Michigan's Post Construction Program Performance Standards

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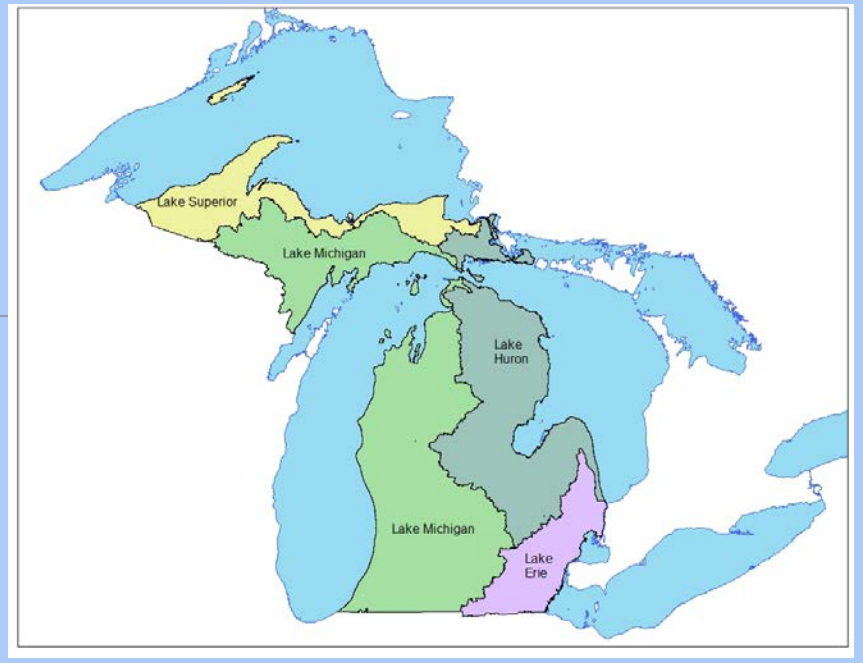
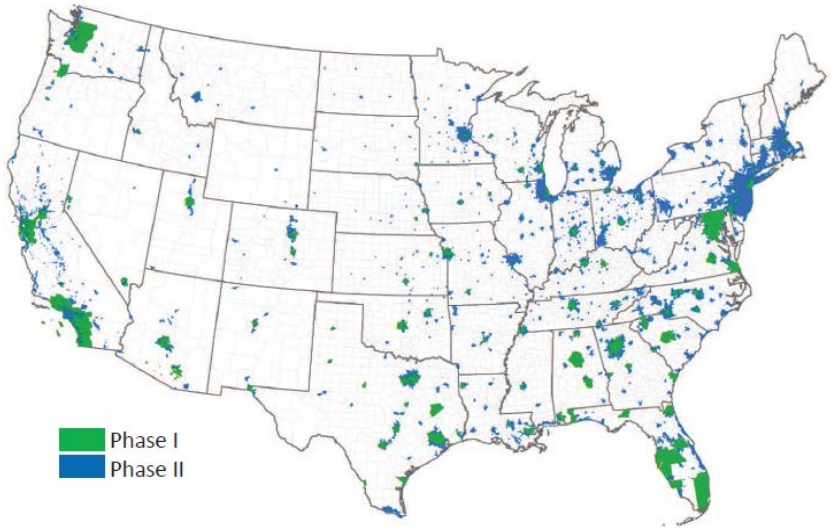


National Profile

National Map of Regulated MS4s



Quick Facts

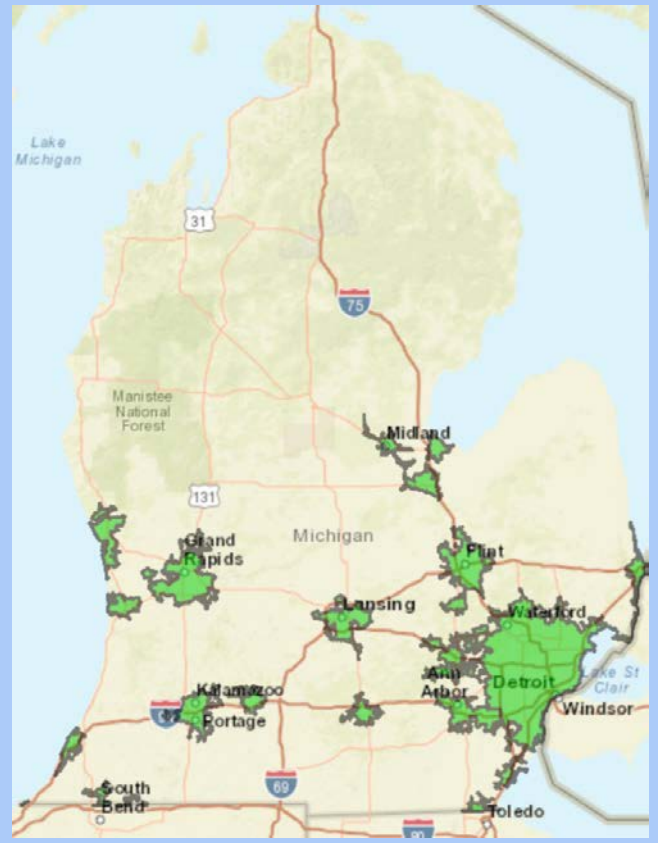
855 Phase I MS4s
covered by 250 Individual Permits

6,695 Phase II MS4s
6,589 covered by 54 General Permits
106 covered by 100 Individual Permits
3 Watershed Permits cover 3 Phase I and 40 Phase II MS4s

Regulated MS4 area represents 4% of the U.S. land area and > 80% of the population

Regulated MS4s are typically cities, counties, towns, and villages. Phase II MS4s also include nontraditional MS4s such as public universities, departments of transportation, hospitals and prisons. The universe of the Phase II MS4 program changes every 10 years according to the U.S. Census Bureau definition of urbanized area.

Michigan Profile



Quick Facts

Phase I MS4s

Ann Arbor
Flint
Grand Rapids
Lansing
MDOT
Sterling Heights
Warren

300 Phase II MS4s

Transitioning from general permits to individual permits

Regulated MS4 Area

Serves a population of 6.5 million people or 66% of Michigan's population

Permitting History

2003

Issued two general permits: Jurisdictional (traditional) and Watershed (pilot)

2008

Reissued general permits; permits contested

Class action lawsuit filed (300 permittees in the class)

2010

General permits withdrawn

Extended coverage under 2003 general permits

2013

Begin requiring permittees to apply for an individual permit

2015

MDEQ prevails in the lawsuit. Owning/operating an MS_4 is a voluntary action not a state mandate.

First individual permit issued

Individual Permits

Stakeholders Meetings

- General permits were a one-size-fits-all approach
- Desired a permit reflecting the size and complexity of the MS4

Individual Permits

- 88 question application
- Range in length with referenced material
- Complete application produces a SWMP
- Public notice the application and permit for 30 days
- Approve SWMP as part of permit issuance

Performance Standards

Water Quality Treatment Performance Standard

- Treat the first 1" of runoff from the project site
- Treat runoff generated from 90% of all runoff-producing storms for the project site

Treatment: BMPs designed to reduce total suspended solids loadings by 80% or achieve a discharge concentration not to exceed 80 mg/l

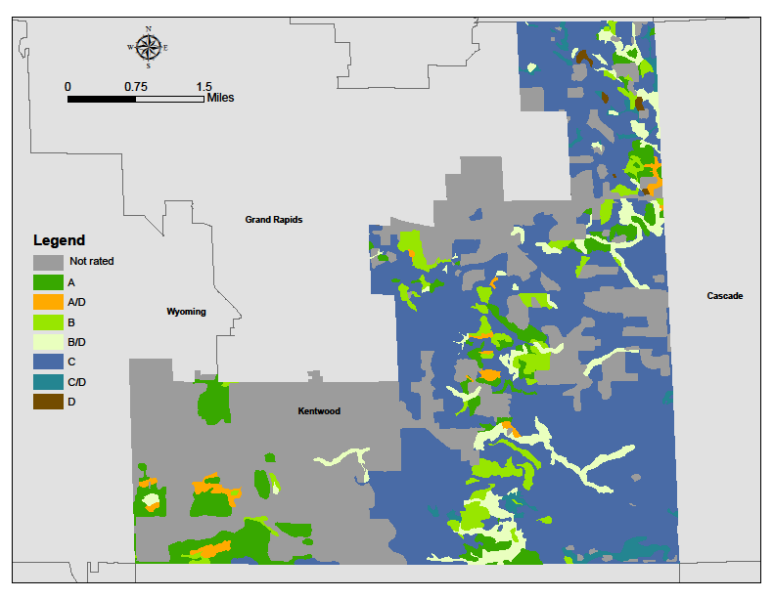
Performance Standards

Channel Protection Performance Standard

Post-construction runoff rate and volume of discharge not to exceed the pre-development rate and volume for all storms up to the 2-year, 24-hour storm event at the project site

Predevelopment: *Last land use prior to the planned new development or redevelopment*

Challenges



Channel Protection Performance Standard dubbed "Infiltration Requirement" limiting BMP selection

Limited Soil Infiltration Rates (C/D soils)

Orifice Sizing Concerns

Challenges

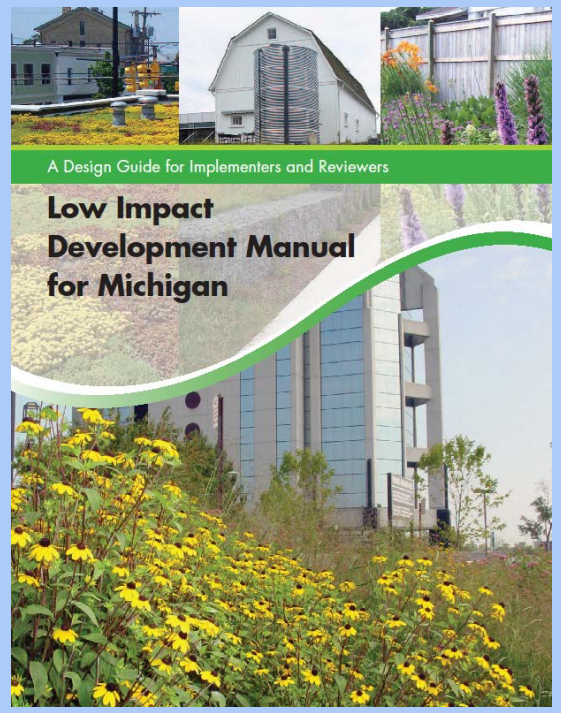
Linear Projects

- Lack of ROW
- Jurisdictional issues
- Limitations of road funding

Site Constraints

- Focus on detention basins
- All or nothing attitude toward BMP selection

Process



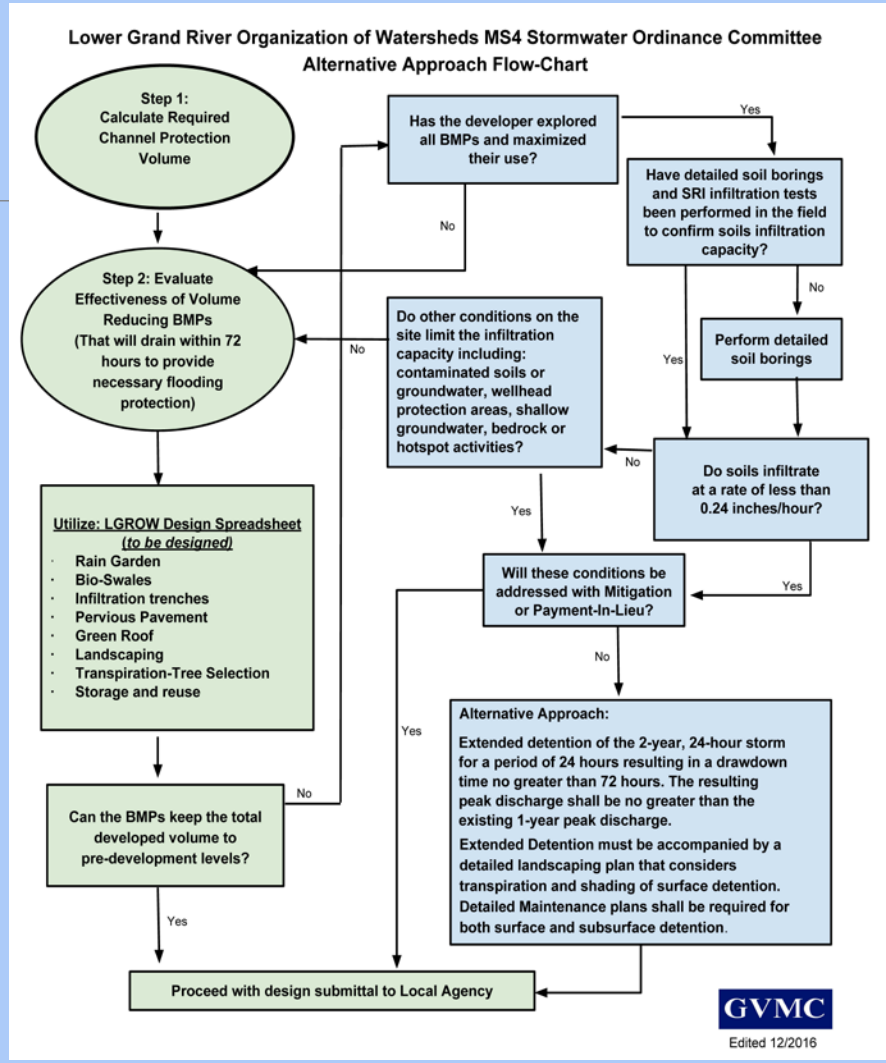
- MDEQ review team to ensure consistency statewide
- Referenced existing resources
- Met with critical practitioners
- Addressed risk concerns
- Understand process updates needed (e.g. new spreadsheets as part of site review)

Maximizing the Site

- Identifying suitable areas of the site early in the design process
- Onsite infiltration testing
- Isolate contamination
- Decentralized BMPs (Green Infrastructure)

Alternatives

- Determination of Maximum Extent Technically Feasible (EISA Technical Guidance)
- Payment in lieu and off-site mitigation
- Separate directly connected impervious and pervious areas for water quality volume (e.g. one inch of runoff from all impervious areas and 0.25 inches of runoff from all disturbed pervious areas)



Alternatives

- Supplemental measures allowed in areas with marginal soils (e.g. soil amendments and underdrains)
- Extended detention to address soils with limited infiltration rates

7) The following infiltration (K_{sat}) values shall be used to determine the appropriate design methods for infiltration BMPs:

- $K_{sat} \geq 0.50$ inches/hour
  Infiltration BMPs shall be constructed to provide the infiltration volume as calculated using the above requirements.
- 0.24 inches/hour $< K_{sat} <$ 0.50 inches/hour
  Install supplemental measures, which may include subsoil amendment, or an underdrain placed at the top of the storage bed layer to ensure dewatering in the event underlying soils fail to provide adequate drawdown/dewatering time. If underdrains are selected, they shall be designed to allow stormwater to percolate through the soils first, with the underdrain serving as a secondary outlet, by placing the underdrain in the upper level of the BMP, with pipe perforations located along the underdrain invert.
- $K_{sat} <$ 0.24 inches/hour
  Soils are not suitable for infiltration. Alternative methods to reduce stormwater volume shall be used.

Regional Consistency

Flexibility within the individual permit

Permittees desired:

- Consistent standards
- Coordinated compliance dates

Fair and equitable development/redevelopment expectations across a region

Successes

Above and Beyond the Minimum Requirements

- Standards applied in non-urbanized area and to direct discharges to WOS
- Standards applied to sites <1 acre (not part of a larger common plan of development/sale)
- Pre-settlement (woods/meadow) as the last land use for channel protection
- Required retrofits for redevelopment (>50% of the site redeveloped triggers retrofits)

Needs and Next Steps

National Stormwater Testing and Evaluation for Products and Practices (STEPP)

Promoting green infrastructure – Ongoing efforts to identify barriers within communities

Post construction control in CSO areas (resiliency planning)

Typical Sediment Removal Rates of Stormwater Management Practices

Type	TSS Removal Rate (%)
Infiltration basin or trench*	89
Retention basin	89
Wet (wetland) swale	87**
Sand filter	86
Dry swale	81**
Vegetative filter strip	81
Wet extended detention pond	80
Multiple pond or pond/wetland complex	>80
Constructed stormwater wetland	>80
Bioretention	74
Grass swale	65**
Landscaped ED basin (no buffer)	50
Dry extended detention (ED) basin	49
Manufactured BMPs*** (swirl concentrators, filter systems)	43
Pervious pavement system	35
Catchbasin w/sump and hooded outlet	20
Conventional dry detention	18
Cistern	15

Outcomes

Time consuming application reviews

Shared understanding of the SWMP and implementation expectations

Improved compliance as the focus is not on reviewing procedures