Presentation Goals

Overview

• Understanding the effects of development on the hydrologic cycle

• Understand the design and performance standards

Understanding the effects of development on the hydrologic cycle
What is stormwater?

“Stormwater”

Water resulting from precipitation (including rain and snow) that runs off the land’s surface, is transmitted to the subsurface, or is captured by separate storm sewers or other sewage or drainage facilities, or conveyed by snow removal equipment.

What affects stormwater?

Site Conditions:

• Density of Vegetation
• Soil
• Slope
• Surface Roughness
• Groundwater

Vegetation & Rainfall
Post-Development Impacts on the Hydrologic Cycle

Understanding the effects of development on the hydrologic cycle

Summary

- Increased runoff volume and rate of stormwater
- Degraded water quality
- Depleted groundwater and stream baseflow

Understanding the design and performance standards
Definitions

- Major Development
- Infiltration & Groundwater Recharge
- Design Storms (2, 10, & 100)
- Hydrograph

Understanding the effects of development on the hydrologic cycle

Overview

- Increased runoff volume and rate of stormwater
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Stormwater Management Rule Requirements

Runoff Quantity Control Option 1

N.J.A.C. 7:8-5.4(q)(3):
Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the 2-, 10-, and 100-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;
Stormwater Management Rule Requirements

Runoff Quantity Control Option 1

N.J.A.C.7:8-5.4(a)(3)(j):
Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the 2-, 10-, and 100-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of existing land uses and projected land uses assuming full development under existing zoning and land use ordinances in the drainage area; or
Stormwater Management Rule Requirements

Runoff Quantity Control Option 3

N.J.A.C.7:8-5.4(a)(3.iii):
Design stormwater management measures so that the post-construction peak runoff rates for the 2-, 10-, and 100-year storm events are 50, 75 and 80 percent, respectively, of the pre-construction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed.

Runoff Quantity Control Exemption

N.J.A.C.7:8-5.4(a)(3.iv):
This requirement does not apply to projects in tidal flood hazard areas if it is clear the project will not cause downstream flooding:

- Discharges into large tidally controlled bays, watercourses, inlets, the ocean, etc.

Understanding the effects of development on the hydrologic cycle

Overview

- Increased runoff volume and rate of stormwater
- **Degraded water quality**
- Depleted groundwater and stream baseflow
Stormwater Management Rule Requirements

% Runoff Quality Control

Applies when a project proposes > ¼ acre of new impervious coverage

Requirements:
- Remove 80% TSS from developed site
- Remove nutrients to max. extent feasible

Runoff Quality Control

BMPs must be designed to manage the Water Quality Design Storm:

1.25” rainfall over 2 hours
Custom Distribution shown in the rules

This requirement does not apply to discharges that have a separate NJPDES permit with a numerical TSS effluent limitation.
Understanding the effects of development on the hydrologic cycle

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Stormwater Management Rule Requirements

Groundwater Recharge Option 1

N.J.A.C. 7:8-5.4(a)(2)(i)(1):
Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100 percent of the average annual preconstruction groundwater recharge volume for the site; or

Groundwater Recharge Option 2

N.J.A.C. 7:8-5.4(a)(2)(i)(2):
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.
Stormwater Management Rule Requirements

Groundwater Recharge Exemption

This requirement does not apply to previously developed portions of urban redevelopment areas:

Previously developed = areas cleared of woody vegetation

Nonstructural Strategies

N.J.A.C. 7:8-5.2(a):
Must use nonstructural strategies to the maximum extent practicable before any structural measures may be used.


9.5 INFILTRATION BASINS

Infiltration basins are stormwater management systems constructed with highly permeable components designed to both maximize the removal of pollutants from stormwater and to promote groundwater recharge. Pollutants are treated through settling, filtration of the runoff through, and biological and chemical activity within the component. The total suspended solids (TSS) removal rate is 88%.

<table>
<thead>
<tr>
<th>N.J.A.C. 7:8 Stormwater Management Rules</th>
<th>Design and Performance Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Necessitated Strategy</td>
<td>Assist with Strategy 42, Sec 3 Page 3</td>
</tr>
<tr>
<td>Water Quantity</td>
<td>Yes, when designed as an on-line system</td>
</tr>
<tr>
<td>Groundwater Recharge</td>
<td>Yes</td>
</tr>
<tr>
<td>Water Quality</td>
<td>88% TSS Removal</td>
</tr>
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</table>
Summary

Understand the effects of development on the hydrologic cycle

• Increased rate and volume of runoff
• Degraded water quality
• Depleted groundwater and base flow

Summary

Understand the design and performance standards

• Water Quantity Controls
• Water Quality Controls
• Groundwater Recharge
• Nonstructural Strategies

More Information:

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