

COUNTY DRAINS

MICHIGAN'S ESSENTIAL INFRASTRUCTURE

A LOOK AT THE PAST
MICHIGAN ASSOCIATION OF COUNTY DRAIN COMMISSIONERS
A VIEW OF THE FUTURE

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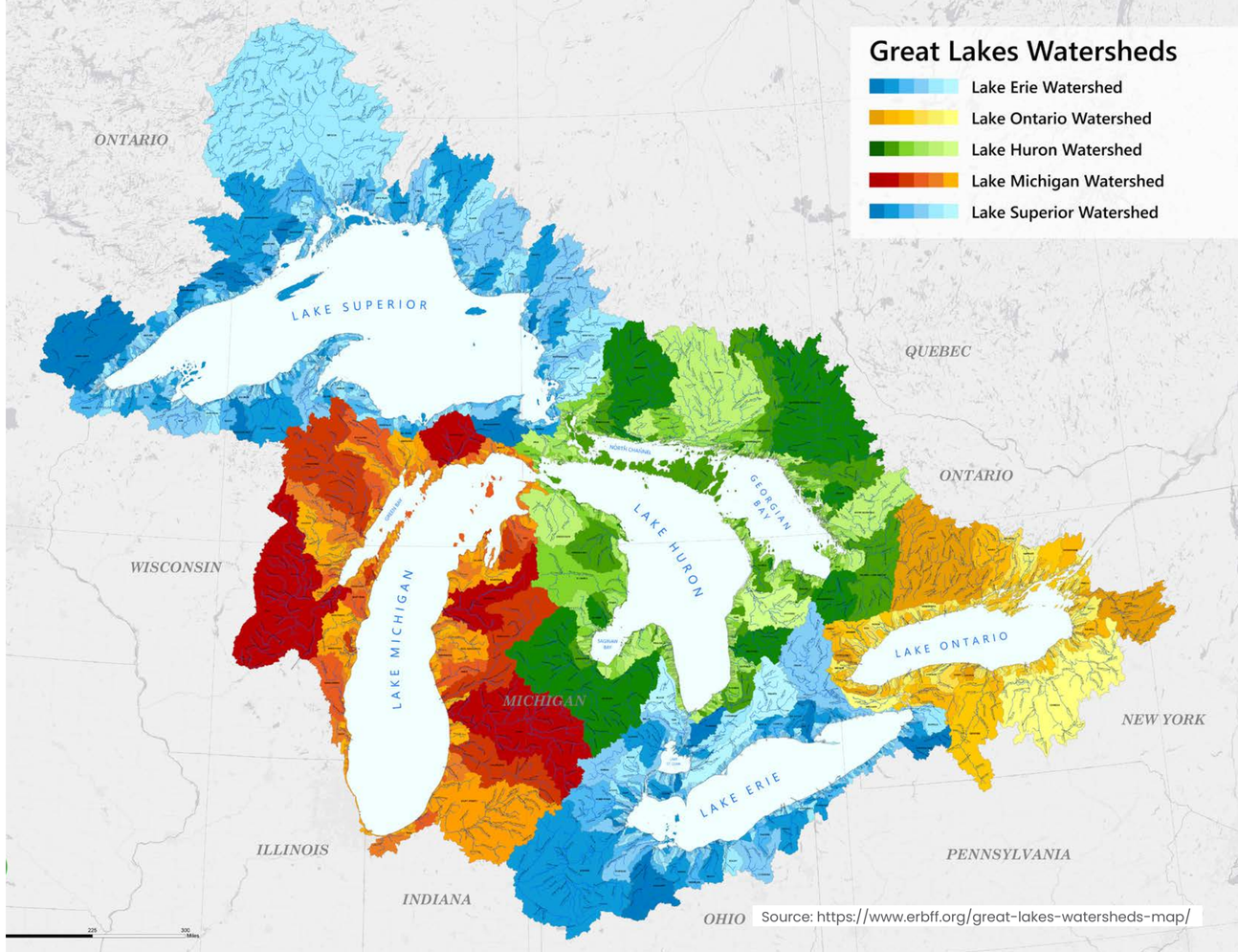
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MICHIGAN'S UNIQUE STORMWATER CHALLENGES

As the Great Lakes State, Michigan is defined by an abundance of surface water, variable soils, and low-relief terrain that require careful and ongoing water management. From early settlement to modern development, effective drainage has been essential to public health, agriculture, transportation, and economic growth.

Drainage authority in Michigan is not new, optional, or regulatory overreach — it is one of the state's oldest and most essential government functions, rooted in territorial law and shaped by Michigan's unique water geography.

1815

Surveyors arrive in Michigan for the first time. It was so swampy, they reported back that they "have been obliged to suspend their operations until the country shall be sufficiently frozen so as to bear man and beast."



1819

Michigan Territory enacts its first drainage law, making drainage one of the earliest infrastructure issues addressed by territorial government.

1834

Cholera rips through Detroit, killing 7% of the city's population, including Territorial Governor George B. Porter.



1837

Michigan officially becomes the 26th state in the United States.

1839

Michigan passed its first state drainage statute that eventually included both township and county drain commissioners.

1850

The Federal Swamp Land Act encouraged states like Michigan to drain low-lying lands to support agriculture and settlement.



1860

Medical observers noted reduced incidence of malaria in regions with improved water management, linking drainage to improved public health and community safety.

1920

U.S. Census of 1920 included a dedicated drainage survey in Michigan, recognizing artificial drainage as critical infrastructure supporting farmland that would otherwise not be suitable for reliable agriculture.

1945

Michigan experienced rapid suburban growth following World War II. New subdivisions required planned drainage systems to ensure safe building sites, protect roadways, and prevent localized flooding as open land was converted to residential use.

1956

The most recent recodification of the Drain Code occurs, Public Act 40 of 1956.

2014

Flood damaging over 100,000 homes and causing $1.8 billion in losses highlighted how population growth and aging drainage infrastructure increase flood risk.



2019

Multiple Great Lakes reached record-high water levels, resulting in widespread flooding, erosion, and damage to roads, homes, and other vital infrastructure across Michigan.

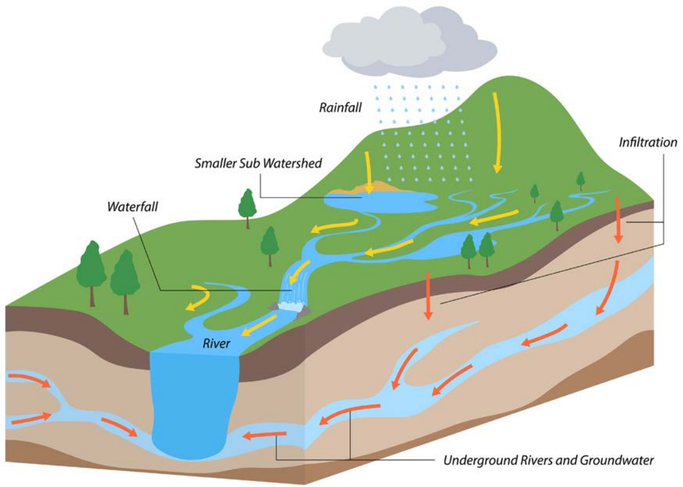


2026

Following severe weather and record rainfall across Michigan in early 2026, 41 counties were placed under a state of emergency—allowing local governments to access additional state resources, expedite response and recovery efforts, and take extraordinary measures to protect public safety and infrastructure.

MICHIGAN WATERSHEDS: WE ARE ALL CONNECTED

In Michigan, **everyone lives in a watershed**, and each watershed is connected to a stormwater system. Every drop of rain or melting snow that falls on our roofs, roads, and fields drains to a shared destination. Water doesn't disappear - it flows through ditches, storm sewers, streams, rivers, lakes, and wetlands, connecting our homes and communities to the state's vast water system.

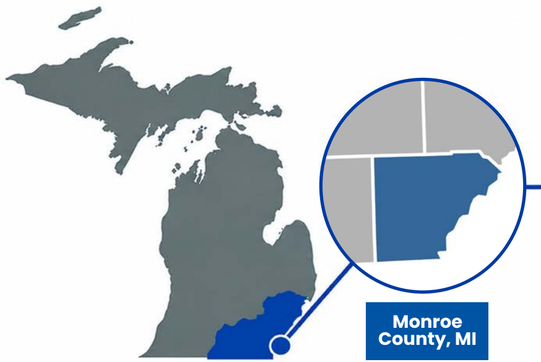


Watershed Mechanics

Because Michigan is surrounded by the Great Lakes and crisscrossed by countless inland waters, the way each of us manages stormwater locally directly affects water quality, flooding, and natural resources downstream.

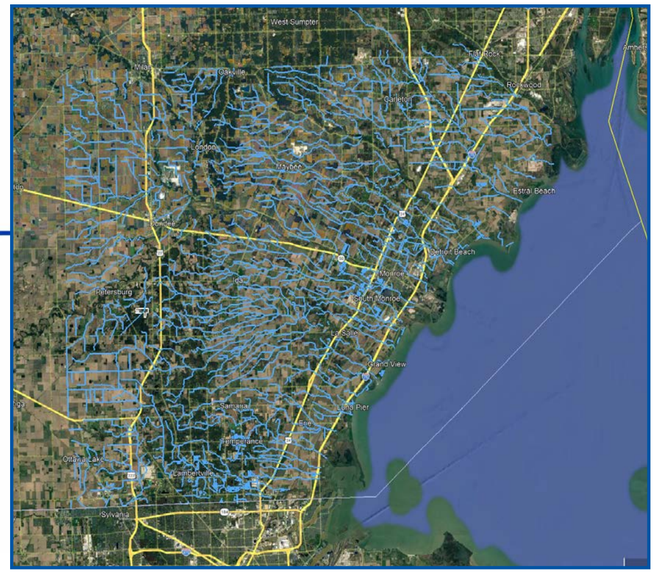
The drainage from every piece of property contributes to a watershed that needs to be publicly managed for flood control to assure **SAFETY** and **PROTECTION** for the surrounding infrastructure and properties.

Watershed boundaries define how water naturally flows across the landscape and are shaped by the land's topography, as well as features such as roads, urban development, and storm sewer infrastructure. In both rural and urban settings, human activities such as agricultural drainage, land grading, and construction can alter natural topography, redirect runoff, and effectively reshape watershed boundaries and flow patterns over time.



Lake Erie Watershed in Michigan

Monroe County, MI



Monroe County Drain Map

MICHIGAN COUNTY DRAINS 101

In Michigan, **county drains** are publicly regulated stormwater systems established under the Michigan Drain Code to manage surface water runoff, reduce flooding, and protect public health and property. These drains are the foundational element of Michigan's infrastructure and without adequate drainage infrastructure, flooding occurs with impacts to other critical infrastructure.

Types of Stormwater Infrastructure

Open Ditches
Ditches, swales, streams, or channels used for the conveyance of stormwater



Culverts
Enclosed structures designed to act as a controlled path for stormwater runoff, to pass under roads, parking lots, etc.



Enclosed Storm Sewers
Systems of installed pipes that carry stormwater



Pump Stations
Infrastructure designed to collect and move stormwater when gravity drainage is not possible



Detention & Retention Basins
Areas used to temporarily store and treat stormwater runoff



Green Infrastructure
Rain gardens, bioswales, constructed wetlands and other sustainable solutions for stormwater drainage



Who is Responsible for the Drains?

Drain Commissioners
Drain Commissioners have jurisdiction over county drains located in their county and are part of an intercounty drainage board that manages drains within watersheds crossing county lines.

Road Commissions
Road Commissions are responsible for the roadside ditches and storm sewers along county roads unless they were established as county drains.

Michigan Department of Transportation (MDOT)
MDOT has jurisdiction over the drains along and within state highways. In urban areas, these can include sophisticated pump station operations.

Local Municipalities
Local governments like cities and villages have jurisdiction over street storm sewer and roadside drain systems.

Private Property Owners
Owners of residences, farms, and businesses with storm drains outletting to a larger drainage system are responsible for maintenance of their private drainage systems.

A **county drain** is a legal designation under the Michigan Drain Code. These drains are built, operated, and maintained by the county Drain Commissioner. In some counties, the Drain Commissioner's Office manages more than 1,000 county drains.



DRAIN COMMISSIONERS EXPLAINED

Unlike other states, **Michigan elects Drain Commissioners because managing water here is local, important, and personal.** Decisions directly affect farms, homes, roads, and neighborhoods, and residents expect a clear line of accountability. Electing Drain Commissioners ensures the people overseeing water issues are answerable to the communities they serve and understand local needs.

What is a Drain Commissioner?



- **A Drain Commissioner is one of six county-wide elected officials in Michigan, holding a four-year term.**
  - Also known as the Public Works Commissioner or Water Resources Commissioner.
  - Wayne County has an appointed Drain Commissioner appointed by the County Executive.
- Counties with populations less than 12,000 have the option of the Road Commission serving as Drain Commissioner.
- Offices throughout the state range from as small as one person to over a hundred staff, depending on the additional responsibilities of the office.

What do Drain Commissioners do?



Drain Code Responsibilities:

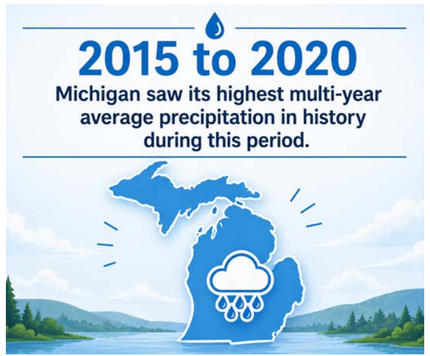
- Inspects and maintains county drains
- Responds to landowner calls and service requests
- Coordinates with other entities regarding infrastructure (roads, water, sewer, fiber, wind, solar)
- Implements petitioned improvement projects
- Develops assessment methodologies based on benefits derived
- Levies special assessments to pay for all costs related to drains

The Many Roles of a Drain Commissioner

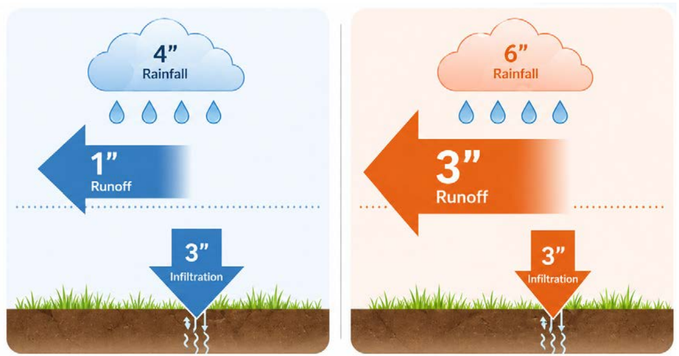
- County Enforcing Agency for Soil and Sedimentation Control (Part 91)
- Delegated Authority regarding inland lake levels (Part 307)
- County Parks and Recreation Commission
- Intercounty Drainage Boards
- County Board of Public Works
- Lake Improvement Boards (Part 309)
- Land Division and Plats

WEATHERING THE STORM: MANAGING DRAINAGE IN A CHANGING LANDSCAPE

Michigan's drainage systems are overwhelmed as they evolve from rural and agricultural uses to urban stormwater management. Heavier rainfall places increasing pressure on these existing systems.



Bigger Storms Have a Huge Impact



A 50% increase in rainfall can result in far more than a 50% increase in runoff. As soils, pipes, and channels reach capacity, excess water moves faster and in greater volumes, increasing flood risk.

Urban/Municipal Stormwater Assets

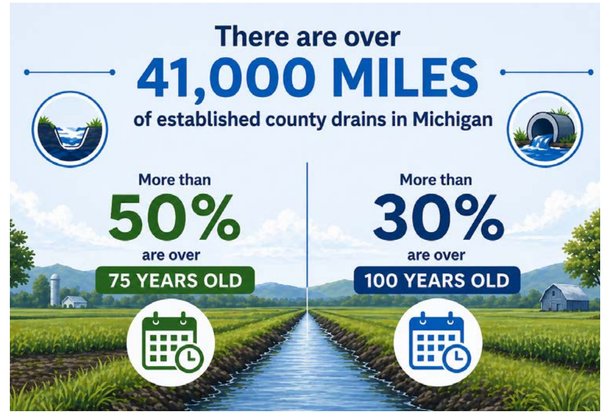
Urban/Municipal stormwater systems in Michigan often outlet into county drains, which contain:

38,000 miles of storm sewer pipe | 725,000 manholes | 1.6 million inlets and catch basins

- 2023 Report Card for Michigan's Infrastructure

Across Michigan, **rain events are becoming more frequent and more intense than ever before**, delivering larger volumes of water in shorter periods of time. These heavier storms generate increased stormwater runoff, placing greater demand on drains, culverts, and other stormwater systems that protect roads, utilities, and communities. However, much of this infrastructure was designed for past weather patterns and has not been upgraded to handle today's conditions. As a result, systems meant to carry water safely away from critical infrastructure are increasingly strained, heightening the risk of flooding, erosion, and damage.

Drainage systems are largely out of sight—but their performance directly affects water quality, infrastructure reliability, and community safety. As conditions continue to change, proactive planning and investment are critical to managing risk both now and into the future.

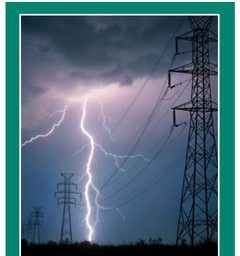


- 2023 Report Card for Michigan's Infrastructure

Big 5 Issues:



Aging Infrastructure



Increase in Storm Events



Changing Great Lakes Water Levels



Loss of Wetlands

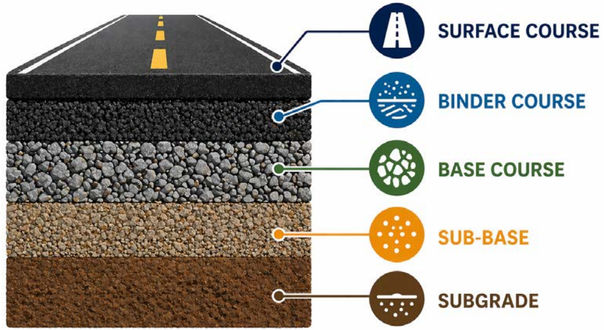


Increased Land Development

DRAINAGE IS ESSENTIAL TO SAFE ROADS

Effective drains—whether roadside ditches, storm sewers, culverts, or underground systems—are essential to keeping roads passable in all seasons, protecting public investment in infrastructure, and ensuring reliable travel for emergency services, commerce, and daily community use. Proper drainage extends the life of roadways, protecting the state's investment in their infrastructure.

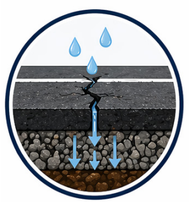
From the bottom of Hillsdale County to the tip of the Keweenaw Peninsula, Michigan's lattice work of roads, streets, and highways, need to be protected by adequate drainage.



Inadequate Drainage For Stormwater:



Erodes road foundations by washing away supporting soils under pavements, shoulders, and embankments



Weakens pavement structure when water infiltrates cracks and joints, reducing load-bearing capacity



Accelerates pothole formation as trapped water expands during freeze–thaw cycles and breaks apart pavement



Floods roadways during heavy rain events, creating unsafe driving conditions and forcing closures



Increases repair costs when prolonged water exposure leads to structural—not just surface—damage

Michigan is home to more than **120,000 miles of local and state roads**, all of which depend on effective stormwater drainage to remain safe and functional. As rain and storm events become more frequent and intense, proper drainage is more important than ever to prevent roadway damage, reduce flooding, and protect motorists. Stormwater systems play a critical role in **flood protection for roads and surrounding infrastructure.**

How Road Drainage Provides Flood Protection:

Keeps water off roadway surfaces, reducing flooding and hydroplaning risks

Ensures bridges and crossings are properly sized to move stormwater efficiently and prevent overtopping

County drains help prevent water from pooling on roads, protecting pavement and road foundations

Reduces emergency service disruptions caused by flooded or impassable roadways



Flooded roads will cause user delays and result in considerable economic impacts. A recent study in Southeast Michigan estimated a flooded highway to cause tens of thousands of person hours of delay and an average of over $150,000 for each hour of closure.

- 2023 Report Card for Michigan's Infrastructure

Stormwater Funding is essential to protect Michigan's investment in roads.

MANAGING DRAINAGE THROUGH A PUBLIC PROCESS

A Drain Commissioner may work only on drains that are established as county or intercounty drains. That work generally falls into two categories: routine maintenance and petitioned improvements.

Drain Maintenance Activities

Drain Commissioners may perform maintenance to restore a drain to its original design. State law limits annual maintenance spending, which can prevent Drain Commissioners from completing needed maintenance on time and can require work to be spread over multiple years. Maintenance costs are paid through special assessments.

Maintenance may include, but is not limited to:

- **Tree and debris removal**
- **Sediment removal**
- **Prevent or repair soil erosion**
- **Repair and clean pipes & storm sewers**



Before Drain Maintenance



After Drain Maintenance

Petitioned Drain Improvements

Drain improvements must follow the public process required by the Michigan Drain Code. The process begins only after property owners or a municipality submit a petition. The Drain Commissioner must then hold a public hearing and determine that the project is necessary before moving forward.

1. **Formal Petition Submitted**
   A petition requesting drain improvements (or a new drain) is submitted to the Drain Commissioner. Petitions must meet Michigan Drain Code requirements, including required signatures.

2. **Hearing Regarding Necessity of Improvements (Board of Determination)**
   A public hearing is held to decide whether the project is necessary after notices are mailed to affected property owners and published in the newspaper. After public testimony, necessity is decided by a three-member Board of Determination made up of county property owners who are not involved in the project.

3. **Engineering, Design Alternatives, and Cost Estimates**
   Engineers evaluate the drainage system, develop design alternatives, and prepare preliminary plans and cost estimates.

4. **Public Informational Meeting**
   While not mandated by the Drain Code, many Drain Commissioners hold an additional public meeting to review design alternatives, scope, and costs with property owners and other stakeholders.

5. **Final Design and Permitting**
   Final engineering plans are completed. Needed property acquisition and environmental permits are obtained, and project specifications are prepared in accordance with state and federal requirements.

6. **Construction Bids and Day of Review of Apportionments**
   The Drain Commissioner oversees bidding and contractor selection, prepares cost calculations, and sends notices of estimated apportionments and assessments. An all-day public hearing is held for property owners to review the estimated assessment amounts and receive additional project information.

7. **Project Financing and Assessments**
   Project costs are financed and assessments are placed on winter tax bills. Property owners may prepay their assessment to avoid interest.

HOW DRAINS ARE FUNDED

In Michigan, county drain maintenance and improvement projects are paid for through special assessments. Costs are apportioned based on factors such as acreage, land use, and runoff contribution. This means property owners bear the financial burden of the drains, and they can face significant, and sometimes unexpected, costs for projects they may feel provide limited personal benefit. Assessments for drain projects only appear on winter tax bills in Michigan, and it is difficult for property owners to budget or plan for these expenses.



Drains are solely paid for by special assessments with no other guaranteed revenue stream.

Drain Assessment Exemptions

- Federal Lands
- State (Michigan DNR)
- Public Colleges and Universities
- County Lands
- Land Banks
- Township/City/Village Lands
- Public Schools
- Cemeteries

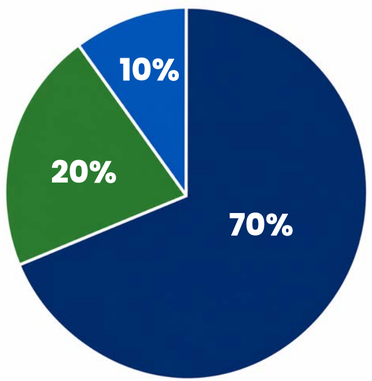
Drain projects are not typically eligible for grant funding and have a very difficult time qualifying for any state revolving funds and loans.



When there is a county drain maintenance or improvement project, those responsible for paying include:



Counties (County Roads) | MDOT (State Highways) | Railroads | Townships, Cities, Villages | Home Owners | Farms | Business/ Industry



Example of County Drain Funding

- **70%** - Property Assessments (Benefited Parcels)
- **20%** - Local Governments (City/Township/Villages at-large)
- **10%** - Road Agencies/MDOT/Railroads (Public Roadway Share)

PROJECT COSTS (MAINTENANCE/IMPROVEMENTS/PERMITTING)

Drain costs are complex. Beyond construction, there are many behind-the-scenes components that people don't always think about, all of which are required to legally, safely, and effectively maintain or improve a county drain.

Permitting, Mitigation & Monitoring

When projects need an environmental permit, conditions like mitigation and monitoring can add significant cost and project delays.

Construction Costs

The most visible costs—covering excavation, installation, erosion control, restoration, traffic control, and labor.

Design

This includes engineering, surveying, hydrologic and hydraulic analysis, along with design/bid documents to ensure proper function and compliance.

Bridges, Culverts & Pipes

Crossings such as bridges, culverts, and pipes are big- ticket items in drain projects and can significantly increase costs.

Property Acquisition

Easements must be acquired for some projects, which can involve appraisals, negotiations, and legal costs.

Inspection

Ongoing inspections ensure construction follows the approved design, meets permit requirements, and protects nearby properties and the environment.

Financing and Interest

Financing adds interest and administrative costs, which raises the overall project cost.



Drain Maintenance

Maintenance expenditures are assessed and are limited to $10,000/mile annually, (adjusted for inflation) providing only $2 per foot of drain for excavation and clearing.

$2
PER FOOT

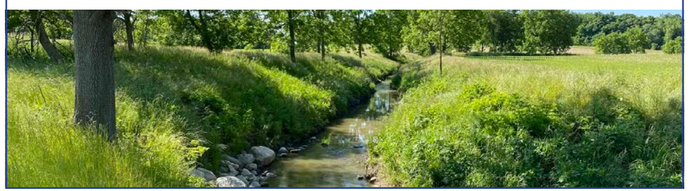
- To replace a single catch basin under a road can cost more than $10,000.
- According to the 2023 MI ASCE Report Card, replacement of a storm sewer system is expected to cost $200 per foot.

DRAIN INFRASTRUCTURE FUNDING VS. OTHER UTILITIES

Unlike other utility infrastructure that support daily life throughout Michigan, **drain maintenance and improvement projects are primarily funded through special assessments**.

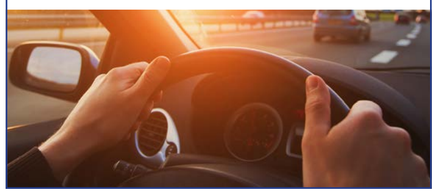
DRAINS

- Paid for through special assessment
- Appears once per year on property owners' tax bills
- Not billed monthly or quarterly
- Assessment amount based on actual project costs rather than a long-term capital improvement plan
- Federal and State properties are exempt from drainage assessments
- Little to nothing available through grants at the state or federal level
- No federal or state programs to provide a steady revenue stream



ROADS

- Paid for by shared public funding
- State and federal taxes contribute to road funding and maintenance
- Payment of these taxes are hidden and spaced out over time
- Registration fees paid once per year are a known quantity
- Local millages and special assessments are optional to provide additional funding





WATER/SEWER

- Paid monthly or quarterly by each user
- Rates include funding for usage, maintenance and improvements
- Often supplemented by state and federal grants and low-interest loans



TELECOMMUNICATION

- Paid for monthly by each user
- Rates include funding for usage, maintenance and improvements
- Funding from private capital investment
- Network expansion and modernization are guided by business needs and competition with costs recovered through pricing, service plans and long-term investment
- Often subsidized by state and federal grants



ENERGY

- Paid monthly by each user
- Rates are established by the Michigan Public Service Commission and include cost recovery for usage, maintenance, capital improvements, and expansions
- Often supplemented by private investment and state or federal dollars to assist low-income users with the cost

DRAIN EASEMENTS

Most property owners don't realize that there is a drain easement on their property, so they dig swimming pools, plant trees, and build structures over drains.

Examples of Unique Challenges of Drain Easements



Structure built over a drain



Gas main through county drain



Shed built on drain easement

These types of encroachments make maintenance and improvement of drains more challenging and more expensive.



Drain Easements obtained before 1956 were not required to be recorded with the Register of Deeds, leaving property owners unaware of their existence.



Typical drain offices have literally thousands of drain easements on file from before 1956, with the majority of easements over 100 years old.



In 1956, new drain easements were required to be recorded at the Register of Deeds for the first time.



Most title companies include an exemption for drain easements, leaving property owners unaware that easements exist even when title work is performed.

DAM AND LAKE MANAGEMENT

County Drain Commissioners in Michigan manage lake levels and dams by operating and maintaining control structures to regulate water levels. They monitor rainfall, watershed conditions, and downstream capacity to adjust lake levels in a way that can reduce flood risk, protect shorelines, and prevent damage to homes, roads, and farmland. This work is done in coordination with state regulations to balance public safety, private property protection, and the health of natural resources such as fisheries, wetlands, and waterways.

Part 307 Lake Levels



Under Part 307 of the Natural Resources and Environmental Protection Act (NREPA), a lake level—known as the legal level—is the legally established target elevation or range for an inland lake, set by circuit court, that provides the greatest public benefit by protecting public health and safety, natural resources, recreation, and surrounding property values while allowing for natural and operational fluctuations. It is maintained by the delegated authority (often the county Drain Commissioner) through the operation of a control structure.

- There are approximately 350 inland lakes with established lake levels in Michigan where the drain or water resources Commissioner is the delegated authority.
- Part 307 allows for a special assessment district and borrowings with payments over a period up to 40 years.
- Part 307 requires inspection of water control structures every three years.

Part 309 Lake Improvements



Under Part 309 of NREPA, Lake Improvement Boards (LIBs) are made up of county, city and township officials, the Drain Commissioner, and a member of the public who owns property on the lake. LIBs manage projects to improve inland lakes, often funded by special assessments on local property owners. Primary projects include aquatic invasive weed control, water quality monitoring, shoreline restoration, aeration, and dredging to enhance boating, fishing, and swimming.

Part 315 Regulated Dams



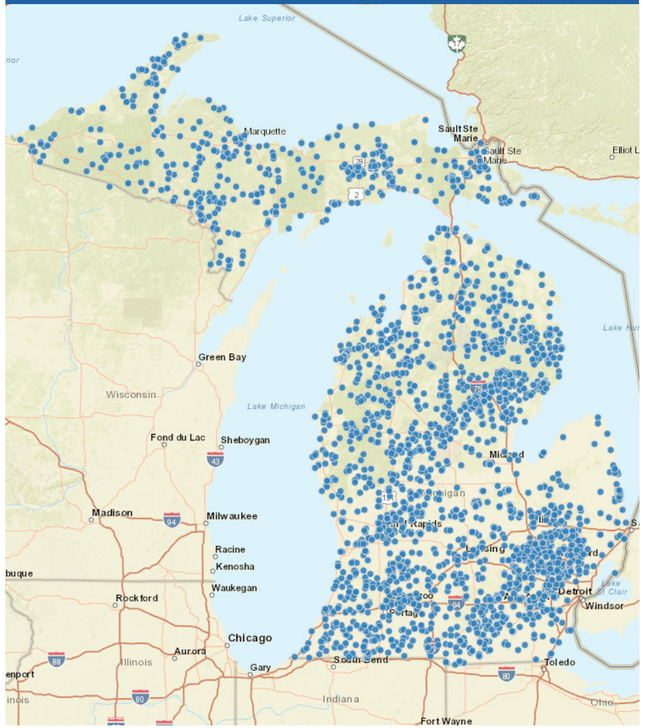
Part 315 dams under NREPA are regulated dams that meet specific size thresholds—six feet or more in height and impounding five acres or more of water—and are subject to state oversight to ensure structural integrity, safe operation, and protection of downstream life, property, and natural resources.

- 170 of Michigan's 2,600 dams were built prior to 1900.
- Dams may be classified as high, significant, or low-hazard potential based on the threat to life and property should a failure occur.

Unique Challenges

- **Aging Infrastructure:** Michigan's investments in dam safety have been lacking for decades, which has increased risk to public safety and environment.
- **Funding Shortages:** There is insufficient funding to address the growing challenges facing Michigan's dams and lake levels, as aging infrastructure and increasing stormwater volumes place greater strain on these systems.

Michigan Dam Inventory



Source: GIS Open Data - Michigan Dam Inventory

HAVE ANY QUESTIONS?

https://macdc.us/

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