TRANSPORTATION STORMWATER PERMIT COMPENDIUM

A compendium of excerpted permit language from municipal separate storm sewer system (MS4) permits and other resources that can be used and/or tailored for transportation-specific MS4 permits.

Office of Wastewater Management
Water Permits Division
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Introduction and Getting Started

This compendium presents examples of different permitting approaches that the U.S. Environmental Protection Agency (EPA) found in a nationwide review of National Pollutant Discharge Elimination System (NPDES) permits that specifically address linear, department of transportation (DOT) municipal separate storm sewer systems (MS4s). To develop this compendium, EPA reviewed current individual and general MS4 final permits issued to DOTs through September 2016. The compendium also includes examples from MS4 permits that may not be specific to DOTs but address activities DOT systems typically encounter (e.g., storage and management of deicing materials).

DOTs may be regulated under Phase I or Phase II MS4 permits. Phase I MS4 permittees are typically regulated under individual permits and can include multiple co-permittees. Most Phase II MS4 permittees are regulated under general permits (with some exceptions where individual permits have been used for Phase II and non-traditional MS4 permittees, including DOTs). Phase II MS4 permits must include terms and conditions that address the six minimum control measures in 40 CFR 122.34(b), annual reporting requirements in 40 CFR 122.34(d), and other requirements as appropriate for the protection of water quality in 40 CFR 122.34(c). Phase I MS4 permits are governed by the regulations at 40 CFR 122.26(d).

EPA notes that this compendium is intended to serve as a snapshot of permit provisions. EPA anticipates that as permits are issued in the coming months and years, this compendium may be updated to include newer examples or modified information. EPA has an interest in ensuring the accuracy of the information contained in this document and therefore welcomes input on any aspect of this compendium at any time. The Agency expects to update the compendium as appropriate based on the comments received. EPA notes that the inclusion of any particular permit example should not be read as an Agency endorsement of the entire approach taken in that permit, nor should it be read as EPA's independent determination that the permit terms meet the Phase I and/or Phase II MS4 requirements.

In addition, this document does not impose any legally binding requirements on EPA, states, or the regulated community and does not confer legal rights or impose legal obligations upon any member of the public. EPA made every attempt to ensure the accuracy of the examples included in this document. In the event of a conflict or inconsistency between this compendium and any statute, regulation, or permit, it is the statute, regulation, or permit that governs, not this compendium. For more information about the NDPES Stormwater Program, visit www.epa.gov/npdes/stormwater.

The compendium is divided into sections that address stormwater requirements associated with typical DOT activities, as well as overall stormwater management program (SWMP) coordination, monitoring, and reporting. Each section includes permit excerpts and associated information formatted into tables as shown below:

Table 1. Example Excerpt Information Table

<Permit excerpt summary statement> (<Permit citation>)			
Effective Date <Date permit became effective>	**Permittee** <Name of permittee>	**Citation** <Citation>[1]	**Link to Permit** <Hyperlink to view entire permit>

[1] Note: Citations are to EPA stormwater regulations and are not intended to be a comprehensive listing of possible legal authorities that could support a particular permit condition. For example, no citations are provided for EPA regulations that apply generally to all NPDES permits or to state regulations that may further support or require particular permit conditions. Each permit example includes a citation to the relevant provision(s) of Phase I regulations (40 CFR 122.26) and Phase II regulations (40 CFR 122.34). In addition, the Phase II stormwater regulations include guidance paragraphs. These are not legally binding in themselves but guide permit writers on developing permit conditions. If a guidance paragraph is cited, it is clearly marked as guidance.

Excerpt from permit:

This section includes language that is directly quoted from the permit. *[Note: In some examples, EPA has included surrounding language from the permit to provide context. To emphasize the portion of the provision that is being showcased and is "clear, specific, and measurable," EPA has highlighted that part of the permit provision.]*

Permit writers may also find the following EPA resources from the *Compendium of MS4 Permitting Approaches* helpful when developing DOT MS4 permits:

- *Introduction*
- *Part 1: Six Minimum Control Measures*
- *Part 2: Post-Construction Standards*
- *Part 3: Water Quality-Based Requirements*

Permit Considerations

Permits that include specific deadlines for compliance, incorporate clear performance standards, and include measurable targets for implementation enable permitting authorities to more easily assess compliance. Similarly, they give permittees and the public greater transparency with respect to what actions are necessary to achieve compliance. Phase II MS4 permits are required to include terms and conditions that are "clear, specific, and measurable"—see 40 CFR 122.34(a).

1 Background

The United States has more than 4 million miles of public urban and rural roads.[1] Local governments, such as municipalities, towns, townships, and counties, own most of our nation's roadways.[2] State DOTs own approximately 21 percent of the roadway lane miles. The federal government owns only about 3 percent of all roads in the country.

Highway Statistic Data

The Federal Highway Administration collects state and national data on roads and other statistics. Check out https://www.fhwa.dot.gov/policyinformation/statistics.cfm.

Some stormwater discharges from roadways, including all of those within defined urbanized areas, are covered under the NPDES MS4 regulations. DOTs may be co-permittees with Phase I MS4s under a Phase I permit or small MS4s—as defined in 122.26(b)(16)—under either an individual or general Phase II MS4 permit. These permits typically include requirements related to pollution prevention, public education/outreach, public involvement, construction, post-construction for new development and redevelopment, and illicit discharge detection and elimination. While most regulated stormwater discharges from roads are within U.S. Census Bureau-defined urbanized areas, some permitting authorities have chosen to extend NPDES permit requirements to include stormwater discharges from state and locally owned roads outside these areas.

[1] FHWA, *Highway Statistics 2014,* October 2015, http://www.fhwa.dot.gov/policyinformation/statistics/2014/hm10.cfm.
[2] Ibid.

1 Background

State DOT stormwater management differs from traditional MS4 stormwater programs in several ways:

Populations/Communities

The communities that linear facilities reach are typically members of the traveling public. Educational campaigns and outreach might be tailored to them.

Inspections and Enforcement

State DOTs do not typically oversee projects or facilities beyond those they own.

Facility Locations and Limitations

Roadways often cross multiple watersheds and city and county jurisdictional boundaries. Therefore, state DOTs are often covered by multiple NPDES permits (or are co-permittees) resulting in stormwater management solutions over a large geographic area, depending on the location of the system. In addition, linear systems often involve limitations of ROW space.

Mission

Most state DOTs have different missions than those of traditional municipalities. They are primarily tasked with the safe transport of goods and the public. Transportation facilities are also unique because their primary objective is ensuring the safety of the public. Therefore the placement of stormwater controls is limited by state and federal safety requirements.

Pollutant Sources and Characterization

State DOTs do not typically oversee new development, redevelopment, and construction projects outside their rights-of-way (ROWs). Stormwater runoff from roadways has also been fairly well characterized, and typical pollutants are known.

Authorities

State DOTs do not have the authority to control stormwater via regulations and ordinances; instead, they must include requirements in their agreements and contracts and establish internal policies/guidelines and cooperative agreements. Some state DOTs also issue ROW permits to adjacent land users to allow them to control access to their ROWs.

Sections 1.1–1.5 provide permit writers with background information and terminology that may help them understand and communicate with transportation permittees.

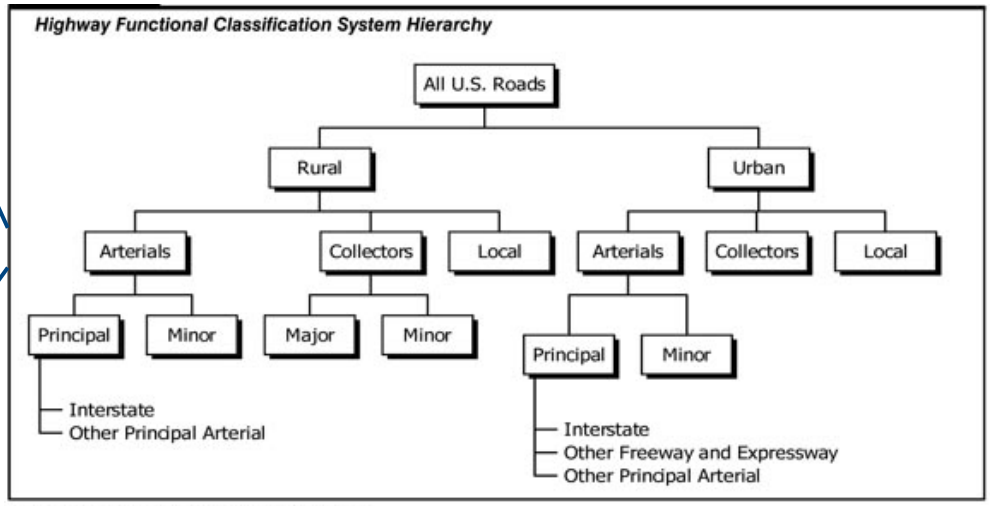
1.1 Functional Classification

In 1989, the Federal Highway Administration (FHWA) established a functional classification process that groups streets and highways into classes, or systems, according to the type of traffic service they provide.

The first class includes rural or urban roads. The three basic categories within each class are local roads, collectors, and arterials. Local roads serve homes, businesses, farms, and small communities and provide access to collector roadways. Collectors channel traffic from the local roads to the arterials, which allow people to travel between larger towns and major cities.

1 Background

Rural principal arterials connect almost all urbanized areas with more than 50,000 people and urban areas with more than 25,000 people.



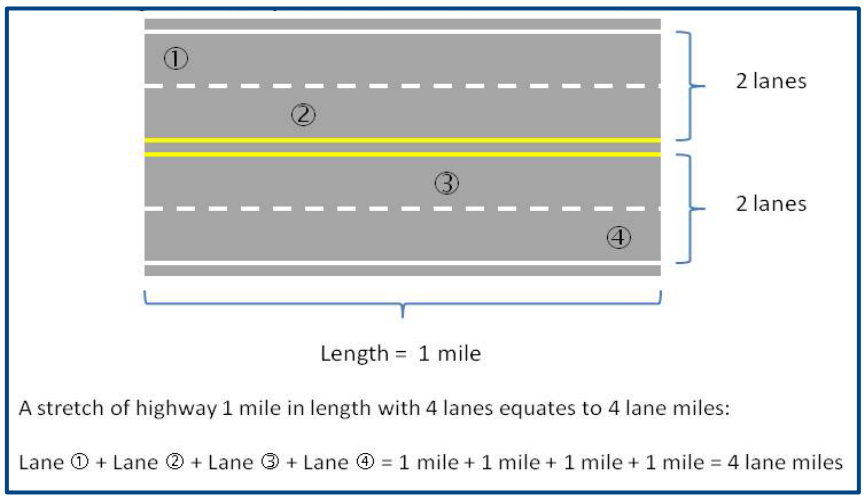
Source: FHWA Functional Classification Guidelines.

For more information:

- https://www.fhwa.dot.gov/policyinformation/pubs/hf/pl11028/chapter1.cfm
- https://www.fhwa.dot.gov/planning/processes/statewide/related/highway_functional_classifications/fcauab.pdf
- https://www.fhwa.dot.gov/environment/publications/flexibility/ch00.cfm (see Chapter 3)

1.2 Lane Miles

Transportation agencies often use miles as the unit of measurement to estimate the length of a section of road. They also use lane miles, which take into account the number of lanes that are present in that same section of road.



A stretch of highway 1 mile in length with 4 lanes equates to 4 lane miles:

Lane ① + Lane ② + Lane ③ + Lane ④ = 1 mile + 1 mile + 1 mile + 1 mile = 4 lane miles

1.3 Types of Pollutants

The types of stormwater pollutants and their corresponding concentrations contained in discharges from roadway surfaces vary depending on the road size, the amount and type of traffic on the road and location, the type and frequency of deicing practices (if applicable), and the type and frequency of chemicals used to manage roadside vegetation. The primary pollutants of concern in roadway stormwater include particulates, nitrogen, phosphorus, lead, zinc, iron, copper, cadmium, chromium, nickel, manganese, bromide, cyanide, sodium, calcium, chloride, sulphate, petroleum, polychlorinated biphenyls (PCBs), pesticides, pathogenic bacteria, rubber, and asbestos.[3] Atmospheric deposition, roadside fertilizer use, and sediment transport are the primary sources of nutrients.[4] In addition, non-roadway land next to, or within the watershed of, the roadway (e.g., developed areas, agricultural land) contribute pollutants.[5]

Table 2. Median Pollutant Concentrations in Highway Runoff[6]

Pollutant	Site Median Pollutant Concentration (µg/l) from Urban Highways (ADT > 30,000)	Site Median Pollutant Concentration (µg/l) from Rural Highways (ADT < 30,000)
TSS (Total Suspended Solids)	142,000	41,000
VSS (Volatile Suspended Solids)	39,000	12,000
TOC (Total Organic Carbon)	25,000	8,000
COD (Chemical Oxygen Demand)	114,000	49,000
NO_3/NO_2 (Nitrate + Nitrite)	760	460
TKN (Total Kjeldahl Nitrogen)	1,830	870
Phosphorus as PO_4	400	160
Cu (Total Copper)	54	22
Pb (Total Lead)	400	80
Zn (Total Zinc)	329	80

ADT = Average daily traffic in vehicles per day

[3] FHWA, *Stormwater Best Management Practices in the Ultra-Urban Setting: Selection and Monitoring,* 2002, http://www.fhwa.dot.gov/environment/ultraurb/index.htm.

[4] FHWA, *Evaluation and Management of Highway Runoff Water Quality, 1996.* (See footnote 3.)

[5] Stonewall, A.J., Granato, G.E., and Haluska, T.L., *Assessing Roadway Contributions to Stormwater Flows, Concentrations, and Loads with the StreamStats Application,* April 2018, https://pubs.er.usgs.gov/publication/70196620.

[6] Driscoll, E.D., Shelley, P.E., and Strecker, E.W., *Pollutant loadings and impacts from highway stormwater runoff volume III: analytical investigation and research report: FHWA Final Report FHWA-RD-88-008*, April 1990, https://newengland.water.usgs.gov/dev/g1/DOT/90Model/FHWA-RD-88-008.pdf. (Table has been modified; not all source table information is included in Table 2 and units have been adjusted for uniformity).

1.4 Pollutant Sources

Transportation system activities can concentrate pollutants on roadway surfaces in and around maintenance yards, park and rides, rest stops, and other areas. Stormwater pollutants come from construction activities, motor vehicles (including vehicle exhaust and water that splashes vehicle undercarriages), pavement wear, and roadway and right-of-way maintenance activities. The pavement itself can also increase the stormwater's temperature, volume, and velocity.

Table 3 Typical Pollutant Sources in Highway Runoff[7]

Constituent	Primary Sources
Asbestos	Clutch and brake lining wear
Bromide	Exhaust
Cadmium	Tire wear, insecticide application
Chloride	Deicing salts
Chromium	Metal plating, engine parts, brake lining wear
Copper	Metal plating, bearing wear, engine parts, brake lining wear, fungicides and insecticides use
Cyanide	Anti-caking compound used to keep deicing salt granular
Iron	Auto body rust, steel highway structures, engine parts
Lead	Leaded gasoline, tire wear, lubricating oil and grease, bearing wear, atmospheric fallout
Manganese	Engine parts
Nickel	Diesel fuel and gasoline, lubricating oil, metal plating, brake lining wear, asphalt paving
Nitrogen, Phosphorus	Atmosphere, roadside fertilizer use, sediments
Particulates	Pavement wear, vehicles, atmosphere, maintenance, snow/ice abrasives, sediment disturbance
Pathogenic bacteria	Soil litter, bird droppings, trucks hauling livestock/stockyard waste
PCBs, pesticides	Spraying of highway rights-of-way, atmospheric deposition, PCB catalyst in synthetic tires
Petroleum	Spills, leaks, blow-by motor lubricants, antifreeze, hydraulic fluids, asphalt surface leachate
Rubber	Tire wear
Sodium, Calcium	Deicing salts, grease
Sulphate	Roadway beds, fuel, deicing salts
Zinc	Tire wear, motor oil, grease

[7] Kobringer, N.P., *Volume I - Sources and Migration of Highway Runoff Pollutants- Executive Summary*, FHWA/RD-84/057, Federal Highway Administration, Rexnord, EnviroEnergy Technology Center, Milwaukee, WI, 1984 (reordered)

Spotlight: Copper-Free Brake Pads Initiative

On January 21, 2015, EPA, the Environmental Council of the States, and eight industry groups signed a Memorandum of Understanding to reduce the use of copper and other materials in motor vehicle brake pads. The agreement calls for reducing copper in brake pads to less than 5 percent by weight by 2021 and to 0.5 percent by 2025. In addition to copper, this voluntary initiative reduces mercury, lead, cadmium, asbestiform fibers, and chromium-six salts in motor vehicle brake pads. This initiative will decrease runoff of these materials from roads into our nation's streams, rivers, and lakes.

1.5 Activities Typically Associated with Repairs, Improvements, and Maintenance

Each state permitting authority may classify new development, redevelopment, and roadway repair and improvement activities differently. DOTs typically classify their activities into new construction, reconstruction, rehabilitation, maintenance, and resurfacing. Two common examples are illustrated below.

Road resurfacing that does not disturb the subsurface.

Routine maintenance, such as filling in potholes, repainting lane and edge lines, removing accumulated debris from drainage inlets, and mowing.

1 Background

Transportation agencies often incorporate stormwater facility maintenance into larger asset management and operations and maintenance programs or—in some cases—track and execute a standalone stormwater facility maintenance program. Stormwater facilities include, but are not limited to, catch basins, detention basins, filter strips, riparian buffers, infiltration trenches, sand filters, constructed wetlands, wet ponds, bioretention systems, low flow bypasses, and stormwater conveyances.

2 Formatting and Permit Organization

Permit includes a table with clear SWMP requirements organized by permit year. (Part 4.2.1)			
Effective Date 1/3/2012	**Permittee** Georgia DOT	**Citation** 40 CFR 122.26(d)(2)(iv); 40 CFR 122.34(b)(1)	**Link to Permit** https://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/Final_DOT_SW_NPDES_Permit_MS4_Dec_2011.pdf

Excerpt from permit:

Table 4.2.1 Public Education – Best Management Practices						
BMPs	Measurable Goals	Year 1	Year 2	Year 3	Year 4	Year 5
1. **Use the DOT website** to educate the public regarding stormwater related topics (e.g. litter prevention, Adopt-A-Highway).	1.a. Develop a storm water and pollution prevention web page. 1.b. Using a counter, track the traffic on the website and include the number of "hits" during the reporting period in the annual report. 1.c. Update the website at least annually and provide specifics on the updates made during the reporting period in each annual report.	X	X X	X X	X X	X X
2. **Develop a program to educate contractors and employees conducting activities that may impact stormwater runoff.**	2.a. Develop a program that includes training topics such as erosion and sedimentation control, good housekeeping and pollution prevention measures, spill prevention, illicit discharge identification, etc. Submit the program to EPD for review and approval 2.b. Conduct a training program at least annually. In each annual report, include…	X	X	X	X	X

Permit includes specific objectives, management measures, and measurable targets for each SWMP requirement. (Part II)			
Effective Date 10/1/2015	**Permittee** North Carolina DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(B); 40 CFR 122.34(b)(3)	**Link to Permit** https://connect.ncdot.gov/resources/hydro/HSPPermits/2015_NPDES_Stormwater_Permit.pdf

Excerpt from permit:

SECTION A ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM

b. Management Measures

The NCDOT shall implement the following management measures to meet the objectives of the Illicit Discharge Detection and Elimination Program.

Management Measures	Measurable Goals
(a) Provide illicit discharge identification training.	NCDOT shall provide annual training for appropriate staff and contractors. Training shall include identification and reporting of illicit discharges and illegal dumping.
(b) Perform illicit discharge inspections.	NCDOT shall perform inspections for illicit discharges to the stormwater drainage system and illicit dumping activities when performing other work on the NCDOT system. Inspections shall be documented when illicit discharges are verified.
(c) Maintain a standard point of contact.	NCDOT shall maintain a standard reporting format and contact for all complaints and reports of illicit discharges.
(d) Report illicit discharges.	NCDOT shall investigate all reports of illicit discharges or illegal dumping. NCDOT shall report verified illicit discharges to the appropriate DWQ Regional Office within 30 days of verification.
(e) Maintain a tracking database.	NCDOT shall maintain a tracking database for reports of illicit discharges.

Permit to be implemented in phases according to watershed. (Part III)			
Effective Date 11/1/2006	**Permittee** South Carolina DOT	**Citation** 40 CFR 122.26(d)(2)(iv); 40 CFR 122.30(d) (guidance)	**Link to Permit** http://www.scdot.org/business/pdf/stormwater/MS4_permit_signed_copy.pdf

Excerpt from permit:

A. WATERSHED MANAGEMENT

The permit will be implemented in five phases as indicated in the Table below. Each phase corresponds to the basin scheduled for permitting according to South Carolina DHEC's Watershed Program Five Year Rotating Basin Schedule and their respective 11 Digit Hydrologic Unit Codes (HUCs). The only deviation allowed from this must be justified by the number of impaired stations in a given basin according to the table included in Part IV.

There are four priority watersheds in the State of South Carolina designated by US EPA they are:

- The entire Upper Saluda HUC 03050109 (From the Mountains above Greenville to the Lake Murray Dam),
- The entire Middle Savannah HUC in SC 03060106 [and] the area around Aiken to the Savannah River,
- The Seewee to Santee area which is the upper portion of the eleven digit 0305022060 watershed, and,
- The Lower Edisto-03050205.

Fiscal Year	Basin	Urbanized Hydrologic Unit Codes (HUCs)
2007	Broad	03050106060 (4), 03050106070 (2), 03050106090 (1)
		03050105150 (3), 03050105160 (2), 03050107010 (4), 03050107040 (3)
		03050108010 (17)
		03050106050
		03050105090 (7), 03050105110 (1), 03050105130 (6), 03050105170 (4), 03050105180 (5), 03050105190 (2), 03050107020 (2), 03050107030 (1), 03050107060 (13)
2008	Savannah	03060101040, 03060103030 (1), 03060103070 (6), 03060103080 (1), 03060101100
		03060106050, 03060106060 (4), 03060106070 (1), 03060106100*, 03060107040
		03060101040, 03060101070, 03060101090
		03060101060 (1), 03060101070 (4), 03060101090 (6), 03060101100 (1)
		03060103150 (3), 03060107010 (2)
	Salkehatchie	03050208090, 03050208100 (5), 03050208110

Fiscal Year	Basin	Urbanized Hydrologic Unit Codes (HUCs)
2009	Saluda	03050109070, 03050109090 (3)
		03050109190 (1), 03050109210 (7), 03050110010, 03050110020 (4), 03050110030, 03050110050, 03050110060, 03050110070
		03050109010 (1), 03050109020 (3), 03050109040 (5), 03050109050 (2), 03050109060 (1), 03050109080, 03050109100, 03050109110, 03050109120 (2), 03050109130 (4)
		03050109140
		03050109150 (3)
	Edisto	03050204020
		03050203060, 03050203070, 03050203080, 03050206020

B. SWMP IMPLEMENTATION

The implementation of the permit is progressive. It means that during the first year, the general approach to the SWMP and the first basin is implemented. This implementation continues while the second basin is implemented during the year indicated. By the end of the permit term, the permit will be implemented in all five basins. The milestones to be implemented are depicted in the following table.

Fiscal Year	Urbanized Areas-MS4s	SWMP Compliance Implementation Schedule
2007 Broad	Columbia UA, Greenville UA, Greenville County, Mauldin-Simpsonville UA, Newberry, Richland County, Spartanburg UA	Submitted: 6 months from the effective date
		Implemented: 12 months from the effective date
		Reported, corrections included: 21 months from the effective date of the permit
2008 Savannah	Anderson-Augusta UAs, Clemson, Greenville UA, Greenwood	Submitted: 15 months from the effective date
		Implemented: 24 months from the effective date
Salkehatchie		Reported, corrections included: 33 months from the effective date of the permit
	Beaufort, Hilton Head	Same as the Savannah basin
2009 Saluda	Anderson County, Anderson & Columbia UAs, Columbia, Greenville UA, Greenville County, Mauldin-Simpsonville UA, Greenwood, Newberry, Richland County	Submitted: 27 months from the effective date
		Implemented: 36 months from the effective date
Edisto		Reported, corrections included: 45 months from the effective date of the permit
	Augusta UA, Orangeburg	Same as the Saluda basin
2010 Catawba	Charlotte & Columbia UAs, Fort Mill, Tega Cay Richland County, Rock Hill & Sumter UAs	Submitted: 39 months from the effective date
		Implemented: 48 months from the effective date
Santee		Reported, corrections included: 52 months from the effective date of the permit
	Charleston UA	Same as the Catawba basin

3 Establishment of the Stormwater Management Program

3.1 Legal Authority

Permit requires permittee to have its chief legal counsel annually certify that it has adequate legal authority to implement and enforce each of the key regulatory requirements from 40 CFR 122.26.d(2)(i). (Part E.2.b.2)			
Effective Date **7/1/2013**	**Permittee** California DOT	**Citation** 40 CFR 122.26(d)(2)(i); 40 CFR 122.34(b) (including (b)(3), (b)(4), and (b)(5))	**Link to Permit** http://www.swrcb.ca.gov/board_decisions/adopted_orders/water_quality/2012/wqo2012_0011_dwq.pdf

Excerpt from permit:

a) The Department shall establish, maintain, and certify that it has adequate legal authority through statute, permit, contract or other means to control discharges to and from the Department's properties, facilities and activities.

b) The Department has provided a statement certified by its chief legal counsel that the Department has adequate legal authority to implement and enforce each of the key regulatory requirements contained in **40 Code of Federal Regulations sections 122.26(d)(2)(i)(A-F)**. The Department shall submit annually, as part of the Annual Report, a ***CERTIFICATION OF THE ADEQUACY OF LEGAL AUTHORITY*.**

Permit acknowledges the DOT's limited legal authority and addresses it by establishing agreements with other agencies as part of the Enforcement Response Plan. (Part 3.3.1.a)			
Effective Date **8/17/2015**	**State** Arizona DOT	**Citation** 40 CFR 122.26(d)(2)(i); 40 CFR 122.34(b)(3)(i)(B)	**Link to Permit** https://www.azdot.gov/docs/default-source/planning/azs0000018-2015_ms4_permit.pdf

Excerpt from permit:

a. Where ADOT lacks direct legal authority to prohibit illicit discharges, require compliance, receive and collect information, inspect, respond to violations, levy monetary penalties or impose civil/ criminal penalties, ADOT shall establish agreements with other agencies, to the extent allowable by state law, including, but not limited to the Arizona Office of the Attorney General and Arizona Department of Public Safety. Such interagency agreements shall, at a minimum, contain the following:

1. **Inter-agency** Divisions
2. **Process for referring matters to the appropriate agency for enforcement**
3. **Time frames for referrals, actions, response, and resolution**

Permit acknowledges that DOTs may need to develop policies or procedures in place of ordinances to address permit requirements. (Section 6.2)			
Effective Date	**Permittees**	**Citation**	**Link to Permit**
7/1/2017	Massachusetts State Transportation Agencies (except for the MassDOT Highway Division)	40 CFR 122.26(d)(2)(iv)(A) and (B); 40 CFR 122.34(b) (including (b)(3), (b)(4), and (b)(5))	https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp.pdf

Excerpt from permit:

6.2 Ordinances and regulatory mechanisms

The transportation agency may not have authority to enact an ordinance, by-law or other regulatory mechanisms. The agency shall ensure that written agency policies or procedures are in place to address the requirements of part 2.3.4.5 [System mapping], part 2.3.4.6 [Written Illicit Discharge Detection and Elimination Program] and part 2.3.6.a [Post-construction stormwater runoff for new development and redevelopment].

Permit Considerations

Some DOTs may have different legal authorities than traditional MS4 permittees. DOT-specific MS4 permits may acknowledge this in different ways. For example, the Tennessee DOT, uses the following language to introduce the list of areas where the permittee shall have the authority to control discharges: "To the extent allowed by law, each permittee shall ensure legal authority to control discharges to and from those portions of the MS4 over which it has jurisdiction. This legal authority may be a combination of statute, ordinance, permit, contract, order or inter-jurisdictional agreements between permittees with adequate existing legal authority…" (Part 2.5).

3.2 Contractual Requirements

Permit requires permittee to have contracts with private contractors that require compliance with the MS4 permit and consistency with the Stormwater Pollution Prevention Plan (SPPP). (Part 1.E.2.b.)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
3/1/2009	New Jersey Highway Agencies	40 CFR 122.26(d)(2)(i); 40 CFR 122.34(b) (including (b)(3), (b)(4), and (b)(5))	http://www.nj.gov/dep/dwq/pdf/existing_highway_permit_final_2_27_09.pdf

Excerpt from permit:

For any projects or activities which the Highway Agency contracts out to private contractors after the EDPA [effective date of permit authorization], the awarded contract must require the contractor to conduct projects or activities in a manner that complies with the Highway Agency's SPPP and this permit's conditions. The Highway Agency is responsible for any violations of this permit resulting from a contractor's noncompliance.

Spotlight: Additional Permit Requirements

The South Carolina DOT permit also requires the DOT to "develop a standard environmental section for all contracts" related to legal authority during the first year of the permit, and it "require[s] utility contractors to obtain encroachment permits and become co-permittees or work through a utility agreement to address NPDES requirements." (NPDES Permit No. SCS040001, Part III.B)

Permit describes the specific types of legal authority the DOT must have to implement its stormwater program. (Part 2.5)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
1/3/2012	Georgia DOT	40 CFR 122.26(d)(2)(i); 40 CFR 122.34(b)(4)(i)(A)	https://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/Final_DOT_SW_NPDES_Permit_MS4_Dec_2011.pdf

Excerpt from permit:

4.2.4 Construction Site Storm Water Runoff Control

The permittee must develop, implement and enforce a program to reduce pollutants in any stormwater runoff to the MS4 from the permittee's construction activities that result in a land disturbance of greater than or equal to one acre. Storm water discharges from the permittee's construction activity disturbing less than one acre must be included in the permittee's program if that construction activity is part of a larger common plan of development or sale that would disturb one acre or more. At a minimum, the Construction Site Storm Water Runoff Control Program must contain the elements and schedules shown in Table 4.2.4 and include the development and implementation of the following:

4.2.4.1 A contractual obligation mechanism to require erosion and sediment controls consistent with the Manual for Erosion and Sediment Control in Georgia and the Construction General Permits, as well as penalties to ensure compliance, to the extent allowable, under State or local law;…

Table 4.2.4 Construction Site Storm Water Runoff Control – Best Management Practices						
BMPs	Measurable Goals	Year 1	Year 2	Year 3	Year 4	Year 5
1. Develop and implement a contractual obligation mechanism to require erosion and sedimentation controls consistent with the Manual for Erosion and Sediment Control in Georgia and the Construction General Permits, as well as penalties to ensure compliance, to the extent allowable under State or local law.	1.a. Submit a proposed contractual obligation mechanism to EPD for review with the second annual report.		X			

3.3 Enforcement

Permit Considerations

State DOTs have different strategies than municipalities for ensuring compliance with stormwater requirements. For example, they may use encroachment permits or utilize the state highway patrol or police to deal with major stormwater issues on roadways. Due to the linear nature of a road system, many DOTs find it important to have a well-defined notification protocol for scenarios in which they find illicit discharges that originate within another regulated MS4, as well as a process for notifying state permitting agencies.

Permit specifies the DOT's responsibility related to contractual requirements and removal of temporary sediment control BMPs. (Part III.H)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
7/7/2010	Nevada DOT	40 CFR 122.26(d)(2)(i); 40 CFR 122.34(b)(4)(i)(A)	https://ndep.nv.gov/uploads/documents/ndotms4perm.pdf

Excerpt from permit:

- **NDOT shall, at a minimum, require its contractors to comply with NDEP's General Permit NVR100000 for Construction Activities for regulated construction projects, including the contractor's requirement to file a Notice of Intent ("NOI") and obtain authorization under NDEP's General Permit NVR100000 for Construction Activities for each construction project or site that disturbs more than one (1) acre, or less than one (1) acre if it is part of a larger project. The contractor shall also file a Notice of Termination ("NOT") for each construction project or site, either terminating their responsibility if final stabilization has been achieved, or transferring it to NDOT for completion.**

- **NDOT shall ensure that the contractor's NOI references the construction site as an NDOT project and shall keep a copy of the NDEP authorization certificate in the SWPPP. NDOT shall ensure that all applicable provisions of NDEP's General Permit NVR100000 for Construction Activities and this permit are implemented for NDOT projects and shall implement a system to enforce these provisions. NDOT is responsible for inspection oversight.**
- **When contractors complete their work at a site and interim stabilization is in place, they may file a NOT to terminate their responsibility for site activities. In this instance, NDOT shall assume responsibility for the site until final stabilization has been achieved for the entire project. NDOT is responsible for removing all temporary sediment control BMPs that may impede stormwater flow as soon as practicable after final stabilization.**
- **NDOT shall include a list of all construction projects in the Annual Report, including the name of the project and its associated NDEP construction stormwater permit number(s) (e.g. CSW-xxxx), that have achieved final stabilization and that NDOT considers to be complete.**
- **NDOT shall provide in the Annual Report, a list and description of all violations and their resolution, including any enforcement actions taken against its contractors.**

Permit specifies the process that the DOT must use to notify the state environmental agency. (Part D.1.d.(6))			
Effective Date 10/28/2013	**Permittee** Hawaii DOT	**Citation** 40 CFR 122.26(d)(2)(i); 40 CFR 122.34(b)(4)(i)(A)	**Link to Permit** http://www.stormwaterhawaii.com/swmp_wp/wp-content/uploads/2014/10/A.1_DOT-HWYS-NPDES-Permit-No.-HI-S000001.pdf

Excerpt from permit:

Process *to* ***refer noncompliance and non-filers to DOH*** - In the event the Permittee has exhausted its use of sanctions and cannot bring a construction site or construction operator into compliance with its policies, standards, or this permit, or otherwise deems the site to pose an immediate and significant threat to water quality, the Permittee shall provide e-mail notification to cleanwaterbranch@doh.hawaii.gov, Attn: Enforcement Section Supervisor within one (1) week of such determination. E-mail notification shall be followed by written notification in accordance with Part A.6. and include a copy of all inspection checklists, notes, and related correspondence in pdf format (300 minimum dpi) within two (2) weeks of the determination. In instances where an inspector identifies a site that has not applied for permit coverage under the NPDES permit program, the Permittee shall provide written notification in accordance with Part A.6. to DOH within two (2) weeks of the discovery.

3.4 Requirement to Ensure Adequate Resources

Permit Considerations

The Phase I regulations include a requirement to perform a "fiscal analysis of the necessary capital and operation and maintenance expenditures necessary to accomplish the activities of the programs…" (see 40 CFR 122.26(d)(2)(vi)).

Permit requires permittee to maintain adequate resources and submit an annual fiscal analysis. (Part E.2.b.3)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
7/1/2013	California DOT	40 CFR 122.26(d)(2)(vi); 40 CFR 122.34(c)(2)	http://www.swrcb.ca.gov/board_decisions/adopted_orders/water_quality/2012/wqo2012_0011_dwq.pdf

Excerpt from permit:

3) Fiscal Resources

a) The Department shall seek to maintain adequate fiscal resources to comply with this NPDES Permit. This includes but is not limited to:

i) Implementing and maintaining all BMPs;

ii) Implementing an effective storm water monitoring program; and

iii) Retaining qualified personnel to manage the storm water program.

b) The Department shall submit a ***FISCAL ANALYSIS*** of the storm water program annually. At a minimum, the fiscal analysis shall show:

i) The allocation of funds to the Districts for compliance with this Order;

ii) The funding for each program element;

iii) A comparison of actual past year expenditures with the current year's expenditures and next year's proposed expenditures;

iv) How the funding has met the goals specified in the SWMP and District workplans; and

v) Description of any cost sharing agreements with other responsible parties in implementing the storm water management program.

c) The fourth year report shall contain a ***BUDGET ANALYSIS*** for the next permit cycle.

3.5 Total Maximum Daily Load (TMDL) Requirements

Permit includes an appendix that identifies specific impaired waterbodies, the pollutant(s) of concern, and the associated wasteload allocations. (Part II.B.2)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
5/7/2013	Delaware DOT	40 CFR 122.26(d)(1)(iv)(C)(1); 40 CFR 122.34(c)(1)	http://www.dnrec.delaware.gov/wr/Information/SWDInfo/Documents/NCC%20DelDOT%20Phase%20I%20MS4%20Permit.pdf

Excerpt from permit:

A number of TMDLs have been approved or established by the U.S. Environmental Protection Agency for waters located in New Castle County to which the permittees' MS4 discharges. These TMDLs listed in Appendix A assign specific numeric Waste Load Allocations (WLAs) to watersheds located within the MS4 permit area. The WLAs represent all pollutant sources including urban stormwater, industrial stormwater, agriculture, and septic.

In order to assist DNREC to further break down WLAs for urban stormwater, by year four (4) of the permit term, the permittees shall submit a GIS layer for all urbanized/impervious areas within the coverage area of this permit, which shall be accomplished by ground truthing currently available land use/land cover data and impervious surface data (urban stormwater, impervious surfaces, and industrial stormwater).

Example from Appendix A of the Permit:

Table A.1 WLAs Assigned to the New Castle County/DelDOT MS4

Waterbody	Pollutant	MS4 Wasteload Allocation Specified in Approved TMDL		
		Annual Baseline Load	Annual TMDL Load	Load Reduction
Appoquinimink River dissolved Oxygen and Nutrients (updated Dec 2003)	Total N	131,326 lb/yr	70,251 lb/yr	60%
	Total P	23,300 lb/yr	8,860 lb/yr	60%
Bacteria (Dec 2006)	Bacteria	7.52E+12 CFU/yr	6.32+12 CFU/yr	15% (1)
		7.03E+10 CFU/yr	6.06+10 CFU/yr	73% (2)
Army Creek	Total N	14,782.5 lb/yr	8,833 lb/yr	40%
TMDL Analysis for the Watersheds of Army Creek, Red Lion Creek, and Dragon Run Creek, Delaware (August 2006)	Total P	1241 lb/yr	730 lb/yr	40%
	Bacteria	1.1E+13 CFU/yr	5.037E+12 CFU/yr	39%

Permit includes specific requirements to show consistency with TMDLs. (E.2.a.ii)			
Effective Date 7/1/2013	**Permittee** California DOT	**Citation** 40 CFR 122.26(d)(1)(iv)(C)(1); 40 CFR 122.34(c)(1)	**Link to Permit** http://www.swrcb.ca.gov/board_decisions/adopted_orders/water_quality/2012/wqo2012_0011_dwq.pdf

Excerpt from permit:

ii) Total Maximum Daily Load Watersheds
The Department shall comply with the TMDL monitoring requirements as expressed in approved TMDL, in the TMDL-specific permit requirements of Attachment IV, or in orders of the Regional Water Boards pursuant to Water Code section 13383 that require TMDL-related monitoring. TMDL monitoring shall also include the constituents listed in Attachment II. If there is a conflict between this order and the requirements of the TMDL, the TMDL requirements will apply, except that the constituents listed in Attachment II shall be monitored even if not required by the TMDL.

Determinations of compliance with the TMDL shall be made by the Executive Officer of the Regional Water Board or his designee. When a determination is made that a site or discharge is in compliance with the TMDL, the site will no longer be considered an active monitoring site pursuant to provision E.2.c.1) and monitoring of Attachment II constituents will be discontinued. This provision applies regardless of any continued monitoring that may be required at the site pursuant to the TMDL.

R6 – Lahontan Regional Water Board
Lake Tahoe Sediment and Nutrients TMDL Effective Date: August 16, 2011 BPA: WQ Amendment May 2008 Resolution: 2009-0028 Lake Tahoe Sediment Requirements A. Pollutant Load Reduction Requirements The Department must reduce fine sediment particle (FSP), total phosphorus (TP), and total nitrogen (TN) loads by 10%, 7%, and 8%, respectively, by September 30, 2016. Pollutant load reductions shall be measured in accordance with the processes outlined in the most recent version of Lake Clarity Crediting Program Handbook. To demonstrate compliance with the average annual fine sediment particle pollutant load reduction requirements, the Department must earn and maintain 298 Lake Clarity Credits for the water year October 1, 2015 to September 30, 2016, and for subsequent water years. B. Pollutant Load Reduction Plans The Department shall prepare a Pollutant Load Reduction Plan (PLRP) describing how it expects to meet the pollutant load reduction requirements described in Section A above. The Department shall submit a plan no later than July 15, 2014 that shall include, at a minimum, the following elements:

R6 – Lahontan Regional Water Board

1. *Catchment registration schedule*

   The PLRP shall include a list of catchments that the Department plans to register pursuant to the approved Lake Clarity Crediting Program to meet load reduction requirements. The list shall include catchments where capital improvement projects have been constructed since May 1, 2004 that the Department expects to claim credit for, and catchments where projects will be constructed and other load reduction activities (capital improvements, institutional controls, and other measures/practices implement) taken during the term of this Order.

2. *Proposed pollutant control measures*

   The PLRP shall generally describe storm water program activities to reduce fine sediment particle, total phosphorus, and total nitrogen loading that the Department will implement in identified catchments.

3. *Pollutant load reduction estimates*

   The Department shall conduct pollutant load reduction analyses on a representative catchment subset to demonstrate that proposed implementation actions are expected to achieve the pollutant load reduction requirements specified in Section A. above. For representative catchments, the analysis shall include detailed estimates of both baseline pollutant loading and expected pollutant loading resulting from implementation actions and provide justification why the conducted load reduction analysis is adequate for extrapolation to other catchments.

   The pollutant loading estimates shall differentiate between estimates of pollutant load reductions achieved since May 1, 2004 and pollutant load reductions from actions not yet taken.

4. *Load reduction schedule*

   The PLRP shall describe a schedule for achieving the pollutant load reduction requirements described in the Lake Tahoe Sediment TMDL Section A above. The schedule shall include an estimate of expected pollutant load reductions for each year of this Permit term based on preliminary numeric modeling results. The schedule shall also describe which catchments the Department anticipates it will register for each year of this Permit term.

5. *Annual adaptive management*

   The PLRP shall include a description of the processes and procedures to annually assess storm water management activities and associated load reduction progress. The plan shall describe how the Department will use information from the monitoring and implementation or other efforts to improve operational effectiveness and for achieving the pollutant load reduction requirements specified in Section A.

6. *Pollutant Load Reduction Plan Update*

   By March 15, 2017, the Department shall update its Pollutant Load Reduction Plan to describe how it will achieve the pollutant load reduction requirements for the second five-year TMDL implementation period, defined as the ten-year load reduction milestone in the Lake Tahoe TMDL.

   Specifically, the updated Pollutant Load Reduction Plan shall demonstrate how the Department will reduce baseline fine sediment particle, total nitrogen, and total phosphorus loads by 21 percent, 14 percent, and 14 percent, respectively, by water year 2021.

R6 – Lahontan Regional Water Board
C. Pollutant Load Reduction Progress To demonstrate pollutant load reduction progress, the Department shall submit a Progress Report by July 15, 2014 documenting pollutant load reductions accomplished between May 1, 2004 (baseline year) and October 15, 2011. D. Pollutant Load Reduction Monitoring and Water Quality Monitoring Requirements The Department shall prepare and submit a Storm water Monitoring Plan for review and approval by the Regional Water Board by July 15, 2013 and implement the approved plan.

Permit requires specific prioritization and implementation activities to be consistent with 84 different TMDLs. (Amendment Attachment IV)			
Effective Date 7/1/2013	**Permittee** California DOT	**Citation** 40 CFR 122.26(d)(1)(iv)(C)(1); 40 CFR 122.34(c)(1)	**Link to Permit** https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2014/wqo2014_0077_dwq.pdf

Excerpt from permit:

Attachment IV prescribes the implementation requirements for the Total Maximum Daily Loads (TMDLs) in which the Department of Transportation (Department) has been identified as a responsible party. The TMDLs in this attachment have been (1) adopted by the Regional Water Quality Control Boards (Regional Water Boards) and approved by the State Water Resources Control Board (State Water Board) and the Office of Administrative Law or the United States Environmental Protection Agency (USEPA), or (2) established by USEPA.

Section I of this attachment provides directions and general guidance on development of a prioritized list of reaches for implementation actions. Section II identifies the applicable TMDLs and implementation requirements. Section II also contains TMDL-specific permit requirements for the Lake Tahoe Sediment/Nutrients TMDL, Napa River Sediment TMDL, Sonoma Creek Sediment TMDL, and the Lake Elsinore and Canyon Lake Nutrients TMDL. Section III prescribes the general implementation requirements applicable to all TMDLs, and the specific requirements applicable to each pollutant category.

[EPA Note regarding Permit Excerpt: Attachment IV includes detailed control requirements for each TMDL; below is one example.]

Attachment IV
TMDL Requirements

Lake Tahoe Sediment and Nutrients
Effective Date: August 16, 2011
BPA: WQ Amendment May 2008
Resolution: 2009-0028

Lake Tahoe Sediment Requirements

A. Pollutant Load Reduction Requirements

The Department must reduce fine sediment particle (FSP), total phosphorus (TP), and total nitrogen (TN) loads by 10%, 7%, and 8%, respectively, by September 30, 2016.

Pollutant load reductions shall be measured in accordance with the processes outlined in the most recent version of Lake Clarity Crediting Program Handbook. To demonstrate compliance with the average annual fine sediment particle pollutant load reduction requirements, the Department must earn and maintain 361 Lake Clarity Credits for the water year October 1, 2015 to September 30, 2016, and for subsequent water years.

B. Pollutant Load Reduction Plans

The Department shall prepare a Pollutant Load Reduction Plan (PLRP) describing how it expects to meet the pollutant load reduction requirements described in Section A above. The Department shall submit a plan no later than September 15, 2013 that shall include, at a minimum, the following elements:

1. Catchment registration schedule

The PLRP shall include a list of catchments that the Department plans to register pursuant to the approved Lake Clarity Crediting Program to meet load reduction requirements. The list shall include catchments where capital improvement projects have been constructed since May 1, 2004 that the Department expects to claim credit for, and catchments where projects will be constructed and other load reduction activities (capital improvements, institutional controls, and other measures/practices implement) taken during the term of this Order.

2. Proposed pollutant control measures

The PLRP shall generally describe storm water program activities to reduce fine sediment particle, total phosphorus, and total nitrogen loading that the Department will implement in identified catchments.

3. Pollutant load reduction estimates

The Department shall conduct pollutant load reduction analyses on a representative catchment subset to demonstrate that proposed implementation actions are expected to achieve the pollutant load reduction requirements specified in Section A above. For representative catchments, the analysis shall include detailed estimates of both baseline pollutant loading and expected pollutant loading resulting from implementation actions and provide justification why the conducted load reduction analysis is adequate for extrapolation to other catchments.

The pollutant loading estimates shall differentiate between estimates of pollutant load reductions achieved since May 1, 2004 and pollutant load reductions from actions not yet taken.

4. Load reduction schedule

The PLRP shall describe a schedule for achieving the pollutant load reduction requirements described in Section A above. The schedule shall include an estimate of expected pollutant load reductions for each year of this Permit term based on preliminary numeric modeling results. The

Attachment IV TMDL Requirements
schedule shall also describe which catchments the Department anticipates it will register for each year of this Permit term. *5. Annual adaptive management* The PLRP shall include a description of the processes and procedures to annually assess storm water management activities and associated load reduction progress. The plan shall describe how the Department will use information from the monitoring and implementation or other efforts to improve operational effectiveness and for achieving the pollutant load reduction requirements specified in Section A. 6. *Pollutant Load Reduction Plan Update* By March 15, 2017, the Department shall update its Pollutant Load Reduction Plan to describe how it will achieve the pollutant load reduction requirements for the second five-year TMDL implementation period, defined as the ten-year load reduction milestone in the Lake Tahoe TMDL. Specifically, the update Pollutant Load Reduction Plan shall demonstrate how the Department will reduce baseline fine sediment particle, total nitrogen, and total phosphorus loads by 21 percent, 14 percent, and 14 percent, respectively, by water year 2021. **C. Pollutant Load Reduction Progress** To demonstrate pollutant load reduction progress, the Department shall submit a Progress Report by March 15, 2014 documenting pollutant load reductions accomplished between May 1, 2004 (baseline year) and October 15, 2011. **D. Pollutant Load Reduction Monitoring and Water Quality Monitoring Requirements** Caltrans shall prepare and submit a Stormwater Monitoring Plan for review and approval by the Regional Board by July 15, 2013 and implement the approved plan.

Spotlight: Additional Resources

- For other TMDL implementation examples, view the *Post-Construction Performance Standards & Water Quality-Based Requirements: A Compendium of Permitting Approaches* (EPA 833-R-14-003).

3.6 Shared Responsibilities

Permit allows permittee to share responsibilities but requires commitments in writing. (Part I.D.1)			
Effective Date 3/1/2009	**Permittees** New Jersey Highway Agencies	**Citation** 40 CFR 122.26(d)(2)(i)(D) and (vii); 40 CFR 122.35(a)	**Link to Permit** http://www.nj.gov/dep/dwq/pdf/existing_highway_permit_final_2_27_09.pdf

Excerpt from permit:

A Highway Agency may rely on another governmental, private, or nonprofit entity (for example, a watershed association) to satisfy the Highway Agency's NJPDES permit obligations to implement one or more control measures (or components(s) thereof) pursuant to N.J.A.C. 7:14A-25.7(a) if:

I. The other entity, in fact, implements the measure(s), or component(s) thereof;

II. The particular measure(s), or component(s) thereof, is at least as stringent as the corresponding NJPDES permit requirement;

III. The other entity agrees in writing (or is required by law) to implement the measure(s), or component(s) thereof, on the Highway Agency's behalf. The Highway Agency is responsible for compliance with this permit if the other entity fails to implement the measure(s), or component(s) thereof. In the annual reports the Highway Agency must submit under Part I, Section H.3, the Highway Agency shall specify that it is relying on another entity to satisfy some of the Highway Agency's NJPDES permit obligations.

IV. If the Highway Agency is relying on another entity regulated under the NJPDES permit program to satisfy all of that Highway Agency's NJPDES permit obligations, including that Highway Agency's obligation to file these annual reports, the Highway Agency shall notify the Department of this reliance in writing, and shall also note this reliance in the Highway Agency's SPPP.

Permit requires formal interjurisdictional agreements among permittees that choose to share SWMP implementation responsibilities. (Part I.C.3)			
Effective Date 5/7/2013	**Permittee** Delaware DOT	**Citation** 40 CFR 122.26(d)(2)(i)(D) and (vii); 40 CFR 122.35(a)	**Link to Permit** http://www.dnrec.delaware.gov/wr/Information/SWDInfo/Documents/NCC%20DelDOT%20Phase%20I%20MS4%20Permit.pdf

Excerpt from permit:

Tasks specifying the implementation of the SWPP&MP elements set forth herein shall be described, identifying parties responsible, within an Inter-jurisdictional Agreement. No later than six (6) months following the effective date of this permit, the principal permittees shall coordinate with all co-

permittees to develop an inter-jurisdictional agreement that defines relative responsibilities for each of the activities required herein, with a final agreement due within 15 months of the effective date of this permit included within the SWPP&MP. The interjurisdictional agreement shall address, at a minimum, the following elements:

- roles and responsibilities for each permittee, by SWPP&MP element
- monitoring responsibilities
- reporting responsibilities
- financial arrangements between permittees (if any), and
- communication/coordination between permittees

Permit Considerations

The Phase II regulations at 40 CFR 122.35(a) specify that "[t]he permittee may rely on another entity to satisfy its NPDES permit obligations to implement a minimum control measure …. EPA encourages the permittee to enter into a legally binding agreement with that entity if the permittee wants to minimize any uncertainty about compliance with the permit."

3.7 Public Education and Public Involvement

Permit includes specific target audiences to consider among the traveling public. (Part II.B.10.a)			
Effective Date 11/1/2006	**Permittee** South Carolina DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(A)(6), (B)(5) and (6), and (D)(4); 40 CFR 122.34(b)(1), (2)	**Link to Permit** http://www.scdot.org/business/pdf/stormwater/MS4_permit_signed_copy.pdf

Excerpt from permit:

10. ***Public Education*;** A public education program shall be developed and implemented
a. The permittee shall develop this program to address specific users of the traveling public such as:

Truckers
Garbage haulers
Septic haulers
Recreation vehicles
AAA Carolinas
Pet owners
Others as defined with a high potential impact

…

c. The Public Education program will be outlined and developed in the first year and fully implemented in years two (2) through five (5)

Permit requires a public education survey to evaluate the education and outreach program's effectiveness. (Part II.A.1)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
5/7/2013	Delaware DOT	40 CFR 122.26(d)(2)(iv)(A)(6), (B)(5) and (6), and (D)(4); 40 CFR 122.34(b)(1),(2)	http://www.dnrec.delaware.gov/wr/Information/SWDInfo/Documents/NCC%20DelDOT%20Phase%20I%20MS4%20Permit.pdf

Excerpt from permit:

c. A statistically-valid public education survey to evaluate the effectiveness of the education and outreach program in increasing public awareness and changing behaviors about storm water pollution. The permittees shall coordinate on conducting this public survey. A baseline survey (Public Education Survey #1) shall be conducted beginning within 18 months of the effective date of this permit with the results submitted to the Department 6 months after the survey starts. A second survey (Public Education Survey #2) will be conducted beginning within approximately 3.5 years of the effective date of this permit (2 years after Public Education Survey #1). Survey results shall be submitted to the Department 6 months after the survey begins. The two surveys shall be consistent so results are comparable. If upon comparison of the two surveys, no measurable difference in public awareness and behavior is evident, the permittees shall reevaluate their public education and outreach program in order to determine more effective methods of conveying their message.

Permit specifically identifies who the "public" is for a DOT. (Section 6.1)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
7/1/2017	Massachusetts State Transportation Agencies (except for the MassDOT Highway Division)	40 CFR 122.34(b)(1),(2) and 40 CFR 122.26(d)(2)(iv)(A)(6), (B)(5) and (6), and (D)(4)	https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp.pdf

Excerpt from permit:

6.1 Public education

For the purpose of this permit, the audiences for a transportation agency education program include the general public (users of the roadways), employees, and any contractors working at the location. The permittee may use some of the educational topics included in part 2.3.2.d. as appropriate, or may focus on topics specific to the agency. The permittee shall document the educational topics for each target audience.

Permit Considerations

Some DOTs find that working with metropolitan planning organizations and others to incorporate stormwater in master planning is a good way to comprehensively address the challenges of establishing an SWMP. Also, linking stormwater within an existing program (e.g., Complete Streets programs) can be a cost-effective way to get multiple benefits for both transportation and water quality objectives.

EPA's website includes information on voluntary long-term stormwater planning. Using long-term planning approaches, communities can prioritize actions related to stormwater management as part of capital improvement plans, integrated plans, master plans, or other planning efforts. Further details are available at www.epa.gov/npdes/stormwater-planning.

4 Facilities

4.1 Non-Industrial Facility Inventory and Management

Permit Considerations

DOTs often have facilities other than roads that are covered by the MS4 permit (e.g., parking lots, rest areas, maintenance yards). Stormwater management considerations at these facilities may be different than those for linear roadways. South Carolina DOT's permit, for example, requires that the permittee develop, implement, and maintain a stormwater runoff management plan specifically for interstate rest areas (Part II.B.3).

Permit requires an inventory of maintenance yard facilities and specific, potential pollution sources. (Attachment D)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
3/1/2009	New Jersey Highway Agencies	40 CFR 122.26(d)(2)(iv)(A); 40 CFR 122.34(b)(6)	http://www.nj.gov/dep/dwq/pdf/existing_highway_permit_final_2_27_09.pdf

Excerpt from permit:

1. Highway Agencies shall include for maintenance yard operations an inventory that includes the following:
   i. List to be made part of the SPPP of general categories of all materials or machinery located at the maintenance yard, which could be a source of pollutants in a stormwater discharge. The materials in question include, but are not limited to: raw materials; intermediate products; final products; waste materials; by-products; machinery and fuels; and lubricants, solvents, and detergents that are related to the maintenance yard operations or ancillary operations. Materials or machinery that are not exposed to stormwater or that are not located at the maintenance yard or related to its operations do not need to be included.

Permit requires an annual inventory update for specifically identified facilities that could contribute polluted discharges. (Part II.A.5.a)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
5/7/2013	Delaware DOT	40 CFR 122.26(d)(2)(iv)(A); 40 CFR 122.34(b)(6)	http://www.dnrec.delaware.gov/wr/Information/SWDInfo/Documents/NCC%20DelDOT%20Phase%20I%20MS4%20Permit.pdf

Excerpt from permit:

A plan to include the current inventory with provisions to update the inventory annually for all facilities owned or operated by any of the permittees located in the MS4 service area that either maintain

coverage under the NPDES industrial stormwater general permit program or that have the potential to contribute polluted discharges as a result of stormwater. These facilities can include, but are not limited to, maintenance yards, municipally-owned parking lots, Del-DOT-operated parking lots, or municipally-owned parks. This list is to be submitted in the Annual Report package. All facilities on the list must be inspected annually.

Permit requires an inventory of vehicle wash facilities. (Part 2.1.6.1)			
Effective Date 10/1/2006	**Permittee** Tennessee DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(A); 40 CFR 122.34(b)(6)	**Link to Permit** https://www.tn.gov/content/dam/tn/tdot/documents/NPDESStatewideMS4Permit.pdf

Excerpt from permit:

TDOT will inventory its facilities to document vehicle-washing practices. A policy will be developed that requires all TDOT vehicles and equipment to be either washed off-site at a commercial facility, or on a covered, dedicated wash pad that collects all wastewater and transfers it to a sanitary sewer system or a wastewater collection system. TDOT will implement this policy to assure that no wastewater from the washing of vehicles and equipment at TDOT facilities enters storm water runoff or storm water runoff control systems. TDOT will inspect all buildings where equipment maintenance is performed and take necessary actions to assure that floor drains are sealed or connected to a sanitary sewer system.

Permit describes DOT facilities management BMPs. (Part III.L)			
Effective Date 7/7/2010	**Permittee** Nevada DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(A); 40 CFR 122.34(b)(6)	**Link to Permit** https://ndep.nv.gov/uploads/documents/ndotms4perm.pdf

Excerpt from permit:

III.L.2. NDOT shall implement the following BMPs at its maintenance facilities:

a. NDOT shall prevent litter, debris, and chemicals that could be exposed to stormwater from becoming a pollutant source in stormwater discharges; and
b. NDOT shall implement good housekeeping and material management BMPs for operating and maintaining all NDOT maintenance facilities and each of the following maintenance facility areas:
c. NDOT shall describe and implement BMPs that prevent or minimize contamination of stormwater runoff from all areas used for vehicle or equipment storage. NDOT shall implement the following BMPs, or alternatives that will provide equivalent protection:
    i. Confine the storage of leaky or leak-prone vehicles and equipment awaiting maintenance to designated areas;
    ii. Use drip pans under vehicles and equipment;

iii. Store vehicles and equipment indoors whenever practicable;
iv. Install berms or dikes around the areas;
v. Use absorbents to clean spilled materials;
vi. Roof or cover storage areas whenever practicable; and
vii. Clean pavement surfaces to remove oil and grease. Use dry cleanup methods, or, if water is used, capture and properly dispose of the cleaning water.

Permit requires facility inspections to ensure indoor drains are sealed or go to a sanitary sewer. (Section 2.1.6.2)			
Effective Date	**State**	**Citation**	**Link to Permit**
10/1/2006	Tennessee DOT	40 CFR 122.26(d)(2)(iv)(A); 40 CFR 122.34(b)(6)	https://www.tn.gov/content/dam/tn/tdot/documents/NPDESStatewideMS4Permit.pdf

Excerpt from permit:

TDOT will inspect all buildings where equipment maintenance is performed and take necessary actions to assure that floor drains are sealed or connected to a sanitary sewer system.

Management Measure	Measurable Goal	Scheduled Completion From effective date of permit
Facility Floor Drains	Insure that all are closed or tied to sanitary sewer	90 Days

Permit requires phasing of inspection and inventory of permittee facilities. (Section 2.1.6.3)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
10/1/2006	Tennessee DOT	40 CFR 122.26(d)(2)(iv)(A); 40 CFR 122.34(b)(6)	https://www.tn.gov/content/dam/tn/tdot/documents/NPDESStatewideMS4Permit.pdf

Excerpt from permit:

TDOT will inspect and inventory all TDOT owned and operated (O/O) facilities to determine whether activities and materials at these facilities may be contributing pollutants to storm water runoff. Facility activities that could contribute to polluting storm water include, but are not limited to: welcome centers, rest areas, weighing stations, material handling/storage areas (i.e. salt storage), vehicle maintenance, vehicle storage and waste generation areas.

…

4 Facilities

Management Measure	Measurable Goal	Scheduled Completion from effective date of permit
Vehicle and Equipment Washing	Insure all washing is off-site or on dedicated pad draining to sewer	90 Days
Facility Floor Drains	Insure that all are closed or tied to sanitary sewer	90 Days
Facility Inventory and Notification	Inspect, and inventory TDOT facilities:	
	Region HQ Facilities (4)	90 Days
	District HQ Facilities (18)	90 Days
	25% of TDOT County Garages (20 of Higher Priority)	180 Days
	75 % of TDOT County Garages (60 of Lower Priority)	12 Months
	Airport Hanger (1)	180 Days
	Truck Weigh Stations (9)	180 Days
	Welcome Centers (13)	180 Days
	Rest Areas (20)	180 Days
	Floating Maintenance Facilities	180 Days
	Floating Salt Storage Facilities (22)	180 Days
	Floating HELP Truck Facilities (1)	180 Days
	Other Existing TDOT Facilities	12 Months
	New TDOT Facilities	At least 5 days prior to commencement of activities at the site

Permit Considerations

Unlike city municipalities, DOTs may lack the mechanism to incorporate pollution prevention and good housekeeping requirements into ordinances. The Tennessee DOT's permit requires it to develop standard operating procedures (SOPs) for spill prevention and response. The permit also requires that the SOPs, resources, and training programs be incorporated in each facility's SWPPP (Part 2.1.6.6).

4.2 Facility Contractor Education

Permit requires certified chemical applicator training. (Part D.1.f.(2))			
Effective Date 10/28/2013	**Permittee** Hawaii DOT	**Citation** 40 CFR 122.26(d)(iv); 40 CFR 122.34(b)(6)(i)	**Link to Permit** http://www.stormwaterhawaii.com/swmp_wp/wp-content/uploads/2014/10/A.1_DOT-HWYS-NPDES-Permit-No.-HI-S000001.pdf

Excerpt from permit:

The Permittee shall ensure that their employees or contractors or employees of contractors applying registered pesticides, herbicides, and fertilizers shall work under the direction of a certified applicator, follow the pesticide label, and comply with any other State, City or government regulations for pesticides, herbicides, and fertilizers. All Permittee employees or contractors applying pesticides, herbicides or fertilizers shall receive training on the BMPs annually.

Permit requires DOT to train contractors involved with maintenance. (Part II.E.1.b.a)			
Effective Date 10/1/2015	**Permittee** North Carolina DOT	**Citation** 40 CFR 122.26(d)(iv); 40 CFR 122.34(b)(6)(i)	**Link to Permit** https://connect.ncdot.gov/resources/hydro/HSPPermits/2015_NPDES_Stormwater_Permit.pdf

Excerpt from permit:

NCDOT shall provide annual stormwater pollution awareness training for appropriate NCDOT personnel and contractors involved in construction and maintenance activities. NCDOT may require contractors to have equivalent training in lieu of NCDOT-provided training. Training shall include general stormwater awareness, NPDES stormwater permit NCG010000 implementation, identification of stormwater pollution potential, appropriate spill response actions and contacts for reporting spills and illicit discharges/illegal dumping).

Permit requires a contractor stormwater management training course and specifies required course content. (Part 2.1.1.2)			
Effective Date	**State**	**Citation**	**Link to Permit**
10/1/2006	Tennessee DOT	40 CFR 122.26(d)(iv); 40 CFR 122.34(b)(6)(i)	https://www.tn.gov/content/dam/tn/tdot/documents/NPDESStatewideMS4Permit.pdf

Excerpt from permit:

Management measures to educate contractors. TDOT shall develop, implement and maintain an education and training program for contractors conducting construction, repairs, or maintenance of TDOT highways, right-of-ways and other facilities.

Management Measure	Measurable Goal	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
Develop a contractor storm water management training course tailored to fit TDOT construction contractors. Develop and implement a requirement for appropriate contractors to attend this course prior to bidding on TDOT contracts.	This course should be equivalent to TDEC's Fundamentals of Erosion and Sediment Control. Training shall include the following components: erosion and sediment control, good housekeeping and pollution prevention measures, spill prevention and clean up, illicit discharge identification and how to report them, vehicle maintenance, chemical storage and waste management.	X				

5.1 Winter Storm Management

The Importance of Properly Storing De-Icing Materials

DOTs often use various materials to keep roads safe for travel during winter months, and the facilities where they store these materials can be sources of pollutants. For example, as seen below in Table 4, 68 percent of deicer abrasives are stored outside and are not covered. Uncovered salt piles can contribute significant pollutant loads to surface and groundwater. The New Hampshire Department of Environmental Services (NHDES) conducted a study to determine the salt loss from salt piles. NHDES measured the loss from an uncovered, 600-cubic-yard pile of salt-sand during January–March 2007 and estimated that the salt pile contributed 313 tons of salt per year to a local stream. Furthermore, the U.S. Geological Survey (USGS) performed several studies in this same area and determined that between 229 and 903 tons of salt load were in the groundwater.[1]

Table 4. Materials Storage [2]

Materials	Outside Uncovered	Outside Covered	Indoor Storage	Impermeable Pad	Runoff Control
Abrasives	68% (19)	32% (9)	29% (8)	25% (7)	29% (7)
Solid Chemicals	11% (3)	36% (10)	79% (22)	54% (15)	50% (14)
Liquid Chemicals	NA	NA	NA	50% (14)	22% (11)

[1] NHDES, *Data Report from the TMDL for Chloride from Waterbodies near the I-93 Corridor from Massachusetts to Manchester, NH*, December 2007, http://des.nh.gov/organization/divisions/water/wmb/tmdl/documents/chloride_data_report.pdf.

[2] Table 2-6 from Levelton Consultants, *Guidelines for the Selection of Snow and Ice Control Materials to Mitigate Environmental Impacts*, National Cooperative Highway Research Program Report 577, Transportation Research Board of the National Academies, 2007, http://www.trb.org/Publications/Blurbs/158876.aspx.

Permit requires characterization of deicers used and documentation of application data. (Part III.P.1.b)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
7/7/2010	Nevada DOT	40 CFR 122.34(b)(6)(i), 40 CFR 122.34(b)(6)(ii) (guidance), and 40 CFR 122.26(d)(2)(iv)(A)	https://ndep.nv.gov/uploads/documents/ndotms4perm.pdf

Excerpt from permit:

Where abrasives and/or de-icing agents are used on highways, the following shall be recorded:

1. Location of the source of abrasives materials;
2. Types and chemistry of de-icing agents;
3. Deicing salt shall be analyzed for: total phosphorus, total nitrogen, iron, and percent sodium chloride (NaCl);
4. Alternative deicers shall be analyzed for total nitrogen and total phosphorus;
5. Type and chemistry of abrasives with the gradation and percent organic matter. Gradation and percent organic matter shall be determined from composite samples. The composite samples shall be taken from one stockpile that represents all deliveries from the originating source. Composite samples shall be taken from every new delivery from a new originating source;
6. Abrasives shall be analyzed for volatile solids, iron, total nitrogen, total phosphorus, and total reactive phosphorus;
7. Volume of abrasives and deicing agents used on individual highway segments shall be documented in the Annual Report.

Permit specifically does not authorize direct discharge of snow disposal into receiving waters or the MS4. (Part I.D.3)			
Effective Date	**Permittees**	**Citation**	**Link to Permit**
2/1/2013	Ada County Highway District & Idaho Transportation Department (District #3)	40 CFR 122.34(b)(6)(i), (ii) and 40 CFR 122.26(d)(2)(iv)(A)	http://apps.itd.idaho.gov/apps/env/d-3_ms4/D3-PI-Boise_MS4_Permit_2-1-13.pdf

Excerpt from permit:

Snow Disposal to Receiving Waters. Permittees are not authorized to push or dispose of snow plowed within the Permit area directly into waters of the United States, or directly into the MS4(s)….

Permit Considerations

Transportation MS4 permittees use a variety of chemicals to remove and prevent ice and snow from forming on areas like roads and parking lots and to maintain the right-of-way. Chloride-based salts are the most commonly used material for snow and ice control, followed by acetates. In 2015, nearly 32 million tons of salt were used for highway deicing in the United States (46 percent of 69.5 million tons consumed).[8] Studies have shown an upward trend in freshwater chlorides, which is thought to be the result of deicing salt applied to roadways, parking lots, driveways, and sidewalks.[9] For example, in a recent USGS study, "researchers also examined trends in salinity at four sites in the New Jersey portion of the Delaware River drainage. Upward trends were observed at all four sites, with chloride concentrations nearly doubling over the last 30 years. Other studies in the northeastern U.S. have yielded similar results."[10]

5.2 Street Sweeping

Permit specifies high-priority sweeping frequencies. (Part I.F.7)			
Effective Date 3/1/2009	**Permittees** New Jersey Highway Agencies	**Citation** 40 CFR 122.26(d)(2)(iv)(A); 40 CFR 122.34(b)(6)(i), (ii)	**Link to Permit** http://www.nj.gov/dep/dwq/pdf/existing_highway_permit_final_2_27_09.pdf

Excerpt from permit:

a. Street sweeping

i. Minimum Standard – (For County Agencies Only) County Highway Agencies shall sweep, at a minimum of once per month (weather and street conditions permitting) all streets (including roads or highways) that meet all of the following criteria:

- the street is owned or operated by the County Agency;
- the street is curbed and has storm drains;
- the street has a posted speed limit of 35 mph or less;
- the street is not an entrance or exit ramp; and
- the street is in a predominantly commercial area.

[8] USGS, *Mineral Commodity Summaries 2016*, http://minerals.usgs.gov/minerals/pubs/mcs/2016/mcs2016.pdf.
[9] USGS, Granato, G.E., DeSimone, L.A., Barbaro, J.R., and Jenznach, L.C., *Methods for evaluating potential sources of chloride in surface waters and groundwaters of the conterminous United States*, September 2015, https://pubs.er.usgs.gov/publication/ofr20151080.
[10] USGS, *Trends in the Quality of Water in New Jersey Streams, Water Years 1971–2011*, Scientific Investigations Report 2016-5176, 2017 https://pubs.er.usgs.gov/publication/sir20165176.

- All remaining streets (including roads or highways) that they own or operate shall be swept at a minimum of once every 2 years.

…

ii. … Highway Agencies shall certify annually that they have met the Street Sweeping minimum standard. Highway Agencies must maintain records including the date and areas swept, number of miles of streets swept and the total amount of materials collected. Information shall be reported to the Department in the annual report and certification.

iii. Implementation - On March 1, 2009 and thereafter, Highway Agencies shall have fully implemented a street sweeping program that meets the minimum standard above.

Permit specifies sweeping frequency and equipment based on road classifications. (Part II.B.4.d)			
Effective Date 2/1/2010	**Permittee** Alaska DOT and Public Facilities	**Citation** 40 CFR 122.26(d)(2)(iv)(A); 40 CFR 122.34(b)(6)(i), (ii)	**Link to Permit** http://anchoragestormwater.com/Documents/KWood/files/aks052558_fp.pdf

Excerpt from permit:

The permittees must update their respective street sweeping management plans within nine months of the effective date of this permit. Each permittee's updated plan must designate streets, roads, and public parking lots within their jurisdiction that fit within each of the following categories for street sweeping frequency based on land use, traffic volumes or other factors.

- Residential – Streets and road segments that include, but are not limited to, light traffic zones and residential zones.
- Arterial and all other – Streets and road segments with high traffic volumes serving commercial or industrial districts.
- Parking lots – large lots serving schools and cultural facilities, plazas, sports and event venues or similar facilities.

While this example is not exclusively for a DOT MS4 permittee, the permit considers the road classifications for the frequency of street sweeping for all permittees.

i. Within one year, the permittees must identify and map all designated streets, roads, and public parking lots for sweeping frequency.

ii. Within one year and one month of the effective date of this permit, the permittees must sweep streets, roads, and public parking lots in their jurisdictions according to the following schedule:

Table II.B-2

Period in the Year	Residential	Arterial and all other	Public Parking Lots [3]
April 15 – June 1	1 tandem [1]	2 tandem	1 vacuum [2]
June 15 – August 1	1 tandem	1 tandem	--
Aug 15 – Oct 15	--	--	1 vacuum
Sept 1 – Oct 15	1 tandem	1 tandem	--

Notes:

[1] "Tandem" means one mechanical sweeper preceding one vacuum sweeper during the same sweeping event (on the same day). This is equivalent to two sweepers sweeping the same surface; a mechanical sweeper uses a conveyor belt to carry the collected debris to a hopper.

[2] A vacuum sweeper sucks up loosened street particles with a vacuum and sends the[m] directly to a hopper

[3] Threshold size for public parking lots to be swept will be determined as permittees update their street sweeping plan(s).

…

For areas where street sweeping is technically infeasible, the permittees must document in the 1st Year Annual Report why sweeping is infeasible, and document how the permittee will increase implementation of other trash/litter control procedures to minimize pollutant discharges to the MS4 and receiving waters.

Permit requires sweeping of sanded streets no later than four days after last snowfall. (Part III.O.1)			
Effective Date 7/7/2010	**Permittee** Nevada DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(A); 40 CFR 122.34(b)(6)(i), (ii)	**Link to Permit** https://ndep.nv.gov/uploads/documents/ndotms4perm.pdf

Excerpt from permit:

c. Leaf litter and debris on all streets in urbanized areas shall be swept a minimum of two times per year, once in the spring and once in the fall;

d. Sweeping of sanded streets in urbanized areas shall be performed as soon as weather, logistics and site conditions permit after snow storms, but no later than four (4) days after the last snowfall;

e. Sweeper wastes shall be disposed of properly. Recycling of sweeper wastes shall be considered. The amount of sweeper waste accumulated, recycled and/or disposed of shall be documented and included in the Annual Report.

6 Storm Sewer Infrastructure

6.1 Storm Sewer Cleaning

Permit specifies catch basin inspection and cleaning frequencies. (Part I.F.7.d)			
Effective Date 3/1/2009	**Permittees** New Jersey Highway Agencies	**Citation** 40 CFR 122.34(b)(6)(i), 40 CFR 122.34(b)(6)(ii) (guidance), and 40 CFR 122.26(d)(2)(iv)(A)	**Link to Permit** http://www.nj.gov/dep/dwq/pdf/existing_highway_permit_final_2_27_09.pdf

Excerpt from permit:

Minimum Standard – Highway Agencies shall inspect all catch basins operated by the Highway Agency for accumulated sediment, trash, and debris; and clean those basins to remove sediment, trash, or debris (if any observed during inspection). Highway Agencies with:

- Less than 10,000 catch basins shall annually inspect and (to the extent noted above) clean at least 2,000 catch basins, or as many catch basins as they own and operate.
- 10,000 or more catch basins shall inspect and (to the extent noted above) clean all catch basins that they own and operate by February 28, 2014 ().

Permit Considerations

DOTs often have hundreds or even thousands of catch basins, outfalls, inlets, and BMPs to track, operate, and maintain. Maintaining everything, everywhere, on identical schedules may prove challenging. Therefore, many DOTs find it helpful to develop maintenance requirements that systematically prioritize schedules and inspections based on water quality and other criteria.

6.2 Stormwater Management Controls Tracking, Operation, and Maintenance

Permit requires a tracking database and photographs of all public and private BMPs that discharge stormwater into the permittee's MS4. (Part D.1.e.(3))			
Effective Date 10/28/2013	**Permittee** Hawaii DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(A)(2) and 40 CFR 122.34(b)(6)(ii) (guidance)	http://www.stormwaterhawaii.com/swmp_wp/wp-content/uploads/2014/10/A.1_DOT-HWYS-NPDES-Permit-No.-HI-S000001.pdf

Excerpt from permit:

Part D.1.e.(3) *BMP, Operation and Maintenance, and Inspection Database* – The Permittee shall implement its Asset Management System to track the frequency of inspections and maintenance of the Permanent BMPs.

In addition to the standard information collected for all projects (e.g., project name, owner, location, start/end date, etc.), the database shall also include, at a minimum:

- Type and number of LID practices
- Type and number of Source Control BMPs
- Type and number of Treatment Control BMPs
- Latitude/Longitude coordinates of controls using Global Positioning Systems (GPS) and NAD83 or other Datum as long as the datum remains consistent
- Photographs of controls
- Operation and maintenance requirements
- Frequency of inspections
- Frequency of maintenance

All stormwater treatment and LID BMPs shall be inspected at least once a year for proper operation; maintenance shall be performed as necessary to ensure proper operation.

6.3 Storm Sewer System Mapping

Permit requires mapping of green technology BMPs. (Part II.A.8)			
Effective Date 5/7/2013	**Permittee** Delaware DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(A)(2) and 40 CFR 122.34(b)(5)(ii) (guidance); 40 CFR 122.34(b)(3)(A) and 40 CFR 122.26(d)(1)(iii)	**Link to Permit** http://www.dnrec.delaware.gov/wr/information/swdinfo/pages/ms4.aspx

Excerpt from permit:

At least once a year, the permittees shall revisit and update, as necessary, BMP GIS data layers and storm sewer data. The data layers shall show the location of all outfalls and drainage outlets and the names and location of all waters that receive discharges from those outfalls. Structural BMPs are to be included, along with other green technology BMPs, but smaller, residential-type dispersed BMPs such as rain barrels and rain gardens need not be included. Mapping may include all existing and readily available information including project plans, records, drainage maps and field surveys, and must be

based on Global Positioning System (GPS) data that sufficiently identifies structures in terms of data accuracy.

Permit requires mapping of specific infrastructure and facility features on a single map. (Part II.B.3.d)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
10/15/2009	Idaho Transportation Department District No. 3	40 CFR 122.26(d)(1)(iii)(B) and 40 CFR 122.34(b)(3)(i)(A)	http://apps.itd.idaho.gov/apps/env/d-3_ms4/D3_MS4_Permit_10-15-09.pdf

Excerpt from permit:

Within three years from the effective date of this permit, the permittee must complete a comprehensive MS4 map. At a minimum, the map(s) must show jurisdictional boundaries; the location of all District-owned or operated storm sewers, culverts, ditches, and other conveyances; the location of all inlets and outfalls; points at which the permittee's MS4 is interconnected with other MS4s; names and locations of all waters that receive discharges from those outfalls; and locations of all permittee-owned or operated facilities, including all maintenance/storage facilities, permittee-owned or private snow disposal sites and the permittee's maintenance yard. Locations of all outfalls must also be provided in latitude and longitude, and the diameter of all outfalls must be provided with the map. The maps shall be available in electronic or digital format as appropriate. A copy of the completed map(s) as both a report and as an electronic file via Arc GIS format, must be submitted to EPA and IDEQ as part of the corresponding Annual Report.

Spotlight: Stormwater Asset Inventory

As part of its NPDES permit compliance (Part II.B), the North Carolina DOT had to evaluate new BMP inspection and maintenance needs and create an inventory of stormwater controls. The DOT now uses a stormwater control management system (SCMS) to inventory and track various BMP types and locations. The SCMS includes inspection reports that provide a level of service and ranking. The stormwater control inventory includes bioretention, infiltration basins, dry detention basins, level spreaders, wet detention basins, pet waste stations, filtration basins, stormwater wetlands, hazardous spill basins, swales, and other types of BMPs.[11]

[11] Center for Environmental Excellence by AASHTO, *Stormwater Management White Paper Connecting the DOTs through Collaboration in Stormwater Management: Proceedings from the 2014 National Stormwater Practitioners Meeting,* Washington, D.C., p. 19, October 2014, http://environment.transportation.org/pdf/2014_national_stormwater_practitioners_meeting/AASHTO_SW_White_Paper_31Oct2014.pdf.

6.4 Outfall Prioritization and Screening

Permit requires permittee to determine areas with high potential for illicit discharges and prioritize them for screening. (Part II.A.b)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
5/7/2013	Delaware DOT	40 CFR 122.26(d)(2)(ii); 40 CFR 122.26(d)(2)(iv)(B)(3); 40 CFR 122.34(b)(3)(i)(C); 40 CFR 122.34(b)(6)(i) and (ii) (guidance)	http://www.dnrec.delaware.gov/wr/information/swdinfo/pages/ms4.aspx

Excerpt from permit:

(2) As part of the SWPP&MP, permittees shall develop a screening program for illicit discharges. Each permittee's program shall include a schedule and methodology to evaluate at least 20% of their storm sewer system per year, using existing mapping and water quality data, to determine areas with high potential for illicit discharges and improper disposal. Dry weather screening and field inspection activities shall be conducted in these areas. The evaluation will consider, among other things, the following criteria:

- Past dry weather flow
- Past discharge complaints and reports
- Age of development
- Density of aging septic systems
- Aging or failing sewer infrastructure
- Density and age of industrial activities

6.5 Illicit Discharge Detection and Elimination (IDDE) Source Identification and Elimination

Permit specifies investigation methodology for all catchments determined to be vulnerable to illicit connections or discharges. (Part 2.3.4.8)			
Effective Date	**Permittees**	**Citation**	**Link to Permit**
7/1/2017	Massachusetts State Transportation Agencies (except for the MassDOT Highway Division)	40 CFR 122.26(d)(2)(iv)(B)(3); 40 CFR 122.34(b)(3)(i)(C)	https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp.pdf

Excerpt from permit:

2.3.4.8. Catchment Investigations

The permittee shall develop a systematic procedure to investigate each catchment associated with an outfall or interconnection within their MS4 system.

a. Timelines:

- A written catchment investigation procedure shall be developed within 18 months of the permit effective date in accordance with the requirements of part 2.3.4.8.b below.
- Investigations of catchments associated with Problem Outfalls shall begin no later than two (2) years from the permit effective date.
- Investigations of catchments associated with High and Low Priority Outfalls shall follow the ranking of outfalls updated in part 2.3.4.7.c.
- Investigations of catchments associated with Problem Outfalls shall be completed with seven (7) years of the permit effective date
- Investigations of catchments where any information gathered on the outfall/interconnection identifies sewer input shall be completed within seven (7) years of the permit effective date.
- Investigations of catchments associated with all Problem, High- and Low-Priority Outfalls shall be completed within ten (10) years of the permit effective date.

*For the purposes of these milestones, an individual catchment investigation will be considered complete if all relevant procedures in part 2.3.4.8.c. and 2.3.4.8.d. below have been completed.

b. A written catchment investigation procedure shall be developed that:

i**. Identifies maps, historic plans and records, and other sources of data**, including but not limited to plans related to the construction of the storm drain and of sanitary sewers, prior work performed on the storm drains or sanitary sewers, board of health or other municipal data on septic system failures or required upgrades, and complaint records related to SSOs, sanitary sewer surcharges, and septic system breakouts. These data sources will be used in identifying system vulnerability factors within each catchment.

ii. **Includes a manhole inspection methodology** that shall describe a storm drain network investigation that involves systematically and progressively observing, sampling (as required below) and evaluating key junction manholes (see definition in Appendix A) in the MS4 to determine the approximate location of suspected illicit discharges or SSOs. The manhole inspection methodology may either start from the outfall and work up the system or start from the upper parts of the catchment and work down the system or be a combination of both practices.

Either method must, at a minimum, include an investigation of each key junction manhole within the MS4, even where no evidence of an illicit discharge is observed at the outfall. The manhole inspection methodology must describe the method the permittee will use. The manhole inspection methodology shall include procedures for dry and wet weather investigations.

iii. **Establishes procedures to isolate and confirm sources of illicit discharges** where manhole investigations or other physical evidence or screening has identified that MS4 alignments are influenced

by illicit discharges or SSOs. These shall include isolation of the drainage area for implementation of more detailed investigations, inspection of additional manholes along the alignment to refine the location of potential contaminant sources, and methods such as sandbagging key junction manhole inlets, targeted internal plumbing inspections, dye testing, video inspections, or smoke testing to isolate and confirm the sources.

6.6 Spill Tracking and Reporting

Permit requires maintenance of a database to contain all spill incidents. (Part II.B.7.b.6)			
Effective Date 11/1/2006	**Permittee** South Carolina DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(B)(4); 40 CFR 122.34(b)(3)(i)(C)	**Link to Permit** http://www.scdot.org/business/pdf/stormwater/MS4_permit_signed_copy.pdf

Excerpt from permit:

(6) SC DOT shall develop and maintain a database to contain all illicit SC DOT spill incidences information. This database will act as the maintenance log for SCDOT maintenance facilities. This database will include information that is found onsite during the investigation of a leak, spill or illegal dumping incident such as:

- Toxicity and quantity of any chemicals produced, stored or discharged from the site;
- The history of any NPDES permit violations from a site;
- History of significant leaks or spill of toxic or hazardous pollutants;
- The designated uses of the receiving waters at a site; and
- Inspection and maintenance activities such as containment berm integrity testing, or cleaning of oil/water separators

6.7 IDDE Staff Training

Permit specifies IDDE training topics. (Part III.F.5)			
Effective Date 7/7/2010	**Permittee** Nevada DOT	**Citation** 40 CFR 122.26(d)(iv)(B); 40 CFR 122.34(b)(3)(i)(D)	**Link to Permit** https://ndep.nv.gov/uploads/documents/ndotms4perm.pdf

Excerpt from permit:

III.F.2. NDOT shall implement an Employee Stormwater Training Program and shall outline the program in the SWMP. The program shall provide for NDOT's employees identified in this permit to receive initial training within twelve (12) months of the effective date of this permit and refresher training at least

once every three (3) years thereafter. NDOT shall also provide training to new staff within the first year of hire, and to existing staff when job responsibilities change to newly incorporate stormwater duties.

…

III.F.5. NDOT shall provide specific stormwater training to educate personnel who are directly involved in activities that may impact stormwater quality or that may generate or manage non-stormwater discharges. For each topic, the number of trainings offered, the number of employees trained, and other appropriate measurable goals shall be presented in the Annual Report. The employee training program shall address:

III.F.5.a NDOT shall train all staff whose responsibilities may include responding to illicit discharges or illicit connections to the storm sewer system. Training shall include:

- III.F.a.i The procedures for detection, investigation, (i.e. field screening procedures, sampling methods, field measurements) identification, clean-up, and reporting of illicit discharges and connections, and improper disposal/dumping;
- III.F.5.a.ii and the procedures for outfall screening and investigation.

7.1 Vegetation Management

Permit establishes minimum standard for herbicide application. (Part I.F.7.f)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
3/1/2009	New Jersey Highway Agencies	40 CFR 122.26(d)(2)(iv)(A); 40 CFR 122.34(b)(6)	http://www.nj.gov/dep/dwq/pdf/existing_highway_permit_final_2_27_09.pdf

Excerpt from permit:

Minimum Standard - Highway agencies shall implement a Roadside Vegetation Management Program that limits the application of herbicides and restricts the methods by which mulch is applied. Highway Agencies shall only apply herbicides in a 2-foot radius around structures where it is not practical to mow (such as around guardrails, signposts, telephone poles, etc.). If mulch is applied, it shall be stabilized in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey **N.J.A.C. 2:90-1** (or **N.J.A.C. 16:25A** where NJDOT is the Highway Agency) to prevent it from being washed away with stormwater into the waters of the State.

Permit requires collection and disposal of unused vegetation management chemicals. (Part II.A.5.c)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
5/7/2013	Delaware DOT	40 CFR 122.26(d)(2)(iv)(A); 40 CFR 122.34(b)(6)	http://www.dnrec.delaware.gov/wr/information/swdinfo/pages/ms4.aspx

Excerpt from permit:

[Note: There are deadlines specified in the permit, including review and approval by permitting authority.]

A program to reduce the contribution of pollutants associated with the application, storage and disposal of pesticides, herbicides, and fertilizers from permittees' areas and activities to the MS4. The program shall include, but not be limited to:

1) Educational programs for permittees' employees who work directly with pesticides, herbicides, and fertilizers;
2) A Nutrient Management Plan for all urbanized areas receiving nutrient applications according to requirements set forth by the Delaware Nutrient Management Law (Delaware Code Title 3, Chapter 22 §2201-§2290), with an exemption of construction sites where nutrients are applied to achieve either temporary or permanent stabilization;
3) Application by certified applicators and annual summary report of applications;

4) Integrated pest management measures that incorporate non-chemical solutions;
5) The use of native vegetation; and
6) The collection and proper disposal of unused pesticides, herbicides, and fertilizers

Permit requires that DOT contractors using herbicides be trained and certified. (Part 2.1.7)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
10/1/2006	Tennessee DOT	40 CFR 122.26(d)(2)(iv)(A); 40 CFR 122.34(b)(6)	https://www.tn.gov/content/dam/tn/tdot/documents/NPDESStatewideMS4Permit.pdf

Excerpt from permit:

… Where contractors are using herbicides for vegetation control on TDOT right of ways (ROWs), their employees shall also be trained and certified in the use of herbicides.

Permit Considerations

Some permits include requirements to consult with vegetation management experts, such as state university extension programs. For example, the North Carolina DOT's permit calls for consultation with North Carolina Department of Agriculture and Consumer Services and North Carolina State University in selecting appropriate pest control methods and implementation practices (Part II.B.6.1.b).

7.2 Trash/Litter

Permit requires permittee to estimate the amount of trash and debris collected during agency roadside cleanups. (Part I.F.5.b)			
Effective Date	**State**	**Citation**	**Link to Permit**
3/1/2009	New Jersey Highway Agencies	40 CFR 122.26(d)(2)(iv)(A); 40 CFR 122.34(b)(6)	http://www.nj.gov/dep/dwq/pdf/existing_highway_permit_final_2_27_09.pdf

Excerpt from permit:

…. Highway Agencies shall maintain records of roadside clean ups and estimates of the total amount of trash and debris collected.

Permit requires grate design to minimize entry of trash into storm drain system. (Part 2.1.5.D)			
Effective Date 10/1/2006	**State** Tennessee DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(A); 40 CFR 122.34(b)(3) and (6)	**Link to Permit** https://www.tn.gov/content/dam/tn/tdot/documents/NPDESStatewideMS4Permit.pdf.

Excerpt from permit:

Management Measure	Measurable Goal	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
D. TDOT shall review design standards for storm drain inlets to promote the use of grate spacing that minimize the entry of trash, floatable and other debris into the storm drain system. Trash, floatable and other debris on the highways shall be handled by means other than flushing into storm drains. Where reduction in grate spacing would cause inadequate hydraulic performance, TDOT will pursue other management practices to minimize trash, floatable and large debris in storm runoff.	Documentation of the review shall be provided in the Annual report, with recommendations on developing a new standard if warranted.			X		X

Permit includes training requirements for various entities involved in maintenance, including volunteers. (Section E)			
Effective Date 10/1/2015	**State** North Carolina DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(A)(6), (B)(5) and (6), and (D)(4); 40 CFR 122.34(b)(1), and (2)	**Link to Permit** https://connect.ncdot.gov/resources/hydro/HSPPermits/2015_NPDES_Stormwater_Permit.pdf

Excerpt from permit:

Management Measure	Measurable Goal
(a) Provide pollution prevention awareness	NCDOT shall provide annual stormwater pollution awareness training for appropriate NCDOT personnel and contractors involved in construction and maintenance activities. NCDOT may require contractors to have

Management Measure	Measurable Goal
training for construction workers.	equivalent training in lieu of NCDOT-provided training. Training shall include general stormwater awareness, **NPDES stormwater permit NCG010000** implementation, identification of stormwater pollution potential, appropriate spill response actions and contacts for reporting spills and illicit discharges/illegal dumping.
(b) Provide pollution prevention awareness training for maintenance workers.	NCDOT shall maintain a program of annual stormwater pollution awareness training for appropriate NCDOT maintenance staff. NCDOT shall also maintain an ongoing awareness program for **Adopt-A-Highway** volunteers and prison inmate laborers. NCDOT may require contractors to have equivalent training in lieu of NCDOT-provided training. Training shall include general stormwater awareness, identification of stormwater pollution potential, and appropriate contacts for reporting spills and illicit discharges/illegal dumping

See Section 3.6 for a permit example that also addresses trash/litter.

7.3 Encroachment Permitting

Permit specifies requirements for encroachment permittee regulation and enforcement. (Part II.B.7.a)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
11/1/2006	South Carolina DOT	40 CFR 122.26(d)(2)(i), (d)(2)(iv)(B) and (C); 40 CFR 122.34(b)(3)(i)(B)	http://www.scdot.org/business/pdf/stormwater/MS4_permit_signed_copy.pdf

Excerpt from permit:

One year from the effective date of this permit, the permittee shall have enacted and begin to enforce an encroachment permit process which prohibits illicit connections and illegal dumping into the MS4. It includes but is not limited to provide[ing] documentation which establishes the following legal authority:

(a) Control through policy, permit contract, order or similar means, the contribution of pollutants to the municipal storm sewer by storm water discharges associated with industrial activity and the quality of storm water discharged from sites of industrial activity;

(b) Reporting of illicit discharges to the municipal separate storm sewer;

(c) Control through policy, order or similar means the discharge to a municipal separate storm sewer of spills, dumping or disposal of materials other than storm water;

(e) Require compliance with conditions in policies, permits, contracts or orders; and

(f) Carry out all inspection, surveillance and monitoring procedures necessary to determine compliance and noncompliance with permit conditions including the prohibition on illicit discharges to the municipal separate storm sewer.

Permit Considerations

DOTs often require encroachment permits to allow certain construction, installation, and repair-related activities within, under, or over a state right-of-way. When available, DOTs may use encroachment permits to ensure that third parties act consistently with MS4 permit requirements, as the examples in this section illustrate.

Permit requires the permittee to educate industrial facility owners/operators about impacts to the storm sewer system and report any facilities that are contributing or have the potential to contribute stormwater runoff pollutants to the permitting authority. (Part I.E.4)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
8/28/2015	Colorado DOT	40 CFR 122.26(d)(2)(iv)(A) – (C); 40 CFR 122.34 (b)(1) and (b)(3)(i)(B)	https://www.codot.gov/programs/environmental/water-quality/documents/ms4-program/cdot-ms4-permit

Excerpt from permit:

4. Industrial Facilities Program

The permittee shall implement a program to promote the proper management of stormwater quality from industrial sites.

a. The following requirements apply:

i. Education and Outreach: The program shall provide education and outreach to owners or operators of industrial facilities. The permittee shall provide education and outreach to owners or operators of industrial facilities that the permittee determines are contributing or have the potential to contribute a substantial pollutant loading to the storm sewer system. The education and outreach activities shall promote the proper management of potential pollutants in stormwater discharges from industrial facilities.

ii. Industrial Facilities: The permittee shall provide written notification, within 15 days of the identification or discovery of the industrial facility, to the Division that includes the following:

(A) Facility identification of industrial facilities that are identified by the permittee as contributing or have the potential to contribute a substantial pollutant loading to the storm sewer system.

(B) Information on the discharge, including the water quality concerns.

Permit requires the permittee to inspect encroachment permit construction projects. (Part D.1.d.(4))			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
10/28/2013	Hawaii DOT	40 CFR 122.26(d)(2)(iv)(D); 40 CFR 122.34(b)(3)(i)(B)	http://www.stormwaterhawaii.com/swmp_wp/wp-content/uploads/2014/10/A.1_DOT-HWYS-NPDES-Permit-No.-HI-S000001.pdf

Excerpt from permit:

(iii) All construction projects with a Permit to Perform Work Upon State Highways, connection permit, encroachment permit, or discharge of surface runoff permit/approval shall be inspected at least once annually or once during the life of the project, whichever comes first, by a qualified construction

inspector who is independent (i.e., not involved in the day-to-day planning, design, or implementation) of the construction projects to be inspected. The Permittee may use more than one (1) qualified construction inspector for these inspections. If the project has a site-specific BMP Plan or other equivalent document(s), the inspection shall also verify that the BMPs were properly installed and at the locations specified in the Plan. The reporting procedures shall include, at a minimum, notification of any critical deficiencies to the DOH.

(iv) Develop and implement a standard inspection form(s) and reporting and corrective procedures for inspections, including use of an inspection checklist, or equivalent, and the Permittee shall track inspection results in a database or equivalent system. The inspection checklist shall, include at a minimum, but not be limited to identifying any deficiencies and the date of the corrective actions. Photos shall accompany the inspection checklist to document the deficiencies. The inspection form(s), inspection checklist, reporting and corrective procedures shall be submitted to DOH for review and acceptance within 90 calendar days of the effective date of this permit.

Permit requires the permittee to control third-party activities within the right-of-way. (Part E.2.i)			
Effective Date 7/1/2013	**Permittee** California DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(B); 40 CFR 122.34(b)(3)(i)(B)	**Link to Permit** http://www.swrcb.ca.gov/board_decisions/adopted_orders/water_quality/2012/wqo2012_0011_dwq.pdf

Excerpt from permit:

i. Non-Departmental Activities

The Department shall summarize its control over all non-departmental (third party) activities performed on Department ROW in the SWMP. The summary shall describe how the Department shall ensure compliance with this Order in all non-departmental activities.

The Department shall not grant or renew encroachment permits or easements benefitting any third party required to obtain coverage under the Statewide Construction and/or Industrial Storm Water General Permits unless the party has obtained coverage. In all leases, rental agreements, and all other contracts with third parties conducting activities within the ROW, the Department shall require the third party to comply with applicable requirements of the Construction General Permit, the Industrial General Permit, and this Order.

8.1 Project Development and Planning

FHWA's CTIP

The FHWA oversees the Coordinated Technology Implementation Program (CTIP). The CTIP has produced various publications, including *An Integrated Approach to Sustainable Roadside Design and Restoration* (2013). This document presents approaches to integrating sustainable solutions into roadside designs to address issues such as stormwater early in the project development phase.

Excerpt taken from: *An Integrated Approach to Sustainable Roadside Design and Restoration* (2013), pp. 42, 43, and 44

Authors: Amit Armstrong, Ph.D., P.E., Lindsey Sousa, AICP, LEED AP, Colin Haggerty, P.E., CFM, Conrad Fischer

Available at: http://www.ctiponline.org/publications/view_publication.aspx?id=108

Excerpt taken from Chapter 3.3, "Hydraulic Design"

The term "hydraulic" refers to the field of science and engineering dealing with liquids. For purposes of this guidebook, hydraulic design covers concepts such as conveyance systems, channel behavior, and erosion control.[1]

This section introduces a key issue that engineers face in working toward environmentally sustainable solutions: smaller, more frequent storms are commonly ignored when designing flood control facilities. And yet, these storms are most often responsible for shaping the long-term health of these facilities and the larger roadside. A number of trade-offs are introduced in this section, followed by a set of strategies to help mitigate smaller, more frequent storm events. Example strategies include microcatchments, micro-terraces, slope transitions, bioretention, and multi-cell box culvert design.

"Smaller, more frequent storms are commonly ignored when designing flood control facilities. And yet, these storms are most often responsible for shaping the long-term health of these facilities and the larger roadside."

…

Hydraulics must work together with each of the other disciplines to develop strategies for conveying runoff (rainfall that exceeds infiltration) safely and efficiently. Coordination with revegetation and geotechnical disciplines, among others, is critical.

VEGETATION: In order to create a stable conveyance area, the correct landscape material must be determined. Vegetation can protect slopes by reducing erosion and strengthening soil stability. Utilizing the correct land cover is critical to creating a sustainable roadside. The hydraulics group must determine flow rates and velocities and confer with landscape professionals about materials that can be established in the region and will be stable in the long term. In lieu of or in combination with vegetation, rock material can also be utilized to stabilize drainage ways. A soil-riprap mixture optimizes riprap protection by providing a growing medium that contributes to stability.

[1] Hydraulic design for roadways constructed by FHWA is dictated by the PDDM. Section 7.1.8 defines the Design and Check Flood for proposed drainage systems.

Landscape professionals may also be consulted where issues of water quality must be addressed. Bioretention areas provide environmental benefits such as creating ideal growth mediums for filtration processes. Impacts to adjacent vegetation and natural systems need to be considered to ensure that roadway run-off does not overload the landscape with grease, oils, metals, or chlorides. Sediment and increased run-off impacts should also be reviewed.

Planning is critical in mitigating environmental impacts to vegetation and designing a sustainable roadside. Identifying the protected or sensitive areas will help establish the drainage patterns in the project. General concern with roadway impacts, such as grease or oil, metals, and chlorides, can be addressed with proper planning. In addition, run-off from impervious surfaces can generate erosion that increases sediment conveyance. Slowing run-off and spreading flow will help replicate predevelopment patterns.

GEOTECH: Coordination with the geotechnical discipline is needed when addressing slopes and roadside structures. In general, flatter slopes are preferred but need to be balanced with potential impacts to the surrounding environment. Stable slopes that resist erosion and enhance vegetation growth are crucial to a sustainable environment. Detailed analysis and coordination is especially important when a wall is necessary, and optimal layout must be determined. Hydrostatic forces create complex systems. Weepholes are often required for drainage from backfill on the uphill side. Diversion of stormwater run-off using concrete curbs and gutters allows water to be safely diverted around the walls. In some instances, culverts are needed through the wall section to collect runoff. Overall, coordination between disciplines to ensure the proper wall design and stability is vital to enhancing the roadway.

The construction process needs to ensure that hydraulic features are feasible and sustainable. Design of controls to convey run-off during construction can provide a basis for permanent facilities that provide water quality. Utilizing features such as terracing of slopes can increase the length of travel that run-off follows, increasing the ability of run-off to infiltrate. BMPs such as rock check dams also slow velocities, which reduce erosion potential and increase infiltration. Many of the features installed during construction can remain as permanent features, as long as the materials will hold up over time."

Permit Considerations

According to the FHWA , there are four main types of highway improvement projects: new construction, reconstruction, resurfacing/restoration/rehabilitation, and maintenance. These projects can potentially release various pollutants when it rains or snow melts. DOTs often use advanced planning to determine ways to reduce discharges of these pollutants in stormwater and snowmelt during both active construction and post-construction, and they will also implement structural and nonstructural practices to manage stormwater.

8.2 Active Construction Stormwater Controls

Examples of Typical Active Construction Activities

Lane widening

New roads – creation of road where none currently exists

Road realignment

Permit requires the DOT to notify the permitting authority if it will be using lead-contaminated soil that qualifies as hazardous waste under the state definition. (Finding 17)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
7/1/2013	California DOT	40 CFR 122.26(d)(2)(iv)(B) and (C); 40 CFR 122.34(b)(4)(i)(C)	http://www.swrcb.ca.gov/board_decisions/adopted_orders/water_quality/2012/wqo2012_0011_dwq.pdf

Excerpt from permit:

Department Construction Projects Involving Lead Contaminated Soils

17. Department construction projects may involve soils that contain lead in quantities that meet the State definition of hazardous waste but not the federal definition. The Department of Toxic Substances Control (DTSC) has issued a variance (V09HQSCD006) effective July 1, 2009, allowing the Department to place soil containing specific concentrations of aerially deposited lead under pavement or clean soil. In addition to complying with the terms of the variance, the Department also needs to notify the appropriate Regional Water Boards to determine the appropriate regulation of these soils.

8.3 Post-Construction Stormwater Controls

Permit requires the development of a BMP toolbox for the post-construction stormwater program. (Part II.B.3.a)			
Effective Date 10/1/2015	**Permittee** North Carolina DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(A)(2) and 40 CFR 122.34(b)(5)(i)(A)	**Link to Permit** https://connect.ncdot.gov/resources/hydro/HSPPermits/2015_NPDES_Stormwater_Permit.pdf

Excerpt from permit:

3. BMP Toolbox for Post-Construction Stormwater Program

a. Objectives

i. Maintain and update as necessary a BMP Toolbox to aid in the siting, design, and construction of stormwater quality BMPs with guidance on the suitability of each for NCDOT applications.

ii. Evaluate BMPs for applicability to a linear highway system.

b. Management Measures

The NCDOT shall implement the following management measures to meet the objectives of the BMP Toolbox for Post-Construction Stormwater Program and shall notify the DWQ prior to modification of any goals.

Management Measures	Measurable Goals
(a) Maintain a BMP Toolbox.	Maintain a stormwater BMP Toolbox to provide internal guidance on design of post-construction stormwater control measures. The BMP Toolbox will include appropriate uses/anticipated applications, design criteria. Proprietary BMPs will be evaluated in keeping with the DEMLR requirements for permitting new technologies.
….	
(c) Submit proposed BMP Toolbox revisions to DEMLR for approval.	New guidance on proposed BMPs will be submitted for DEMLR approval prior to implementation.

Permit includes specific thresholds based on imperviousness and disturbed area, as well as performance standards for post-construction stormwater management controls. (Section 4.2.5.1(a))			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
1/3/2012	Georgia DOT	40 CFR 122.26(d)(2)(iv)(A)(2); 40 CFR 122.34(b)(5)(i)(A)	https://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/Final_DOT_SW_NPDES_Permit_MS4_Dec_2011.pdf

Excerpt from permit:

At a minimum, the post-construction program to address new development and redevelopment projects must include:

4.2.5.1(a) Develop and implement strategies which include a combination of structural and/or non-structural BMPs appropriate for the community, including the implementation of the applicable parts of the Georgia Stormwater Management Manual (Blue Book) and Coastal Stormwater Supplement or an equivalent stormwater management design manual. The permittee must provide documentation to demonstrate the implementation of the Blue Book or design manual beginning with the first annual report.

At a minimum, the permittee shall apply the standards for new development and redevelopment to any site that meets one or more of the following criteria:

- New site development that creates or adds 5,000 square feet or greater of new impervious surface area, or that involves linear roadway projects that disturb 1 acre or greater.
- Site redevelopment that creates or adds 5,000 square feet or greater of new impervious surface area, or that involves linear roadway projects that disturb 1 acre or more, including projects less than one acre if they are part of a larger common plan of development or sale.

For sites meeting the above criteria, the permittee shall ensure that the following minimum standards shall be considered during the site plan preparation process:

- Stormwater Runoff Quality/Reduction: All stormwater runoff shall be adequately treated prior to discharge. Stormwater runoff that must be treated does not apply to flows that originate outside of GDOT's right of way or diverted flows from undisturbed areas. The stormwater management system shall be designed to remove 80% of the average annual post-development total suspended solids (TSS) load or equivalent as defined in the Blue Book or in the equivalent manual. Compliance with this performance standard is presumed to be met if the stormwater management system is sized to capture and treat the water quality treatment volume, which is defined as the runoff volume resulting from the first 1.2 inches of rainfall from a site.
- Stream Channel/Aquatic Resource Protection: Stream channel and/or aquatic resource protection shall be provided by using the following approaches: 1) 24-hour extended detention storage of the 1-year, 24-hour return frequency storm event; 2) erosion prevention measures such as energy dissipation and velocity control; and 3) preservation of the applicable stream buffer.

- Overbank Flood Protection: Downstream overbank flood protection shall be provided by controlling the post-development peak discharge rate to the predevelopment rate for the 25-year, 24-hour storm event.

- Extreme Flood Protection: Extreme flood protection shall be provided by controlling the 100-year, 24-hour storm event such that flooding is not exacerbated.

Permit requires prioritization of landscape and soil-based BMPs. (Section E.2.d.2.b)			
Effective Date 7/1/2013	**Permittee** California DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(A)(2); 40 CFR 122.34(b)(5)(i)(A)	**Link to Permit** http://www.swrcb.ca.gov/board_decisions/adopted_orders/water_quality/2012/wqo2012_0011_dwq.pdf

Excerpt from permit:

…a. The Department shall always prioritize the use of landscape and soil-based BMPs to treat storm water runoff. Other BMPs may be used only after landscape and soil-based BMPs are determined to be infeasible. The Department shall also consider other effective storm water treatment control methods or devices for Department approval. (E.2.d.2.b)

Permit includes a hydromodification risk-based approach to assess the lateral and vertical stability of channels. (Section E.2.d.3)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
7/1/2013	California DOT	40 CFR 122.26(d)(2)(iv)(A)(2); 40 CFR 122.34(b)(5)(i)(A)	http://www.swrcb.ca.gov/board_decisions/adopted_orders/water_quality/2012/wqo2012_0011_dwq.pdf

Excerpt from permit:

The Department shall ensure that all new development and redevelopment projects do not cause a decrease in lateral (bank) and vertical (channel bed) stability in receiving stream channels. Unstable stream channels negatively impact water quality by yielding much greater quantities of sediment than stable channels. The Department shall employ the risk-based approach detailed in this permit to assess lateral and vertical stability. The approach assists the Department in assessing pre-project channel stability and implementing mitigation measures that are appropriate to protect structures and minimize stream channel bank and bed erosion. [The permit also depicts the approach in Figure 1 and describes it further.]

Permit identifies specific standards that apply to development and redevelopment and includes links for easy access to the standards (Part I.F.3)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
3/1/2009	New Jersey Highway Agencies	40 CFR 122.26(d)(2)(iv)(A)(2); 40 CFR 122.34(b)(5)(i)(A)	http://www.nj.gov/dep/dwq/pdf/existing_highway_permit_final_2_27_09.pdf

Excerpt from permit:

Minimum Standard - To prevent or minimize water quality impacts, the Highway Agency shall develop, implement, and enforce a program to address stormwater runoff from new development and redevelopment projects on property owned or operated by the Highway Agency that disturb one acre or more, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the Highway Agency's small MS4. The Highway Agency shall in its post-construction program:

- Comply with the applicable design and performance standards established under **N.J.A.C. 7:8** for major development, unless:
    - Those standards do not apply because of a variance or exemption granted under N.J.A.C. 7:8; or
    - Alternative standards are applicable under an areawide or Statewide Water Quality Management Plan adopted in accordance with N.J.A.C. 7:15.

…

- Comply with standards set forth in Attachment C of the permit to control passage of solid and floatable materials through storm drain inlets.
- Projects that do not require any Department permits (the term "permit", in this case, shall include transition area waivers under the Freshwater Wetlands Protection Act) under the Flood Hazard Area Control Act (N.J.S.A. 58:16A-50 et seq.), Freshwater Wetlands Protection Act (N.J.S.A. 13:9B-1 et seq.), Coastal Area Facility Review Act (N.J.S.A.:19-1 et seq.), or Waterfront and Harbor Facilities Act (N.J.S.A. 12:5-3) are not considered "new development or redevelopment projects" if construction began prior to 12 months from the original EDPA, or if the projects went to bid or had right-of-way authorization prior to the original EDPA.

…

Implementation - On March 1, 2009 and thereafter, Highway Agencies shall:

- Implement applicable design and performance standards established under **N.J.A.C. 7:8** for major development at the Highway Agency pursuant to 3.a.i. above.
- Comply with the standards set forth in Attachment C of the permit to control passage of solid and floatable materials through storm drainage inlets for storm drain inlets the Highway Agency installs within the Highway Agency's small MS4.

Permit requires that portions of projects that discharge to a stream segment listed as impaired for a roadway pollutant of concern install post-construction controls that meet either a water quality control volume, runoff reduction, or pollutant removal standard. (Part I.E.2.a.iii)			
Effective Date 8/28/2015	**Permittee** Colorado DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(A)(2); 40 CFR 122.34(b)(5)(i)(A)	**Link to Permit** https://www.codot.gov/programs/environmental/water-quality/documents/ms4-program/cdot-ms4-permit

Excerpt from permit:

iii. Priority Development Projects and Cherry Creek Reservoir Development Projects: The following applies to priority development projects and Cherry Creek Reservoir Development Projects:

(A) Control Measure Design Standards for Priority Development Projects: The permittee's requirements and oversight for priority development projects must be implemented to address the selection, installation, implementation, and maintenance of control measures in accordance with requirements in Part I.B. Only the portion of the project that discharges to the stream segment listed for a roadway pollutant of concern is required to meet one of these control measure design standards and Part I.E.2.a.iii. The control measures for priority development projects shall meet one of the following design standards listed below:

1) WQCV Standard: The control measure(s) is designed to provide treatment and/or infiltration from impervious surfaces with a surface area equal to or greater than 90% of the new impervious surface area located within the portion of the project discharging runoff to that

segment of Cherry Creek Reservoir basin. In addition the design drain time of the WQCV shall be a minimum of 12 hours. Evaluation of the minimum drain time shall be based on the pollutant removal mechanism and functionality of the control measure implemented. Consideration of drain time shall include maintaining vegetation necessary for operation of the control measure.

2) Runoff Reduction Standard: The control measure(s) is designed to infiltrate into the ground where site geology permits, evaporate, or evapotranspire a quantity of water equal or greater than 60% of what the calculated WQCV would be if all impervious area from the applicable portion of the priority development project discharged without infiltration. This base design standard can be met through practices such as green infrastructure. “Green infrastructure” generally refers to control measures that use or mimic natural processes to infiltrate, evapotranspirate, or reuse stormwater on the site where it is generated. Green infrastructure can be used in place of or in addition to low impact development principles.

3) Pollutant Removal Standard: The control measure(s) is designed to treat at a minimum the 2-year, 1-hour peak runoff flow. The control measure(s) shall be designed to treat to an expected median effluent concentration for total suspended solids (TSS) of 30 mg/L from impervious surfaces with a surface area equal to or greater than 90% of the new impervious surface area located within the portion of the project discharging runoff to the 303(d)-listed segment for a roadway pollutant of concern.

[The Definitions section contains additional specificity and clarity.]

Part I.2.J. 51. Roadway Pollutants of Concern include:

a. Total suspended solids

b. Cadmium (Total and Potentially Dissolved)

c. Chromium (Total and Potentially Dissolved)

d. Copper (Total and Potentially Dissolved)

e. Iron (Total and Potentially Dissolved)

f. Lead (Total and Potentially Dissolved)

g. Magnesium (Total and Potentially Dissolved)

h. Manganese (Total and Potentially Dissolved)

i. Nickel (Total and Potentially Dissolved)

j. Zinc

k. Total Inorganic Nitrogen

l. Total Phosphorus

m. Chloride

n. Sodium

o. Oil and Grease

Permit Considerations

Some DOTs have indicated that maintenance crews may automatically affiliate the term "post-construction activities" with activities like mowing grass, because these happen post construction of the facility. They are thus beginning to use other terms to describe stormwater post-construction activities during discussions with maintenance and other crews. DOTs have found it may be important to clearly define whatever terms are used so that the terminology is not lost in translation.

Also, following a National Stormwater Practitioners Meeting of DOTs, the American Association of State Highway Transportation Officials' (AASHTO's) Center for Environmental Excellence summarized meeting participant input regarding approaches to incorporate post-construction BMPs in the project delivery process. These recommendations included:

- "Assigning a lead management position to oversee and ensure communication between workers and management during each phase of the project delivery process
- Involving maintenance personnel early in the design process and justifying the use of certain BMPs
- Incorporating state-specific standards and highlights into proposed contracts"

They also noted that "implementing the above measures can result in the following benefits as described by the DOTs:

- Meeting permit compliance
- Increased protection of infrastructure
- Avoidance of possible litigation from downstream users."[12]

[12] Center for Environmental Excellence by AASHTO, *Connecting the DOTs through Collaboration in Stormwater Management: Proceedings from the 2014 National Stormwater Practitioners Meeting*, Washington, D.C., October 2014, http://environment.transportation.org/pdf/2014_national_stormwater_practitioners_meeting/AASHTO_SW_White_Paper_31Oct2014.pdf.

8.4 Green Infrastructure

Permit requires the permittee to consider green infrastructure during the design phase for new and redevelopment sites. (Section 4.2.5.4)			
Effective Date 1/3/2012	**Permittee** Georgia DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(A)(2); 40 CFR 122.34(b)(5)(i)(A)	**Link to Permit** https://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/Final_DOT_SW_NPDES_Permit_MS4_Dec_2011.pdf

Excerpt from permit:

EPD encourages the use of green infrastructure practices and approaches on both new and redeveloped sites. The permittee shall review all projects during the design phase to ensure the plans consider the use of green infrastructure practices, including infiltration, reuse, and evapotranspiration. The program shall, at a minimum, contain the elements and schedules shown in Table 4.2.5.4.

Program Elements	Measure Goals	Year 1	Year 2	Year 3	Year 4	Year 5
Develop a program for conducting a low impact development/green infrastructure (LID/GI) feasibility study, and implementing low impact development/green infrastructure, where feasible.	Develop the program, including a checklist of possible green infrastructure practices to be considered during the design phase. Submit the proposed program to EPD for review and approval.		X			
	Submit a copy of the completed checklist to EPD with each set of plans. The checklist must show which LID/GI practices are included in the project and must detail why each listed practice was not considered feasible for the project.			X	X	X
	Track the type and number of each LID/GI practice incorporated into each set of plans during the reporting period and include in each annual report. Track the type and number of each LID/GI practice incorporated into each set of plans during the reporting period and include in each annual report.			X	X	X

Design information on low impact development practices can be found in the Georgia Stormwater Management Manual (www.georgiastormwater.com). Additional information on green infrastructure and better site design can be found on numerous websites, including these suggested sites: U.S. EPA (www.epa.gov/nps/lid), Center for Watershed Protection (www.cwp.org), Georgia Coastal Resource

Division's "Georgia's Green Growth Guidelines" (crd.dnr.state.ga.us), and Green Infrastructure Center (www.gicinc.org). ....

Permit requires the permittee to develop a strategy to incentivize green infrastructure for private- and public-sector projects. (Part I.2.c)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
2/1/2010	Alaska DOT	40 CFR 122.26(d)(2)(iv)(A)(2) and 40 CFR 122.34(b)(5)(i)(A)	http://anchoragestormwater.com/Documents/KWood/files/aks052558_fp.pdf

Excerpt from permit:

Within one year of the effective date of this permit, the permittees must develop a strategy to provide incentives for the increased use of LID techniques in private and public sector development projects within both the MOA and ADOT&PF jurisdictions. The strategy must outline the methods of evaluating the Green Infrastructure/LID pilot projects described below. Permittees must begin implementation of the Green Infrastructure/LID Strategy and pilot projects within two years of the effective date of this permit.

(i) Beginning with the 4th Year Annual Report, the permittees must report on and evaluate the status of five pilot projects that use LID concepts for on-site control of water quality. Projects must involve managing runoff from at least 10,000 square feet of impervious surface. At least three of the five LID pilot projects must be ADOT&PF-owned locations. Parking lot retrofits as required in Part II.B.2.c.vi may be used as pilot projects. At least two of the pilot sites must address drainage areas greater than five acres in size. At least one pilot project must be located in the Chester Creek, Fish Creek, Campbell Creek, or Little Campbell Creek watersheds.

(ii) The permittees must monitor the performance of each pilot project and report the results beginning with the 4th Year Annual Report. The permittees must calculate or model changes in runoff quantities for each of the pilot project sites in the following manner…

8.5 Watershed Planning/Protection

Permit specifies special requirements for a priority watershed. (Part I.A.4 and Part I.E.1.a.1.viii)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
8/28/2015	Colorado DOT	40 CFR 122.26(d)(2)(iv)(A); 40 CFR 122.30(d) (guidance); 40 CFR 122.34(c)(1)	https://www.codot.gov/programs/environmental/water-quality/documents/ms4-program/cdot-ms4-permit

Excerpt from permit:

4. Cherry Creek Reservoir Drainage Basin

This permit includes conditions and limitations for those portions of the permit area that drain into the Cherry Creek Reservoir drainage basin. As per the Cherry Creek Reservoir Control Regulation (5 CCR 1002-72), as amended, additional requirements are included in the Education Program, Construction Sites Program, and Permanent Water Quality Program. In addition, the stormwater permit requirements section of Regulation 72 (Section 72.7), as amended, is hereby incorporated by reference.

…

(Part I.E.1.a.1.viii.)

viii. Cherry Creek Reservoir Drainage Basin Discharges: All requirements in Part I.B. must be met for those parts of the MS4 that drain into the Cherry Creek Reservoir drainage basin. In addition, the permittee must also meet the requirements in Cherry Creek Reservoir Control Regulation (5 CCR 1002-72). The permittee shall meet the following in addition to the requirements in Part I.E.1 for those parts of the MS4 that drain into the Cherry Creek Reservoir drainage basin:

(A) Covered construction activities shall include construction activities that disturb land, unless it is excluded in accordance with 72.7.2(b)(3).

(B) Control measures shall meet the requirements for required construction control measures per section 72.7.2(b)(5) of the regulation.

(C) Additional Covered Construction Activities: For covered construction activities in accordance with Part I.E.1.a.viii(A), that would not otherwise meet the definition of covered construction activities…

Permit Considerations

Tools are available to help DOTs with watershed planning/protection. One such tool is the Watershed Resources Registry (WRR) developed by EPA Region 3 and partners (FHWA, U.S. Army Corps of Engineers-Baltimore, Maryland State Highway Administration, Maryland Department of Natural Resources, Maryland Department of the Environment). WRR is a comprehensive, replicable framework and GIS-based targeting tool that integrates and streamlines regulatory programs, guides resource planners, saves time and money, increases program efficiencies, screens for preferred actions, and maximizes watershed benefits. WRR has a number of documents that explain the models (suitability analyses), the rationale and criteria used to create them, and how WRR can be applied to multiple regulatory and non-regulatory decisions. These documents include the WRR architecture description, a user's guide, and the report *Integrating Priorities and Achieving a Sustainable Watershed Using the Watershed Resources Registry in the Mattawoman Creek Watershed* by the Interstate Commission on the Potomac River Basin. A live website is also available to understand how to use the WRR, including the GIS tool. Other states may also tailor the tool. For more information, go to www.watershedresourcesregistry.org.

8.6 Retrofits

Permit requires a prescribed number of retrofit projects. (Part II.B.2)			
Effective Date 10/1/2015	**Permittee** North Carolina DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(A)(2); 40 CFR 122.34(b)(5)(i)(A)	**Link to Permit** https://connect.ncdot.gov/resources/hydro/HSPPermits/2015_NPDES_Stormwater_Permit.pdf

Excerpt from permit:

2. BMP Retrofits

a. Objectives

i Develop, implement and support the NCDOT program to be consistent with NPDES post-construction control measures and support development of the BMP Toolbox.

ii. Use retrofits to address pollutant loading from existing NCDOT activities.

iii. Retrofits should not be associated with meeting the requirements of any other DEMLR or DWQ program, unless otherwise allowed.

b. Management Measures

The NCDOT shall implement the following management measures to meet the objectives of the BMP Retrofit Program.

Management Measures	Measurable Goals
(a) Identify appropriate retrofit sites.	Identify a minimum of fourteen (14) potential retrofits per year.
(b) Implement/Install BMP Retrofits.	Maintain a program to implement retrofits. Complete a total of seventy (70) retrofits over the 5-year period of this permit. The retrofits will be appropriate for the identified pollutants of concern. Include in the annual report the number of retrofits completed.

Permit Considerations

Some permits specify the planning the permittee must conduct for future stormwater retrofits. For example, the Arizona DOT's permit requires the development of a retrofit program focused on controls that infiltrate, evapotranspire, or harvest and use stormwater discharges. The permit specifies retrofit locations that the DOT must consider and the development of an evaluation and ranking process to prioritize retrofit projects (Section 8.2.4).

8.7 Offsite Mitigation

Permit allows permittee to construct post-construction controls anywhere in the permit area rather than only building controls in conjunction with a development project. (Part I.E.2.a.iv)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
8/28/2015	Colorado DOT	40 CFR 122.26(d)(2)(iv)(A)(2); 40 CFR 122.34(b)(5)(i)(A)	https://www.codot.gov/programs/environmental/water-quality/documents/ms4-program/cdot-ms4-permit

Excerpt from permit:

iv. Permanent Water Quality Mitigation Pool. The following requirements apply to control measure projects funded by the Permanent Water Quality Mitigation Pool (pool):

(A) Permanent Water Quality Mitigation Pool: The purpose of the pool is to implement control measures in the permittee's permit area.

1) The permittee shall contribute $6,500,000 to the pool each fiscal year for which this permit coverage is active. The permittee shall prorate the contribution to the pool in 2015 since the permit will only be active for a portion of the year. Upon termination, renewal, or expiration without administration extension, the permittee shall annually contribute $6,500,000 multiplied by the percentage of the year the permit was active. The pool shall be used to plan, design, and construct control measures meeting the requirements in Part I. E.2.a.iii and iv. and Part I.B.

2) Ensure that at least 80 percent of the pool shall be spent on a 3-year rolling average.

3) Ensure that the pool shall only be used for designing and building control measures meeting the requirements of this section.

4) The pool shall be administered by a committee comprised of regional and statewide permittee personnel to evaluate and prioritize the planning and installation of control measures.

5) The pool shall not be used to fund the cost of maintenance of control measures.

6) The pool may be used for environmental planning for a control measure.

7) The pool shall not be used for the replacement or modification of previously constructed control measures, unless the replaced or modified control measure will treat additional area within the permit area.

8.8 Active Construction Site Inspections and Enforcement

Permit requires a certified construction inspector for each site. (Part II.B.8.b)			
Effective Date 11/1/2006	**Permittee** South Carolina DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(D)(3); 40 CFR 122.34(b)(4)(i)(F)	**Link to Permit** http://www.scdot.org/business/pdf/stormwater/MS4_permit_signed_copy.pdf

Excerpt from permit:

The permittee shall develop and implement a program for inspecting construction sites and for enforcing the requirement for control measures.

The permittee shall address in the SWMP the following elements:

- enhance erosion control during construction and ensure compliance with state storm water requirements by providing more detail of the specific procedures for handling violations found during inspections, such as methods of serving notice, imposing restrictions, administrative penalties (stop work order);
- **SC DOT must provide at least one certified inspector for each and every one of its construction sites. The subjects to be addressed in the training program shall be detailed for review including a copy of the inspection procedures;**
- **Include verification that construction sites subject to the NPDES Storm Water Regulations have a Storm Water Pollution Prevention Plan on site, and,**
- Must comply with the enforceability provisions of **South Carolina Water Pollution Control Permits Regulation 61-9** 122.26(d)(2)(i)(E)&(F), (iv)(D)(3), 122.34(b)(4)(ii)(F) & (b)(5)(ii)(B) and with the **Standards for Storm water Management and Sediment Reduction Regulation** 72-430.

Permit requires the development of a construction site inspections standard operating procedures document. (E.2.b.5) and minimum inspection frequency (E.5.c.3.a)			
Effective Date 7/1/2013	**Permittee** California DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(D)(3); 40 CFR 122.34(b)(4)(i)(F)	**Link to Permit** http://www.swrcb.ca.gov/board_decisions/adopted_orders/water_quality/2012/wqo2012_0011_dwq.pdf

Excerpt from permit:

5) Inspection Program

…

The inspection program shall also include standard operating procedures for documenting inspection findings, a system of escalating enforcement response to non-compliance (including procedures for addressing third party (i.e., contractor) non-compliance), and a system to ensure the timely resolution of all violations of this Order or the SWMP. The Department shall delegate adequate authority to appropriate personnel within all affected functional offices and branches to require corrective actions (including stop work orders). (E.2.b.5)

…

The minimum inspection frequency for construction sites shall be weekly during the rainy season. (E.5.c.3.a)

…

Permit specifies different timeframes for inspection based on risk categories (moderate and low risk). (Part I.E.1.v.C)			
Effective Date 8/28/2015	**Permittee** Colorado DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(D)(3); 40 CFR 122.34(b)(4)(i)(F)	**Link to Permit** https://www.codot.gov/programs/environmental/water-quality/documents/ms4-program/cdot-ms4-permit

Excerpt from permit:

(C) Reduced Frequency/Scope Inspection: The permittee may perform routine inspections per Part I.E.1.a(V)(B) at a reduced frequency as determined by the type of site indicated below. Reduced frequency inspections must assess the items in Part I.E.1.a.v(B)(1)-(3) (control measures, pollutant sources, and discharge points). The permittee must require the removal of the pollutants, when feasible, from the MS4 when the permittee identifies a failure to implement a control measure or an inadequate control measure resulting in pollutants discharging to the MS4 or beyond the limits of the covered construction site.

1) Inactive sites: The permittee must conduct an inspection at least every 90 days for sites that surface ground disturbance activities are completed and are pending growth for final stabilization or for sites where no construction activity has occurred since the last inspection.

2) Stormwater Management System Administrator's Program: The permittee must conduct an inspection at least every 90 days for construction activities operated by a participant in a Division designated Stormwater Management System Administrator's Program in accordance with Article 8 of title 25, Colorado Revised Statutes that has been identified by the administrator to be fully implementing the program and qualified for reduced oversight incentives of the program.

3) On-Site Permittee Project Manager, Moderate Risk Site: The permittee must conduct an inspection every 60 days for covered construction projects with an on-site project manager that is

personnel of the permittee and is responsible for daily observations of the control measures. The presence of on-site project managers that are contractors or consultants of the permittee do not meet the qualification for this reduced inspection frequency. The permittee on-site project manager must be responsive to daily observations of control measures requiring routine maintenance and inadequate control measure. The covered construction site must have the following:

(a) The project must be located more than 0.5 miles from a classified water of the state.

(b) The construction activity must disturb less than 5 acres during the present phase of the project. Disturbed area that have been stabilized are not included in the disturbance for the purpose of this requirement.

(c) Prior inspection findings cannot have found a discharge of pollutants in violation of a CDPS discharge permit for stormwater associated with construction activities.

(d) Prior inspections in the past 3 months have had no reoccurring findings per individual control measure.

(e) Prior inspections in the past 3 months have had less than two inadequate control measure findings per inspection per acre of disturbance.

4) On-Site Permittee Project Manager, Low Risk Site: The permittee must conduct an inspection every 90 days for covered construction projects with a permittee on-site project manager that is [a] personnel of the permittee and is responsible for daily observations of the control measures. On-site project managers that are contractors or consultants of the permittee do not qualify for this reduced inspection frequency. The permittee on-site project manager must be responsive to daily observations of control measures requiring routine maintenance and inadequate control measure. The covered construction site must have the following:

(a) The project must be located more than 0.5 miles from a classified water of the state.

(b) The construction activity must disturb less than 2 acres during the present phase of the project. Disturbed area that have been stabilized are not included in the disturbance for the purpose of this requirement.

(c) Prior inspection findings cannot have found a discharge of pollutants in violation of a CDPS discharge permit for stormwater associated with construction activities.

(d) Prior inspections in the past 6 months have had no reoccurring findings per individual control measure.

(e) Prior inspections in the past 6 months have had less than two inadequate control measure findings per inspection per acre of disturbance.

8.9 Staff Training

Permit requires training of all project design and development staff. (Part D.1.d.(7))			
Effective Date 10/28/2013	**Permittee** Hawaii DOT	**Citation** 40 CFR 122.26(d)(2)(iv)(A)(2) and (D)(4); 40 CFR 122.34(b)(5)(i)(A)	**Link to Permit** http://www.stormwaterhawaii.com/swmp_wp/wp-content/uploads/2014/10/A.1_DOT-HWYS-NPDES-Permit-No.-HI-S000001.pdf

Excerpt from permit:

The Permittee shall provide annual training to all DOT-HWYS staff with project design and construction storm water responsibilities, including construction engineers, construction and maintenance inspectors, and plan reviewers/ This training shall be , specific to DOT-HWYS activities (including the proper installation and maintenance of BMPs) policies, rules, and procedures.

8.10 Contractor Training

Permit requires state-provided or equivalent contractor training. (Part II.E.1)			
Effective Date 10/1/2015	**Permittee** North Carolina DOT	**Citation** 40 CFR 122.26(d)(iv); 40 CFR 122.34(b)(6)(i)	**Link to Permit** https://connect.ncdot.gov/resources/hydro/HSPPermits/2015_NPDES_Stormwater_Permit.pdf

Excerpt from permit:

Management Measure	Measurable Goal
(b) Provide pollution prevention awareness training for maintenance workers.	NCDOT shall provide annual stormwater pollution awareness training for appropriate NCDOT personnel and contractors involved in construction and maintenance activities. NCDOT may require contractors to have equivalent training in lieu of NCDOT-provided training. Training shall include general stormwater awareness, **NPDES stormwater permit NCG010000** implementation, identification of stormwater pollution potential, appropriate spill response actions and contacts for reporting spills and illicit discharges/illegal dumping.

Permit Considerations

40 CFR 122.42(c), excerpted below, describes annual reporting requirements for Phase I permits. In addition to the requirements at 122.26 for Phase I MS4 permits, 122.42(c) requires "[a]dditional conditions applicable to specified categories of NPDES permits" and describes several broad categories of information that must be reported.

"122.42(c) Municipal separate storm sewer systems. The operator of a large or medium municipal separate storm sewer system or a municipal separate storm sewer that has been designated by the Director under §122.26(a)(1)(v) must submit an annual report by the anniversary of the date of the issuance of the permit for such system. As of December 21, 2020 all reports submitted in compliance with this section must be submitted electronically by the owner, operator, or the duly authorized representative of the MS4 to the Director or initial recipient, as defined in 40 CFR 127.2(b), in compliance with this section and 40 CFR part 3 (including, in all cases, subpart D to part 3), §122.22, and 40 CFR part 127. Part 127 is not intended to undo existing requirements for electronic reporting. Prior to this date, and independent of part 127, the owner, operator, or the duly authorized representative of the MS4 may be required to report electronically if specified by a particular permit or if required to do so by state law. The report shall include:

(1) The status of implementing the components of the storm water management program that are established as permit conditions;

(2) Proposed changes to the storm water management programs that are established as permit condition. Such proposed changes shall be consistent with §122.26(d)(2)(iii) of this part; and

(3) Revisions, if necessary, to the assessment of controls and the fiscal analysis reported in the permit application under §122.26(d)(2)(iv) and (d)(2)(v) of this part;

(4) A summary of data, including monitoring data, that is accumulated throughout the reporting year;

(5) Annual expenditures and budget for year following each annual report;

(6) A summary describing the number and nature of enforcement actions, inspections, and public education programs;

(7) Identification of water quality improvements or degradation[.]"

Permit requires industrial facility monitoring. (Part II.D.3)			
Effective Date 10/1/2015	**Permittee** North Carolina DOT	**Citation** 40 CFR 122.26 (d)(2)(iii) and (d)(2)(v); 40 CFR 122.34(c)(2); and 40 CFR 122.34(d)	**Link to Permit** https://connect.ncdot.gov/resources/hydro/HSPPermits/2015_NPDES_Stormwater_Permit.pdf

Excerpt from permit:

Qualitative Monitoring

a. Objective

(i) Evaluate the effectiveness of the industrial Stormwater Pollution Prevention Plans (SPPP) for each industrial facility.

(ii) Perform required qualitative monitoring at stormwater discharge points or outfalls identified in the SPPPs or during supplemental inspections as required in Part II.D.2.i.

b. Qualitative monitoring shall be performed at each industrial stormwater outfall or discharge point twice per year, once in the spring (April - June) and once in the fall (September-November). Qualitative monitoring requires an inspection of each storm water outfall or discharge point for the parameters listed in paragraph (c). Qualitative monitoring is for the purpose of evaluating the effectiveness of the SPPP. No analytical tests are required. NCDOT will pursue correction of storm water quality where qualitative monitoring indicates degradation of quality in comparison to previous monitoring events. …

Qualitative Monitoring Requirements for Industrial Activities:

Discharge Characteristics	Frequency	Monitoring Location
Color	Semi-Annual	Stormwater Outfalls identified in the SPPP
Odor	Semi-Annual	Stormwater Outfalls identified in the SPPP
Clarity	Semi-Annual	Stormwater Outfalls identified in the SPPP
Floating Solids	Semi-Annual	Stormwater Outfalls identified in the SPPP
Suspended Solids	Semi-Annual	Stormwater Outfalls identified in the SPPP
Foam	Semi-Annual	Stormwater Outfalls identified in the SPPP
Oil Sheen	Semi-Annual	Stormwater Outfalls identified in the SPPP
Erosion at or immediately below the outfall	Semi-Annual	Stormwater Outfalls identified in the SPPP
Other obvious indicators of stormwater pollution	Semi-Annual	Stormwater Outfalls identified in the SPPP

Permit requires baseline monitoring of four different highway types. (Part S7.B)			
Effective Date 4/5/2014	**Permittee** Washington DOT	**Citation** 40 CFR 122.26 (d)(2)(iii) and (d)(2)(v); 40 CFR 122.34(c)(2); and 40 CFR 122.34(d)	**Link to Permit** https://ecology.wa.gov/DOE/files/15/15522e23-d1e1-49a9-9fbf-d1d68c9a7e66.pdf

Excerpt from permit:

B. Baseline Monitoring of WSDOT Highways

1. WSDOT shall continue collecting stormwater discharge quality and quantity data from the edge of pavement at the existing highway sites until September 30, 2014. WSDOT shall collect data to allow analysis of pollutant loads and prioritize parameters of concern. WSDOT shall collect samples at each site, at the frequencies and durations, and for the parameters specified in this section.

2. Baseline Monitoring Site Selection

WSDOT shall continue baseline highway runoff monitoring for water year 2014 (ending September 30, 2014) at its existing sites under the 2009 issued permit with the following annual average daily traffic (AADT):

a. Two highly urbanized Western Washington sites (≥100,000 AADT)

b. One urbanized Western Washington site (≤100,000 and ≥30,000 AADT)

c. One rural Western Washington site (≤30,000 AADT)

d. One urbanized Eastern Washington site (≤100,000 and ≥30,000 AADT)

…

5. Sample timing and frequency

WSDOT shall sample storm events as early in the storm event as practical and continue sampling past the longest estimated time of concentration for the contributing drainage area. For storm events lasting less than 24 hours, samples shall be collected for at least seventy-five percent of the storm event hydrograph. For storm events lasting longer than 24 hours, samples shall be collected for at least seventy-five percent of the hydrograph of the first 24 hours of the storm.

a. WSDOT shall sample each stormwater monitoring site at the following frequency:

i. Sixty-seven percent of the forecasted qualifying storms, which result in actual qualifying storm events up to a maximum of 14 storm events per water year. Eleven storm events are the required minimum.

ii. WSDOT may collect and report data from up to 20% of storm events that were forecasted qualifying storms but which did not meet the qualifying storm event criteria for rainfall depth (0.15-inch minimum) as defined in Section S7.B.5.b. These non-qualifying storm events may be collected and counted as part of the required storm events.

iii. WSDOT shall ensure that storm samples are distributed throughout the year and approximately reflecting the distribution of rainfall between the wet and dry seasons. The goal for western Washington sites is to collect 60-80% of the samples during the wet season (October 1 through April 30) and 20-40% during the dry season (May 1 through September 30). For eastern Washington, the goal is to collect 80-90% of the samples in the wet season (October 1 through June 30) and 10-20% of the samples in the dry season (July 1 through September 30).

b. Storm Event Criteria

A qualifying storm event shall meet the following conditions:

i. Rainfall depth: 0.15-inch minimum, no fixed maximum.

ii. Rainfall duration: Shortest acceptable duration one hour.

iii. Storm start (antecedent dry period): 6 hours minimum with less than 0.04-inch of rain.

iv. Storm end (post storm period): 6 hours minimum with less than 0.04-inch of rain.

Permit Considerations

The USGS and FHWA developed the Stochastic Empirical Loading and Dilution Model (SELDM) to simulate storm flows, concentrations, and loads. SELDM calculates the risk of exceeding water quality criteria with and without user-defined BMPs in catchments. It estimates annual runoff loads and can perform a simple annual lake-loading analysis. The USGS and FHWA also developed national data sets on highway-runoff quality, precipitation, streamflow, runoff coefficients, and background water quality for the model. This helps users to easily select choices that represent a site of interest to use with SELDM.

Permit requires monitoring of BMP effectiveness at a minimum number of facilities (rest areas, maintenance facilities, and ferry terminals). (Part S7.C)

Effective Date	Permittee	Citation	Link to Permit
4/5/2014	Washington DOT	40 CFR 122.26 (d)(2)(iii) and (d)(2)(v); 40 CFR 122.34(c)(2); and 40 CFR 122.34(d)	https://ecology.wa.gov/DOE/files/15/15522e23-d1e1-49a9-9fbf-d1d68c9a7e66.pdf

Excerpt from permit:

C. Monitoring the Effectiveness of Stormwater Treatment and Hydrologic Management BMPs at Rest Areas, Maintenance Facilities, or Ferry Terminals

1. WSDOT shall develop and implement a monitoring program to evaluate the effectiveness of stormwater treatment and hydrologic management BMPs at rest areas, maintenance facilities, or ferry terminals.

2. Stormwater BMPs (operational or structural) selected for monitoring shall address concerns identified from water year 2012 (WY12) and WY13 rest area, maintenance facility, or ferry terminal monitoring data. WSDOT shall evaluate BMPs at three facilities:

a. two facilities in western Washington, and

b. one facility in eastern Washington.

3. For BMPs with short detention times, WSDOT shall use appropriate sections of Ecology's 2011 or the most recent version of the Technical Guidance Manual for Evaluating Emerging Stormwater Treatment Technologies: Technology Assessment Protocol – Ecology (2011 TAPE) to prepare, implement, and report results.

http://www.ecy.wa.gov/programs/wq/stormwater/newtech/index.html

For operational BMPs and BMPs with long detention times, WSDOT shall work with Ecology to identify the portions of TAPE that would apply and/or define alternate monitoring methods.

WSDOT shall use EPA's 2009 or most recent version of the Urban Stormwater BMP Performance Monitoring as additional guidance for preparing the BMP evaluation.

Permit requires monitoring of vegetated filter strips. (Part S7.D)			
Effective Date 4/5/2014	**Permittee** Washington DOT	**Citation** 40 CFR 122.26 (d)(2)(iii) and (d)(2)(v); 40 CFR 122.34(c)(2); and 40 CFR 122.34(d)	**Link to Permit** https://ecology.wa.gov/DOE/files/15/15522e23-d1e1-49a9-9fbf-d1d68c9a7e66.pdf

Excerpt from permit:

D. Monitoring the Effectiveness of Stormwater Treatment and Hydrologic Management BMPs at Highway Monitoring Sites

1. WSDOT shall continue to evaluate the effectiveness of its vegetated filter strip (VFS) and modified-VFS stormwater treatment and hydrologic management BMPs for highway applications. BMP monitoring shall continue until statistical goals in Ecology's 2011 Technical Guidance Manual for Evaluating Emerging Stormwater Treatment Technologies: Technology Assessment Protocol – Ecology (2011 TAPE) or the most recent version of TAPE are met. At a minimum, 12 sampling events are needed for statistically significant performance data. Regardless of statistical significance, 35 sample events is the maximum sampling effort required as defined in the QAPP.

Permit requires wet weather monitoring to compare discharges from roadways and facilities with and without control measures. (Part I.F.6)			
Effective Date	**Permittee**	**Citation**	**Link to Permit**
8/28/2015	Colorado DOT	40 CFR 122.26 (d)(2)(iii) and (d)(2)(v); 40 CFR 122.34(c)(2); and 40 CFR 122.34(d)	https://www.codot.gov/programs/environmental/water-quality/documents/ms4-program/cdot-ms4-permit

Excerpt from permit:

6. Wet Weather Monitoring

The permittee shall implement a wet weather monitoring program to assess wet weather impacts from highways and facilities and the performance of control measures used to control discharges. The following requirements apply:

a. Monitoring Program

i. The permittee shall perform wet weather outfall monitoring that meets the following minimum requirements:

(A) Monitor six outfalls/sample points each calendar year.

1) In year 1, the permittee shall sample three outfalls.

(B) Three samples shall be collected from each monitored outfall/sample point per year.

1) In year 1, the permittee shall collect one sample from one outfall.

(C) Each sample for roadways with and without a control measure shall be analyzed, at a minimum, for all roadway pollutants of concern, conductivity, and hardness. Each sample from facilities shall be analyzed for chloride, sodium, magnesium, total suspended soils, oil and grease, and any other parameters that the permittee determines have a reasonable potential to be present and cause impacts to beneficial uses of receiving waters. This determination shall be based on a review of pollutant sources at the facility.

(D) All samples shall be taken during a measurable storm event. A measurable storm event is a rain event that results in an actual discharge from the facility, and that follows the preceding measurable storm event by at least 72 hours (3 days) or a snowmelt event where a measurable discharge occurs from the facility resulting from melting snow.

(E) Sampling locations shall be chosen that will have at least three measurable storm events occur during the year, including at least one rainfall and one snowmelt event. The measurable storm events must be at least 72 hours (3 days) apart.

(F) All sample locations shall be in the permit area. At a minimum, of outfalls sampled shall be from each of the following:

1) Complex highway maintenance facilities that has at least two of the activity descriptions in Part I.E.6.a.ii(A) and be representative of pollutant sources and expected loading from the facility.

2) Outfalls/sample points from highway road surfaces without control measures in accordance with Part I.E.2.

3) Outfalls/sample points from highway road surfaces with control measures in accordance with Part I.E.2.

[Note: the permit provides the below definition of "Roadway pollutants of concern":

"Roadway pollutants of concern" include total suspended solids, arsenic (total and potentially dissolved), cadmium (total and potentially dissolved), chromium (total and potentially dissolved), copper (total and potentially dissolved), magnesium (total and potentially dissolved), manganese (total and potentially dissolved), zinc, ammonia nitrogen, total phosphorus, chloride, sodium, oil and grease. (Part I.E.2)]

TMDL Considerations

As part of the three-part series of compendia of MS4 permitting approaches, EPA published *Compendium of MS4 Permitting Approaches – Part 3: Water Quality-Based Requirements*. This compendium serves as a snapshot of MS4 permit provisions focused on water quality-based requirements for specific pollutant parameters that are consistent with the assumptions and requirements of an EPA-established or EPA-approved TMDLs. It also includes provisions to protect impaired waters before TMDL development or to achieve other water quality objectives, such as protecting high-quality waters. To develop this compendium, EPA reviewed all state- and EPA-issued individual and general small MS4 final permits up to January 2017 and compiled examples of permit language.

Evaluating Program Effectiveness

The permit must contain requirements for evaluating program effectiveness—see, for example, 40 CFR 122.34(d)(1), 122.42(c). MS4 permittees have found that self-evaluation tools and third-party audits can help them review their SWMP's effectiveness. Two good self-evaluation resources include the following:

- *Municipal Separate Storm Sewer System (MS4) Program Evaluation Guidance* (EPA): This guidance provides NPDES permitting authority staff the information and questions necessary to conduct a comprehensive MS4 program evaluation and determine if the permittee is implementing the program to reduce pollutants discharged. (Also see Appendices B–D, which are posted separately from the above linked document.)
- *A Strategic Approach to Planning for and Assessing the Effectiveness of Stormwater Programs* (California Stormwater Quality Association): This document establishes specific "how to" guidance with examples for managers in planning and assessing their MS4 programs.