Chapter 4 - Post-Construction Stormwater Management in New Development and Redevelopment

The Post-Construction Stormwater Management in New Development and Redevelopment SBR requires the Public Complex to develop, implement, and enforce a program that addresses stormwater runoff from certain new development and redevelopment projects that are at the Public Complex, and that discharge into the Public Complex's MS4.

WHAT IS REQUIRED?

Minimum Standard

To prevent or minimize water quality impacts, the Public Complex shall develop, implement, and enforce a program to address stormwater runoff from new development and redevelopment projects at the Public Complex 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 Public Complex's small MS4. The Public Complex shall in its post-construction program:

i. Comply with the applicable design and performance standards established under N.J.A.C. 7:8 for major development at the Public Complex, 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.

ii. Ensure adequate long-term operation and maintenance of BMPs at the Public Complex.

iii. Comply with standards set forth in Attachment C of the permit to control passage of solid and floatable materials through storm drainage inlets at the Public Complex.

iv. 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. 13:19-1 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 the implementation deadline for this SBR, or if the projects went to bid prior to the date on which the permittee received authorization under this permit.

Measurable Goal

Public Complexes shall certify annually that they have developed, implemented, and are actively enforcing a program to address stormwater runoff from new development and redevelopment projects at the Public Complex's small MS4 in accordance with the minimum standard.

Implementation Schedule

i. Upon the effective date of permit authorization, Public Complexes shall ensure adequate long-term operation and maintenance of BMPs on property owned or operated by the Public Complex.

ii. Within 12 months from the effective date of permit authorization, Public Complexes shall:

- 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 Public Complex installs within the Public Complex's small MS4.

- Adopt applicable design and performance standards established under N.J.A.C. 7:8 for major development at the Public Complex pursuant to item i. of the minimum standard.

WHAT DOES THIS MEAN?

To prevent or minimize pollution of surface waters and groundwater by stormwater runoff from certain new development and redevelopment projects, Public Complexes must develop, implement, and enforce a "post-construction program" to control post-construction stormwater runoff from these projects.

Many projects at the Public Complex that disturb one acre or more are subject to the New Development and Redevelopment Post-construction program.

The projects addressed under this SBR are new development and redevelopment projects, on property owned or operated by the Public Complex, that:

1. disturb one acre or more (including projects less than one acre that are part of a larger common plan of development or sale); and

2. discharge stormwater into the Public Complex's small MS4.

(**Note** - This SBR does not require Public Complexes to control post-construction stormwater runoff from new development and redevelopment on private or public property not owned or operated by the Public

Complex, even though such runoff is discharged into the Public Complex's small MS4. Nor does this SBR require Public Complexes to control post-construction stormwater runoff from new development and redevelopment on Public Complex property if such runoff is not discharged into the Public Complex's small MS4.)

For the purpose of this SBR the following terms are defined as:

"Disturbance" means the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation.

"Impervious surface" means a surface that has been covered with a layer of material so that it is highly resistant to infiltration by water. Impervious surfaces include areas such as roadways, paved parking lots and concrete sidewalks.

"Redevelopment" refers to alterations that change the "footprint" of a roadway or other site or building in such a way that results in the disturbance of one acre or more of land. The term is not intended to include such activities as exterior remodeling, which would not be expected to cause adverse stormwater quality impacts and offer no new opportunity for stormwater controls. The Department does not consider pavement resurfacing projects that do not disturb the underlying or surrounding soil, remove surrounding vegetation, or increase the area of impervious surface to be "redevelopment projects."

"Common plan of development or sale" means a contiguous area where multiple separate and distinct development or redevelopment activities have occurred, are occurring, or are proposed to occur under one plan. The "plan" in a "common plan of development or sale" is broadly defined as any announcement or piece of documentation (including, but not limited to, a sign, public notice or hearing, advertisement, drawing, permit application) or physical demarcation (including, but not limited to, boundary signs, lot stakes, surveyor markings).

To develop, implement, and enforce this post-construction program, the Public Complex must meet requirements concerned with:

- The Department's **Stormwater Management rules (N.J.A.C. 7:8)**, which establish stormwater management design and performance standards for new development and redevelopment, and which are implemented through the Department's Land Use Regulation Program as well as the Public Complex Permit
- **Long-term operation and maintenance of BMPs**
- **Storm drain inlets**

Overview of the Stormwater Management Rules

On February 2, 2004, the Department's new Stormwater Management rules were published in the New Jersey Register and became effective (36 N.J.R. 670(a) and 781(a)). This is the first major update of these rules since their adoption in 1983, and includes fundamental changes in how systems and structures for managing stormwater runoff in New Jersey are planned, designed and implemented.

The new Stormwater Management rules provide a framework and incentives for managing runoff and resolving nonpoint source impairment on a drainage area basis for new development and redevelopment and existing developed areas, and establish a hierarchy for implementation of stormwater management measures with initial reliance on low impact site design techniques to

maintain natural vegetation and drainage before incorporating structural BMPs. These new rules also establish new runoff control performance standards for groundwater recharge, water quality and water quantity; establish special area protection measures (buffers) for pristine and exceptional value ("Category One") waters; provide regulatory consistency among local and State regulatory agencies; and provide safety standards for stormwater management basins.

Public Complex officials involved with Public Complex development or redevelopment decisions, along with their consultants, need to become familiar with the new requirements in these rules; the guidance contained in the New Jersey Stormwater Best Management Practices Manual; and effective nonstructural stormwater management techniques, such as maintaining natural drainage paths and vegetation, and minimizing increases in impervious cover, that will preserve and protect water resources for the future.

A courtesy copy of these rules, answers to "**Frequently Asked Questions**," and the **New Jersey Stormwater Best Management Practices Manual** are available at www.njstormwater.org.

Questions or submissions regarding the **Stormwater Management rules** should be directed to the Division of Watershed Management, New Jersey Department of Environmental Protection, P.O. Box 418, Trenton, New Jersey 08625.

The new Stormwater Management rules have six subchapters as follows:

Subchapter 1. General Provisions

Subchapter 2. General Requirements for Stormwater Management Planning

Subchapter 3. Regional Stormwater Management Planning

Subchapter 4. Municipal Stormwater Management Planning

Subchapter 5. Design and Performance Standards for Stormwater Management Measures

Subchapter 6. Safety Standards for Stormwater Management Basins

Public Complexes are directly affected by subchapters 1, 5, and 6 of these new rules, and may also be directly affected by subchapters 2 and/or 3 if a regional stormwater management planning area includes all or part of the Public Complex, or if the Public Complex permittee (for example, a county) conducts stormwater management planning on its own initiative under these new rules. Several provisions of subchapter 5 are discussed further below.

Special water resource protection areas are established along all waters designated "Category One".

In addition, the Department amended (effective February 2, 2004) the stormwater management provisions of the following rules in order to coordinate with and cross-reference the new Stormwater Management rules: the Freshwater Wetlands Protection Act Rules at N.J.A.C. 7:7A; the

Coastal Zone Management Rules at N.J.A.C. 7:7E; the Flood Hazard Area Control Act rules at N.J.A.C. 7:13; the Water Quality Management Planning rules at N.J.A.C. 7:15; and the Dam Safety Standards at N.J.A.C. 7:20. These amendments affect Public Complex projects that need stream encroachment permits or certain other Department permits.

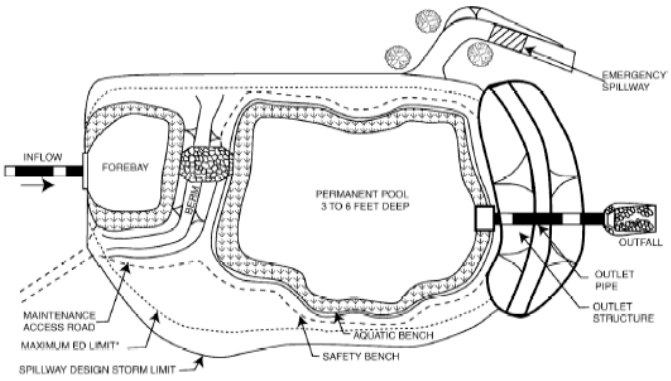
Major Development

"Major development" is one of the most important terms in these new rules and this SBR. The design and performance standards in subchapter 5 apply to "major development" only. The "major development" regulated under this SBR is limited to development and redevelopment projects that disturb one or more acres of land. However, some other "major development" that does not disturb one or more acres of land, but that increases impervious surface by one-quarter acre or more, is subject to these new rules through (i) permits issued to Public Complexes under the Department's Land Use Regulation Program (LURP), which includes stream encroachment permits; freshwater wetlands permits and transition area waivers; and CAFRA, coastal wetlands, and waterfront development permits; and (ii) the Department's Dam Safety Standards permit-by-rule for Class IV dams (if the Public Complex designs or constructs a Class IV dam(s) for stormwater management purposes).

(**Note:** Under N.J.A.C. 7:8-1.6 ("Applicability to Major Development"), major development which has received certain Department LURP permits prior to February 2, 2004 is **not** required to comply with the new Stormwater Management rules, but instead shall be subject to the stormwater management requirements in effect on February 1, 2004. In addition, under item iv. of the minimum standard, Public Complex projects that do not require Department LURP permits are **not** considered "new development or redevelopment projects" if (1) construction began prior to 12 months after the date on which the Public Complex received authorization under the Public Complex Permit, or (2) if the projects went to bid prior to that authorization date.)

Design and Performance Standards for Major Development

As part of its post-construction program, the Public Complex must adopt and implement the applicable design and performance standards for major development established under N.J.A.C. 7:8, unless those standards do not apply because of a variance or exemption granted under N.J.A.C. 7:8, or unless alternative standards under a Water Quality Management Plan (WQM Plan) are applicable. (If such alternative standards are applicable, the Public Complex must adopt and implement them.)



Wet Ponds may be used in some instances to meet runoff quality standards contained in N.J.A.C. 7:8-5.5.

As noted in the Department's Annual Report and Certification form for this SBR (see Chapter 13), the Public Complex must adopt the design and performance standards by means of a written document(s). Such a document could be, for example, a resolution, ordinance, regulation, order, or memorandum issued by the Public Complex's governing body, ranking elected official, principal executive officer, or duly authorized official, or a change to the Public Complex's policy and/or

procedures manual, design manual, and/or stormwater manual. The Public Complex must provide the name and type of this document(s) in its Annual Report.

The Public Complex should use a document(s) appropriate for that Public Complex's institutional structure and procedures. The document(s) must either include a copy of the design and performance standards, or incorporate those standards by reference. If the Public Complex already has its own procedures manual, design manual, and/or stormwater manual for project planning and design, the Public Complex should update that manual(s) to mention expressly those standards, the Public Complex Permit, and the standards set forth in Attachment C of the Public Complex Permit to control passage of solid and floatable materials through storm drainage inlets.

For each new development or redevelopment project that is regulated by the Public Complex Permit (and not exempted under N.J.A.C. 7:8-1.6(b)), the Public Complex must list the project in the Annual Report and Certification form for this SBR, and complete the Post-Construction Program Design Checklist for Individual Projects (see Chapter 13) before the Public Complex approves the project's construction. To the extent that compliance of the project with the applicable design and performance standards is addressed through the Department's Land Use Regulation Program, the final determination as to whether the project complies with those standards is made by the Department through that Program.

In the new Stormwater Management Rules, subchapter 5 establishes design and performance standards for "stormwater management measures" for "major development" intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies.

"Stormwater management measure" is defined in these rules as "any structural or nonstructural strategy, practice, technology, process, program, or other method intended to control or reduce stormwater runoff and associated pollutants, or to induce or control the infiltration or groundwater recharge of stormwater or to eliminate illicit or illegal nonstormwater discharges into stormwater conveyances."

The standards specified in subchapter 5 do not apply to major development if alternative design and performance standards that are at least as protective as would be achieved through subchapter 5 when considered on a regional stormwater management area basis are applicable under a regional stormwater management plan adopted in accordance with N.J.A.C. 7:8 or a WQM plan adopted in accordance with N.J.A.C. 7:15.

Subchapter 5 consists of the following sections:

7:8-5.1 Scope

7:8-5.2 Stormwater management measures for major development

7:8-5.3 Nonstructural stormwater management strategies

7:8-5.4 Erosion control, groundwater recharge and runoff quantity standards

7:8-5.5 Stormwater runoff quality standards

7:8-5.6 Calculation of stormwater runoff and groundwater recharge

7:8-5.7 Standards for structural stormwater management measures

7:8-5.8 Maintenance requirements

7:8-5.9 Sources for technical guidance

Some of the most important new design and performance standards in subchapter 5 include:

- The requirements in N.J.A.C. 7:8-5.2 and 5.3 to incorporate the following **nonstructural stormwater management strategies** into the design:
    - Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
    - Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;
    - Maximize the protection of natural drainage features and vegetation;
    - Minimize the decrease in the "time of concentration" from pre-construction to post-construction. "Time of Concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of the drainage area to the point of interest within a watershed;
    - Minimize land disturbance including clearing and grading;
    - Minimize soil compaction;
    - Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;
    - Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas; and
    - Provide other source controls to prevent or minimize the use or exposure of pollutants at the site in order to prevent or minimize the release of those pollutants into stormwater runoff (see N.J.A.C. 7:8-5.3(b)9 and the New Jersey Stormwater Best Management Practices Manual for examples).
- The requirement in N.J.A.C. 7:8-5.2 to avoid adverse impacts of concentrated flow on habitat for **threatened and endangered species** as documented in the Natural Heritage Database established under N.J.S.A. 13:1B-15.147 through 15.150, particularly *Helonias bullata* (swamp pink) and/or *Clemmys muhlnebergi* (bog turtle).
- The provisions in N.J.A.C. 7:8-5.2 that **exempt** certain utility line and public pedestrian access projects from the groundwater recharge and stormwater runoff quantity and quality requirements at N.J.A.C. 7:8-5.4 and 5.5, and that allow a **waiver from strict compliance**

Nonstructural stormwater management strategies include breaking up or disconnecting impervious surfaces.

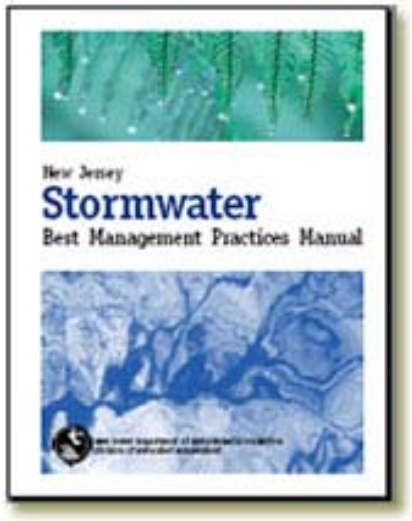
with those requirements to be obtained for the enlargement (widening) of an existing public roadway or railroad or the construction or enlargement of a public pedestrian access.

- The standard in N.J.A.C. 7:8-5.4 to encourage and control **infiltration and groundwater recharge**, including requirements that the design engineer (except in certain specified circumstances) either:
    - Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100 percent of the average annual pre-construction groundwater recharge volume for the site; **or**
    - Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the two-year storm is infiltrated.
- The standard in N.J.A.C. 7:8-5.4 to control **stormwater runoff quantity impacts**.
    - This standard provides the design engineer with various alternatives, such as, for example, designing stormwater management measures so that the post-construction peak runoff rates for the two, 10 and 100-year storm events are 50, 75 and 80 percent, respectively, of the pre-construction peak runoff rates.
- The **"Stormwater runoff quality standards"** in N.J.A.C. 7:8-5.5, including:
    - The requirement (if at least an additional one-quarter acre of impervious surface is being proposed) that stormwater management measures be designed to reduce the post-construction load of **total suspended solids** (TSS) in stormwater runoff generated from the water quality design storm by 80 percent of the anticipated load from the developed site, expressed as an annual average. Table 2 in N.J.A.C. 7:8-5.5 presents the presumed TSS removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual.
    - The requirement that stormwater management measures be designed to reduce, to the maximum extent feasible, the post-construction **nutrient** load of the anticipated load from the developed site in stormwater runoff generated from the water quality design storm.
    - The requirement that the applicant preserve and maintain **300-foot "special water resource protection areas"** along all waters designated "Category One" in the Department's Surface Water Quality Standards at N.J.A.C. 7:9B, and along perennial or intermittent streams that drain into or upstream of the Category One waters as shown on the U.S. Geological Survey (USGS) Quadrangle Maps or in the County Soil Surveys, within the associated hydrologic unit code 14 (HUC14) drainage. All encroachments within such areas shall be subject to review and approval by the Department.
- The **maintenance requirements** in N.J.A.C. 7:8-5.8 (see the discussion below under "Maintenance Requirements - Stormwater Management Rules").

The requirement in the Public Complex Permit to "comply with the applicable design and performance standards established under N.J.A.C. 7:8" pertains to **all** applicable design and performance standards established under the Stormwater Management rules, not just to the

"Stormwater runoff quality standards" in N.J.A.C. 7:8-5.5. Problems such as human-induced base-flow reduction (due to reduced recharge) and exacerbation of flooding and erosion also present water quality problems because they alter the chemical, physical, or biological integrity of the waters of the State, or otherwise contribute to water pollution.

Technical and maintenance guidance for stormwater management measures can be found in the New Jersey Stormwater Best Management Practices Manual (BMP Manual) and other documents listed in N.J.A.C 7:8-5.9. The BMP Manual was developed by the New Jersey Department of Environmental Protection, in coordination with the New Jersey Department of Agriculture, the New Jersey Department of Community Affairs, the New Jersey Department of Transportation, municipal engineers, county engineers, consulting firms, contractors, and environmental organizations. A copy of the BMP manual can be found on the Department's Stormwater Web site at http://www.njstormwater.org. The BMP manual is also on the CD of guidance material provided by the Department to Public Complexes and from Maps and Publications, Department of Environmental Protection, 428 East State Street, P.O. Box 420, Trenton, New Jersey, 08625; telephone (609) 777-1038.



The Public Complex should consider the design and performance standards in subchapter 5 as early as possible in the project planning and design process (including any project scope development or feasibility assessment). Projects should be designed with stormwater issues and nonstructural stormwater management strategies addressed as a primary consideration early in that process, instead of as a secondary concern or afterthought. Early consideration may protect Public Complexes from additional time and expense associated with redesign, or from spending unnecessary time and resources on developing flawed project concepts that do not comply with the Public Complex Permit. Also, if the project requires but does not yet have an environmental assessment (EA) or environmental impact statement (EIS) under Executive Order No. 215 of 1989 or the National Environmental Policy Act, the relationship of the project to these standards and this SBR should be discussed in the EA or EIS prepared for the project.

Under N.J.A.C. 7:8-2.5, counties and other agencies that conduct stormwater management planning under the new Stormwater Management rules may petition the Department at the Division of Watershed Management address provided above for an exemption to the requirements of those rules by submitting documentation to demonstrate that, if granted, the exemption will not result in an increase in flood damage, water pollution, including threats to the biological integrity, or constitute a threat to the public safety. **The stormwater pollution prevention plan (SPPP) required by Part I, Section E of the Public Complex Permit is not a "stormwater management plan" under those rules.**

Training

The Department has provided and will continue to provide training to Public Complex officials on implementation of the new Stormwater Management rules. Training on the updated stormwater rule performance standards has occurred and will continue to occur by request from the Department directly and through the Rutgers Office of Continuing Education. Information on training opportunities will be made available on the Department's stormwater Web site at www.njstormwater.org and on the Rutgers Office of Continuing Education Web site at http://aesop.rutgers.edu/~ocpe/. Please call Rutgers at (732) 932-9271 and request that you be put on the mailing list to receive notice of upcoming training opportunities.

Operation and Maintenance of BMPs

As a part of the post-construction program, the Public Complex must ensure adequate long-term operation and maintenance of BMPs. This means that for any BMP that is installed in order to comply with the requirements of the Public Complex's post-construction program, the Public Complex must ensure adequate long-term operation as well as preventative and corrective maintenance (including replacement). The Public Complex may perform the operation and maintenance itself, or may make arrangements with other entities to perform the operation and maintenance.

Proper long term operation and maintenance of BMPs ensures that they continue to perform as intended.

As discussed above, the Public Complex must also adopt and implement applicable design and performance standards established under N.J.A.C. 7:8 for major development at the Public Complex pursuant to item i. of the minimum standard above. These standards include the maintenance requirements in N.J.A.C. 7:8-5.8 (see the discussion below under "Maintenance Requirements - Stormwater Management Rules"). These standards are also implemented through permits issued to Public Complexes under the Department's Land Use Regulation Program.

Note also that under the "Stormwater Facility Maintenance" component of the Solids and Floatable Controls SBR (discussed in Chapter 8 below), the Public Complex must develop and implement a stormwater facility maintenance program for cleaning and maintenance of **all** stormwater facilities operated by the Public Complex, including existing stormwater facilities not affected by the post-construction program. The operation and maintenance component of the post-construction program should be integrated as soon as possible with the development and implementation of that stormwater facility maintenance program.

Maintenance Requirements - Stormwater Management Rules

Among the most important design and performance standards in N.J.A.C. 7:8-5 are the maintenance requirements in N.J.A.C. 7:8-5.8. Discussed below are provisions in those requirements that are generally important to Public Complexes:

1. The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.

2. The maintenance plan shall contain:

   - Specific preventative maintenance tasks and schedules
   - Cost estimates, including estimated cost of sediment, debris, or trash removal
   - The name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement).

     Maintenance guidelines for stormwater management measures are available in the New Jersey Stormwater Best Management Practices Manual (BMP Manual). If the maintenance plan identifies a person other than the developer (for example, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's agreement to assume this responsibility, or of the developer's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.

     (**Note:** In the context of the Public Complex Permit, the "developer" is generally if not always the Public Complex itself. A "person other than the developer" might be, for example, a municipality.)

   - N.J.A.C. 7:8-5.8 does not specifically assign the responsibility for maintenance of stormwater management measures to Public Complexes or other entities. Instead, the rule simply requires that the entity responsible for maintenance be specified. The decision whether and to whom a Public Complex assigns responsibility is a site-specific one based on the particular facts and circumstances involved. A Public Complex may choose to assume responsibility for maintenance, but it is not obligated to do so under this rule. The Public Complex is responsible under N.J.A.C. 7:8-5.8 for indicating the person or entity responsible for maintenance.

     The selection of BMPs, and the maintenance needs associated with the BMPs, should take into account the ability of the Public Complex or other future users to maintain the proposed stormwater facility. Guidance on the maintenance of specific BMPs is provided in the BMP Manual.

     (**Note:** Under the "Stormwater Facility Maintenance" component of the Solids and Floatable Controls SBR discussed in Chapter 8 below, the Public Complex must develop and implement a program for cleaning and maintenance of **all** stormwater facilities operated by the Public Complex. The Public Complex may not rely on another entity to perform such cleaning and maintenance unless Part I, Section D of the Public Complex Permit ("Sharing of Responsibilities") is satisfied.)

3. If the person responsible for maintenance identified under **(2)** above is not a public agency, the maintenance plan and any future revisions based on **(6)** below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.

4. Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of nonvegetated linings.

5. The person responsible for maintenance identified under **(2)** above shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.

    - The maintenance plan and any revisions, as well as the maintenance record, must be maintained for the life of the stormwater management measures on the site. Maintenance logs for the most recent three years, as well as the maintenance plan and any revisions should remain available for review by public entities with jurisdiction over the activities on the site. If members of the public wish to review the maintenance plan or record, they should contact the Public Complex.

      The Department is not requiring a specific format for the maintenance plan or the maintenance logs. Sample maintenance forms are available in the NJDEP Division of Water Resources "Ocean County Demonstration Study Stormwater Facilities Maintenance Manual," dated June 1989, and updated samples may be available in the future.

6. The person responsible for maintenance identified under **(2)** above shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan (and, if applicable, the deed) as needed.

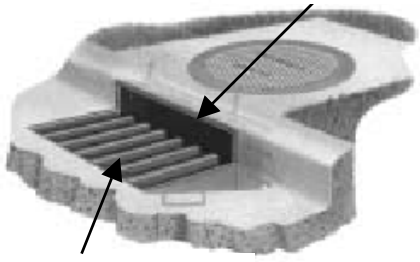
    - The Department recognizes that maintenance for each major development will vary depending on the stormwater management measures implemented within the development, and has provided guidance for maintenance measures in the BMP Manual, including the type and frequency of maintenance. The effective implementation of the maintenance is based on the implementation of the approved maintenance plan. The frequency of maintenance is to be documented on maintenance logs that are required for the stormwater management measures under **(5)** above.

7. The person responsible for maintenance identified under **(2)** above shall retain and make available, upon request by any public entity with administrative, health, environmental or safety authority over the site, the maintenance plan and the documentation required by **(5)** and **(6)** above.

(**Note:** In addition, under Part I, Section J.1 of the Public Complex Permit, Public Complexes shall make records required by the Public Complex Permit, including records of inspections, maintenance, and repairs required by the "Stormwater Facility Maintenance" component of the Solids and Floatable Controls SBR discussed in Chapter 8 below, available to the public at reasonable times during regular business hours (see N.J.A.C. 7:14A-18 for confidentiality provisions). Public Complexes that are subject to New Jersey's Open Public Records Act must also comply with that Act.)

The need for a maintenance plan, and implementation of that plan, cannot be overemphasized**.** The lack of maintenance is one of the major reasons for the failure of structural BMPs to provide the level of treatment for which they were designed. Basic maintenance procedures are

Curb-Opening Inlet



Grate in Pavement

contained in the BMP Manual. Unique or innovative maintenance procedures for those measures that are not specified in the BMP Manual may also be used.

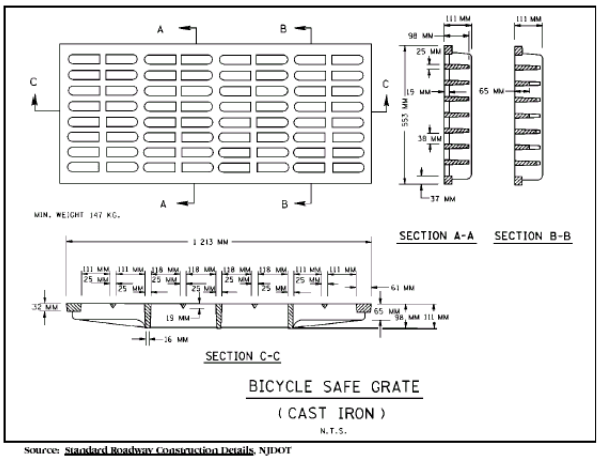
Storm Drain Inlets (New Development and Redevelopment)

For new development and redevelopment projects subject to this SBR, Public Complexes must comply with the design standard in Attachment C of the Public Complex Permit to control passage of solid and floatable materials through storm drain inlets. This design standard is addressed in the Annual Report and Certification form for this SBR, and in the Post-Construction Program Design Checklist for Individual Projects (see Chapter 13). There are separate design standards for grates in pavement or other ground surfaces, and for curb-opening inlets. Each standard is described below. These standards help prevent certain solids and floatables (e.g., cans, plastic bottles, wrappers, and other litter) from reaching the surface waters of the State.

Grates in Pavement or other Ground Surfaces

The standard applies to grates that are used in pavement or another ground surface to collect stormwater into a storm drain or surface water body under the grate.

NJDOT "Bicycle Safe" Grate



Source: Standard Roadway Construction Details, NJDOT

- Examples of storm drain inlet grates subject to this standard include grates in grate inlets, the grate portion (non-curb-opening portion) of combination inlets, grates on storm sewer manholes, ditch grates, trench grates, and grates of spacer bars in slotted drains. Examples of ground surfaces include surfaces of roads (including bridges), driveways, parking areas, bikeways, plazas, sidewalks, lawns, fields, open channels, and stormwater basin floors.

Many grate designs meet the standard. The first option (especially for storm drain inlets along roads) is simply to use the New Jersey Department of Transportation (NJDOT) bicycle safe grate. This grate is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines, which is available at: http://www.state.nj.us/transportation/publicat/bike_guidelines.htm.

The other option is to use a different grate, as long as each "clear space" in the grate (each individual opening) is:

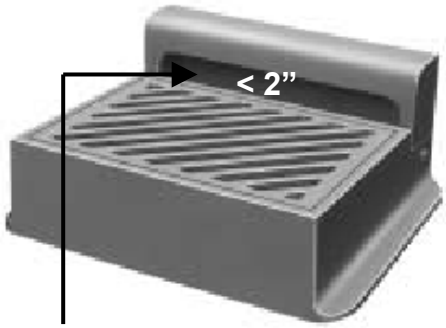
- No bigger than seven (7.0) square inches; or
- No bigger than 0.5 inches (½ inch) across the smallest dimension (length or width).

Curb-Opening Inlets (Including Curb-Opening Inlets in Combination Inlets)

If the storm drain inlet has a curb opening, the clear space in that curb opening (or each individual clear space, if the curb opening has two or more clear spaces) must be:

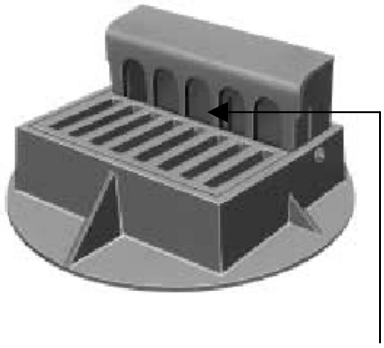
- No bigger than two (2.0) inches across the smallest dimension (length or width) - many curb-opening inlets installed in recent years meet this criterion; or
- No bigger than seven (7.0) square inches

Option 1 (Example)



A curb-opening with a “clear space” no bigger than 2” across the smallest dimension

Option 2 (Example)



Each individual hole (“clear space”) in the curb-opening is no bigger than 7 square inches

Exemptions

The requirements of this standard do not apply whenever any of the following exemptions listed in Attachment C are applicable:

- A “Hydraulic Performance Exemption” where the review agency (generally, the Public Complex itself) determines that this standard would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets that meet this standard.
- Either of two “Alternative Device Exemptions”:
  - The first of these exemptions is where flows from the “water quality design storm” as specified in N.J.A.C. 7:8 are conveyed through any device or combination of devices (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent the passage of all solid and floatable materials that could not fit through one of the following:
    1. A rectangular space that is four and five-eighths ($4^5/_8$) inches long and one and one-half (1½) inches wide (this option does not apply for outfall netting facilities); or
    2. A bar screen that has a ½ inch (0.5 inches) opening between each bar.
  - The second of these exemptions is where flows are conveyed through a trash rack that has parallel bars with one-inch (1.0 inch) spacing between the bars, to the elevation of the “water quality design storm“ as specified in N.J.A.C. 7:8.

    One of the requirements in the new Stormwater Management rules at N.J.A.C. 7:8-5.7(a)2 is that “trash racks shall be installed at the intake to the outlet structure as appropriate, and shall have parallel bars with one-inch spacing between the bars to the elevation of the water quality design storm.” **This second “Alternative Device Exemption” will therefore be applicable to many new development and redevelopment projects.**

In the new Stormwater Management Rules, the "water quality design storm" is specified at N.J.A.C. 7:8-5.5(a).

- A "Historic Places Exemption" where the Department determines, pursuant to the New Jersey Register of Historic Places Rules at N.J.A.C. 7:4-7.2(c), that action to meet this standard is an undertaking that constitutes an encroachment or will damage or destroy the New Jersey Register listed historic property.

WANT TO KNOW MORE?

Stormwater runoff from lands modified by urbanization can harm surface water and groundwater resources by changing natural hydrologic patterns, accelerating stream flows, destroying aquatic habitat, and elevating pollutant concentrations and loadings. These adverse environmental impacts can be more effectively prevented or minimized for new development and redevelopment projects (as required in this SBR) than for existing developed areas.

For a brief description of the hydrologic cycle and how development affects the cycle, see the "Stormwater Discussion" in the Department's Sample Municipal Stormwater Management Plan (Appendix C of the New Jersey Stormwater Best Management Practices Manual). For more detailed description of the adverse impacts that unmanaged land development can have on groundwater recharge and stormwater runoff quality and quantity both at and downstream of a development site, see Chapter 1, "Impacts of Development on Runoff," of the New Jersey Stormwater Best Management Practices Manual. That Chapter also reviews the fundamental physical, chemical, and biological aspects of the rainfall-runoff process and how they can be altered by development. In doing so, that Chapter demonstrates the need for the new Stormwater Management Rules at N.J.A.C. 7:8, which have been developed to directly address these adverse impacts. In addition, that Chapter seeks to increase understanding of these physical, chemical, and biological processes in order to improve the design of structural and non-structural measures mandated by the Rules' groundwater recharge, stormwater quality, and stormwater quantity requirements.

In regard to the design of storm drain inlets, every piece of solid or floatable material that is caught before it enters or leaves a storm drainage system will benefit the environment. Minimizing the size of spaces in storm drain inlet grates and curb openings will trap certain solid and floatable materials before they reach our waterways. However, these spaces must also be large enough to provide adequate hydraulic performance.

Several resources providing information related to this SBR were identified in the pages above. For convenience, some of these resources are also listed below:

- A courtesy copy of the new Stormwater Management Rules (N.J.A.C. 7:8), and answers to "Frequently Asked Questions" about those rules, are available at www.njstormwater.org.
- The New Jersey Stormwater Best Management Practices Manual is available at www.njstormwater.org and from Maps and Publications, Department of Environmental Protection, 428 East State Street, P.O. Box 420, Trenton, New Jersey, 08625; telephone (609) 777-1038. This Manual is also on the CD of guidance material provided by the Department to Public Complexes.