a highway and future drainage from an area. On occasion, a question may arise as to whether the State must comply with local ordinances. Generally, the State is not legally required to comply with local ordinances except where compliance is required by specific State statute. Quite often, however, the State conforms to local ordinances as a matter of courtesy, especially when it can be done without imposing a burden on the State.

Following is a discussion of the application of some of the principles and concepts of drainage law.

Local Regulations

Local regulations may also impact the design of a bridge project. During the study phase, the design engineer shall contact local units of government to understand local requirements that may impact the project. Contact the Design Engineer - Hydraulics for assistance. Some local requirements to consider include:

- County Requirements: A major consideration is the crossing of designated county or intercounty drains. Any plans for new or replacement structure over a county drain must be submitted to the county drain commissioner (see Appendix 2-D).
- City, Village, and Township Requirements: Many communities, especially those participating in the National Flood Insurance Program (NFIP), have floodplain ordinances (see Appendix 2-C). These ordinances may restrict changes to the floodplain elevation that are even more restrictive than State or Federal law.

2.10.1 Municipal Liability

A municipality is generally treated like a private party in State drainage matters. A municipality undertaking a public improvement is liable, the same as an individual, for damage resulting from negligence or an omission of duty. As a general rule, municipalities are under no legal duty to construct drainage improvements unless public improvements necessitate drainage as in those situations in which street grading and paving or construction accelerate or alter storm runoff. In addition, it is generally held that municipalities are not liable for adoption or selection of a defective plan of drainage.

Municipalities can be held liable for negligent construction of drainage improvements, for negligent maintenance and repair of drainage improvements, and if it fails to provide a proper outlet for drainage improvements. In general, in the absence of negligence a municipality will not be held liable for increased runoff occasioned by the necessary and desirable construction of storm drains. Nor will a municipality be held liable for damages

caused by overflow of its storm drains occasioned by extraordinary, unforeseeable rains or floods. Municipal liability will attach where a municipality:

- Collects surface water and casts it in a body onto private property where it did not formerly flow,
- Diverts, by means of artificial drains, surface water from the course it would otherwise have taken, and casts it in a body large enough to do substantial injury on private land, where, but for the artificial storm drain, it would not go, and
- Fills up, dams back, or otherwise diverts a stream of running water so that it overflows its banks and flows on the land of another.

Governmental liability was further defined in Public Act 222 of 2001. In general, governments will be immune from tort liability unless the following is shown:

- The government agency is the owner, operator, or discharger into the defective system.
- The system had a defect.
- The governmental agency knew or should have known of the defect.
- The governmental agency failed to correct the defect.
- The defect was a substantial proximate cause of the damage or injury.

The Act generally limits claims to only economic damages. The Act also prescribes specific procedures to be followed to submit a claim.

2.10.2 Acts of Others

The general rule is that a municipality is not liable for the acts of officers, agents, or employees that are governmental in nature, but is liable for negligent acts of its agents in the performance of duties relating to proprietary or private corporate purposes of the city. If the construction, maintenance, and repair of drainage improvements is regarded as proprietary or corporate functions, a municipality may be held liable for the acts of its officers, agents, or employees for injuries resulting from negligent construction, maintenance, or dangerous conditions of a public facility.

2.10.3 Acts of Developers

Unless an ordinance or statute imposes a duty on a municipality to prevent or protect land from surface water drainage, a municipality will not incur liability for wrongfully issuing building permits, failing to enforce an ordinance, or approving defective subdivision plans. The Courts are imposing a greater burden or responsibility on municipalities for the drainage consequences of urban development.

References

American Association of State Highway and Transportation Officials. Highway Drainage Guidelines, Chapter 5.0, Legal Considerations. 1982.

Federal Emergency Management Agency. National Flood Insurance Program and Related Regulations. 1987.

FHWA. Highways in the River Environment, Training and Design Manual. 1990.

U.S. Army Corps of Engineers. Handbook of How to Compute a Floodway. 1987. (Copies of this publication can be obtained from FEMA Region V, 175 West Jackson Blvd., Fourth Flood, Chicago, Illinois 60604.)

Weblinks

MDEQ	www.michigan.gov/deq
FHWA	www.fhwa.dot.gov/