

# Ordinance

No. 1-2021

## AN ORDINANCE ADOPTING REVISED STORMWATER MANAGEMENT CONTROL REGULATIONS FOR THE BOROUGH OF WESTVILLE IN ACCORDANCE WITH THE TIER A MUNICIPAL STORMWATER PERMIT REQUIREMENTS

WHEREAS, the Borough of Westville is required to amend and replace the current Stormwater Control Ordinance to comply with changes made in the NJDEP Stormwater Rules at N.J.A.C. 7:8 adopted March 2, 2020, and

WHEREAS, the provisions of the within ordinance are intended to replace the existing requirements in Chapter 330;

NOW, THEREFORE, BE IT ORDAINED by the Mayor and Council of the Borough of Westville, Gloucester County, New Jersey, as follows:

### **§ 330-1. Scope and purpose.**

- A. Flood control, groundwater recharge, and pollutant reduction shall be achieved through the use of stormwater management measures, including green infrastructure Best Management Practices (GI BMPs) and nonstructural stormwater management strategies. GI BMPs and low impact development (LID) should be utilized to meet the goal of maintaining natural hydrology to reduce stormwater runoff volume, reduce erosion, encourage infiltration and groundwater recharge, and reduce pollution. GI BMPs and LID should be developed based upon physical site conditions and the origin, nature and the anticipated quantity, or amount, of potential pollutants. Multiple stormwater management BMPs may be necessary to achieve the established performance standards for water quality, quantity, and groundwater recharge. It is the purpose of this article to establish minimum stormwater management requirements and controls for major development, as defined in § 330-2 of this article.
- B. Applicability.
  - (1) This article shall be applicable to all site plans and subdivisions for the following major developments that require preliminary or final site plan or subdivision review:
    - (a) Nonresidential major developments; and
    - (b) Aspects of residential major developments that are not preempted by the residential site improvement standards at N.J.A.C. 5:21.
  - (2) This article shall also be applicable to all major developments undertaken by the The Borough of Westville.

- C. Development approvals issued for subdivisions and site plans pursuant to this article are to be considered an integral part of development approvals under the subdivision and site plan review process and do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance. In their interpretation and application, the provisions of this article shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare.

This article is not intended to interfere with, abrogate, or annul any other ordinances, rule or regulation, statute, or other provision of law except that, where any provision of this article imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, the more restrictive provisions or higher standards shall control.

### **§ 330-2. Definitions.**

- A. Unless specifically defined below, words or phrases used in this article shall be interpreted so as to give them the meanings they have in common usage and to give this article its most reasonable application. The definitions below are the same as or based on the corresponding definitions in the Stormwater Management Rules at N.J.A.C. 7:8-1.2.

- B. As used in this article, the following terms shall have the meanings indicated:

CAFRA CENTERS, CORES, OR NODES — Those areas with boundaries incorporated by reference or revised by the Department in accordance with N.J.A.C. 7:7-13.16.

CAFRA PLANNING MAP — The geographic depiction of the boundaries for Coastal Planning Areas, CAFRA Centers, CAFRA Cores, and CAFRA Nodes pursuant to N.J.A.C. 7:7E-5B.3.

COMMUNITY BASIN — An infiltration system, sand filter designed to infiltrate, standard constructed wetland, or wet pond, established in accordance with N.J.A.C. 7:8-4.2(c)14, that is designed and constructed in accordance with the New Jersey Stormwater Best Management Practices Manual, or an alternate design, approved in accordance with N.J.A.C. 7:8-5.2(g), for an infiltration system, sand filter designed to infiltrate, standard constructed wetland, or wet pond and that complies with the requirements of this chapter.

COMPACTION — The increase in soil bulk density.

CONTRIBUTORY DRAINAGE AREA— the area from which stormwater runoff drains to a stormwater management measure, not including the area of the stormwater management measure itself.

CORE — A pedestrian-oriented area of commercial and civic uses serving the surrounding municipality, generally including housing and access to public transportation.

COUNTY REVIEW AGENCY — An agency designated by the County Board of Chosen Freeholders to review municipal stormwater management plans and implementing ordinance(s). The county review agency may either be:

- (1) A county planning agency; or

(2) A county water resource association created under N.J.S.A. 58:16A-55.5, if the ordinance or resolution delegates authority to approve, conditionally approve, or disapprove municipal stormwater management plans and implementing ordinances.

**DEPARTMENT** — The New Jersey Department of Environmental Protection.

**DESIGNATED CENTER** — A state development and redevelopment plan center as designated by the State Planning Commission such as urban, regional, town, village, or hamlet.

**DESIGN ENGINEER** — A person professionally qualified and duly licensed in New Jersey to perform engineering services that may include, but not necessarily be limited to, development of project requirements, creation and development of project design, and preparation of drawings and specifications.

**DEVELOPMENT** — The division of a parcel of land into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation, or enlargement of any building or structure, any mining excavation or landfill, and any use or change in the use of any building or other structure, or land or extension of use of land, by any person, for which permission is required under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq. In the case of development of agricultural lands, "development" means: any activity that requires a State permit; any activity reviewed by the County Agricultural Board (CAB) and the State Agricultural Development Committee (SADC), and municipal review of any activity not exempted by the Right to Farm Act, N.J.S.A. 4:1C-1 et seq.

**DISTURBANCE**— The placement or reconstruction of impervious surface or motor vehicle surface, or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation. Milling and repaving is not considered disturbance for the purposes of this definition.

**DRAINAGE AREA** — A geographic area within which stormwater, sediments, or dissolved materials drain to a particular receiving water body or to a particular point along a receiving water body.

**EMPOWERMENT NEIGHBORHOOD** — A neighborhood designated by the Urban Coordinating Council in consultation and conjunction with the New Jersey Redevelopment Authority pursuant to N.J.S.A. 55:19-69.

**ENVIRONMENTALLY CONSTRAINED AREAS** — The following areas where the physical alteration of the land is in some way restricted, either through regulation, easement, deed restriction or ownership such as: wetlands, floodplains, threatened and endangered species sites or designated habitats, and parks and preserves. Habitats of endangered or threatened species are identified using the Department's Landscape Project as approved by the Department's Endangered and Nongame Species Program.

**ENVIRONMENTALLY CRITICAL AREAS** — An area or feature which is of significant environmental value, including but not limited to, stream corridors; natural heritage priority sites; habitat of endangered or threatened species; large areas of contiguous open space or upland forest; steep slopes; and wellhead protection and groundwater recharge areas. Habitats of endangered or threatened species are identified using the Department's Landscape Project as approved by the Department's Endangered and Nongame Species Program.

**EROSION** — The detachment and movement of soil or rock fragments by water, wind, ice, or gravity.

**GREEN INFRASTRUCTURE**— A stormwater management measure that manages stormwater close to its source by:

1. Treating stormwater runoff through infiltration into subsoil;
2. Treating stormwater runoff through filtration by vegetation or soil; or
3. Storing stormwater runoff for reuse.

**HUC 14 or HYDROLOGIC UNIT CODE 14** — An area within which water drains to a particular receiving surface water body, also known as a subwatershed, which is identified by a 14-digit hydrologic unit boundary designation, delineated within New Jersey by the United States Geological Survey.

**IMPERVIOUS SURFACE** — A surface that has been covered with a layer of material so that it is highly resistant to infiltration by water.

**INFILTRATION** — The process by which water seeps into the soil from precipitation.

**LEAD PLANNING AGENCY** — One or more public entities having stormwater management planning authority designated by the regional stormwater management planning committee pursuant to N.J.A.C. 7:8-3.2, that serves as the primary representative of the committee.

**MAJOR DEVELOPMENT** — An individual “development,” as well as multiple developments that individually or collectively result in:

1. The disturbance of one or more acres of land since February 2, 2004;
2. The creation of one-quarter acre or more of “regulated impervious surface” since February 2, 2004;
3. The creation of one-quarter acre or more of “regulated motor vehicle surface” since March 2, 2021 {or the effective date of this ordinance, whichever is earlier}; or
4. A combination of 2 and 3 above that totals an area of one-quarter acre or more. The same surface shall not be counted twice when determining if the combination area equals one-quarter acre or more.

Major development includes all developments that are part of a common plan of development or sale (for example, phased residential development) that collectively or individually meet any one or more of paragraphs 1, 2, 3, or 4 above. Projects undertaken by any government agency that otherwise meet the definition of “major development” but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., are also considered “major development.”

**MOTOR VEHICLE** — Land vehicles propelled other than by muscular power, such as automobiles, motorcycles, autocycles, and low speed vehicles. For the purposes of this definition, motor vehicle does not include farm equipment, snowmobiles, all-terrain vehicles, motorized wheelchairs, go-carts, gas buggies, golf carts, ski-slope grooming machines, or vehicles that run only on rails or tracks.

**MOTOR VEHICLE SURFACE** — Any pervious or impervious surface that is intended to be used by “motor vehicles” and/or aircraft, and is directly exposed to precipitation including, but not limited to, driveways, parking areas, parking garages, roads, racetracks, and runways.

**MUNICIPALITY** — Any city, borough, town, township, or village.

NEW JERSEY STORMWATER BEST MANAGEMENT PRACTICES (BMPs) MANUAL or BMP MANUAL— the manual maintained by the Department providing, in part, design specifications, removal rates, calculation methods, and soil testing procedures approved by the Department as being capable of contributing to the achievement of the stormwater management standards specified in this chapter. The BMP Manual is periodically amended by the Department as necessary to provide design specifications on additional best management practices and new information on already included practices reflecting the best available current information regarding the particular practice and the Department’s determination as to the ability of that best management practice to contribute to compliance with the standards contained in this chapter. Alternative stormwater management measures, removal rates, or calculation methods may be utilized, subject to any limitations specified in this chapter, provided the design engineer demonstrates to the municipality, in accordance with Section IV.F. of this ordinance and N.J.A.C. 7:8-5.2(g), that the proposed measure and its design will contribute to achievement of the design and performance standards established by this chapter.

NODE — An area designated by the State Planning Commission concentrating facilities and activities, which are not organized in a compact form.

NUTRIENT — A chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the development of organisms.

PERSON — Any individual, corporation, company, partnership, firm, association, the The Borough of Westville or political subdivision of the State of New Jersey, subject to municipal jurisdiction pursuant to the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq.

POLLUTANT — Any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, medical wastes, radioactive substance (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. § 2011 et seq.), thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt, industrial, municipal, agricultural, and construction waste or runoff, or other residue discharged directly or indirectly to the land, groundwaters or surface waters of the state, or to a domestic treatment works. "Pollutant" includes both hazardous and nonhazardous pollutants.

RECHARGE — The amount of water from precipitation that infiltrates into the ground and is not evapotranspired.

REGULATED IMPERVIOUS SURFACE — Any of the following, alone or in combination:

1. A net increase of impervious surface;
2. The total area of impervious surface collected by a new stormwater conveyance system (for the purpose of this definition, a “new stormwater conveyance system” is a stormwater conveyance system that is constructed where one did not exist immediately prior to its construction or an existing system for which a new discharge location is created);
3. The total area of impervious surface proposed to be newly collected by an existing stormwater conveyance system; and/or
4. The total area of impervious surface collected by an existing stormwater conveyance system where the capacity of that conveyance system is increased.

**REGULATED MOTOR VEHICLE SURFACE**— Any of the following, alone or in combination:

1. The total area of motor vehicle surface that is currently receiving water;
2. A net increase in motor vehicle surface; and/or quality treatment either by vegetation or soil, by an existing stormwater management measure, or by treatment at a wastewater treatment plant, where the water quality treatment will be modified or removed.

**SEDIMENT** — Solid material, mineral or organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, or gravity as a product of erosion.

**SITE** — The lot or lots upon which a major development is to occur or has occurred.

**SOIL** — All unconsolidated mineral and organic material of any origin.

**STATE DEVELOPMENT AND REDEVELOPMENT PLAN METROPOLITAN PLANNING AREA (PA1)** — An area delineated on the State Plan Policy Map and adopted by the State Planning Commission that is intended to be the focus for much of the state's future redevelopment and revitalization efforts.

**STATE PLAN POLICY MAP** — The geographic application of the State Development and Redevelopment Plan's goals and statewide policies, and the official map of these goals and policies.

**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.

**STORMWATER MANAGEMENT BASIN** — An excavation or embankment and related areas designed to retain stormwater runoff. A stormwater management basin may either be normally dry (that is, a detention basin or infiltration basin), retain water in a permanent pool (a retention basin), or be planted mainly with wetland vegetation (most constructed stormwater wetlands).

**STORMWATER MANAGEMENT MEASURE** — 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.

**STORMWATER RUNOFF** — Water flow on the surface of the ground or in storm sewers, resulting from precipitation.

**STORMWATER MANAGEMENT PLANNING AGENCY** — A public body authorized by legislation to prepare stormwater management plans.

**STORMWATER MANAGEMENT PLANNING AREA**— The geographic area for which a stormwater management planning agency is authorized to prepare stormwater management plans, or a specific portion of that area identified in a stormwater management plan prepared by that agency.

**TIDAL FLOOD HAZARD AREA** — A flood hazard area in which the flood elevation resulting from the two-, 10-, or 100-year storm, as applicable, is governed by tidal flooding from the Atlantic Ocean. Flooding in a tidal flood hazard area may be contributed to, or influenced by, stormwater runoff from inland areas, but the depth of flooding generated by the tidal rise and fall of the Atlantic Ocean is greater than flooding from any

fluvial sources. In some situations, depending upon the extent of the storm surge from a particular storm event, a flood hazard area may be tidal in the 100-year storm, but fluvial in more frequent storm events.

**URBAN COORDINATING COUNCIL EMPOWERMENT NEIGHBORHOOD** — A neighborhood given priority access to state resources through the New Jersey Redevelopment Authority.

**URBAN ENTERPRISE ZONES** — A zone designated by the New Jersey Enterprise Zone Authority pursuant to the New Jersey Urban Enterprise Zones Act, N.J.S.A. 52:27H-60 et seq.

**URBAN REDEVELOPMENT AREA** — Previously developed portions of areas:

- (1) Delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1), Designated Centers, Cores or Nodes;
- (2) Designated as CAFRA Centers, Cores or Nodes;
- (3) Designated as Urban Enterprise Zones; and
- (4) Designated as Urban Coordinating Council Empowerment Neighborhoods.

**WATER CONTROL STRUCTURE** — A structure within, or adjacent to, a water, which intentionally or coincidentally alters the hydraulic capacity, the flood elevation resulting from the two-, 10-, or 100-year storm, flood hazard area limit, and/or floodway limit of the water. Examples of a water control structure may include a bridge, culvert, dam, embankment, ford (if above grade), retaining wall, and weir.

**WATERS OF THE STATE** — The ocean and its estuaries, all springs, streams, wetlands, and bodies of surface or ground water, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

**WETLANDS or WETLAND** — An area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as "hydrophytic vegetation."

### **§ 330-3. Design and performance standards for stormwater management measures.**

- A. Stormwater management measures for major development shall be developed to meet the erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards in § 330-4 of this article. To the maximum extent practicable, these standards shall be met by incorporating Green Infrastructure best management practices (GI BMPs), stormwater management measures, and nonstructural stormwater management strategies into the design. If these strategies alone are not sufficient to meet these standards, structural stormwater management measures necessary to meet these standards shall be incorporated into the design.

B. The standards in this article apply only to new major development and are intended to minimize the impact of stormwater runoff on water quality and water quantity in receiving water bodies and maintain groundwater recharge. The standards do not apply to new major development to the extent that alternative design and performance standards, which provide at least as much protection from stormwater-related loss of groundwater recharge, stormwater quantity, and water quality impacts of major development projects as would be provided under the standards in N.J.A.C. 7:8-5, are applicable under a regional stormwater management plan or water quality management plan adopted in accordance with Department rules.

**§ 330-4. Specific requirements.**

- A. The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with § 330-11 of this article.
- B. Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department's Landscape Project or Natural Heritage Database established under N.J.S.A. 13:1B-15.147 through 13:1B-15.150, particularly *Helonias bullata* (swamp pink) and/or *Clemmys muhlenbergi* (bog turtle).
- C. The following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of § 330-4P and Q of this article:
- (1) The construction of an underground utility line, provided that the disturbed areas are revegetated upon completion;
  - (2) The construction of an aboveground utility line, provided that the existing conditions are maintained to the maximum extent practicable; and
  - (3) The construction of a public pedestrian access, such as a sidewalk or trail, with a maximum width of 14 feet, provided that the access is made of permeable material.
- D. A waiver from strict compliance from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of § 330-4F and G of this article may be obtained for the enlargement of an existing public roadway or railroad; or the construction or enlargement of a public pedestrian access, provided that the following conditions are met:
- (1) The applicant demonstrates that there is a public need for the project that cannot be accomplished by any other means;
  - (2) The applicant demonstrates through an alternatives analysis that, through the use of green infrastructure, nonstructural, and structural stormwater management strategies and measures, the option selected complies with the requirements of § 330-4P and Q of this article to the maximum extent practicable;
  - (3) The applicant demonstrates that, in order to meet the requirements of § 330-4P and Q of this article, existing structures currently in use, such as homes and buildings, would need to be condemned; and



- (4) The applicant demonstrates that it does not own or have other rights to areas, including the potential to obtain through condemnation, lands not falling under Subsection D(3), above, within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of § 330-4P and Q of this article that were not achievable on-site.

E. Green Infrastructure Stormwater Strategies

Tables 1 through 3 below summarize the ability of stormwater best management practices identified and described in the New Jersey Stormwater Best Management Practices Manual to satisfy the green infrastructure, groundwater recharge, stormwater runoff quality and stormwater runoff quantity standards specified in Section IV.O, P, Q and R. When designed in accordance with the most current version of the New Jersey Stormwater Best Management Practices Manual, the stormwater management measures found at N.J.A.C. 7:8-5.2 (f) Tables 5-1, 5-2 and 5-3 and listed below in Tables 1, 2 and 3 are presumed to be capable of providing stormwater controls for the design and performance standards as outlined in the tables below. Upon amendments of the New Jersey Stormwater Best Management Practices to reflect additions or deletions of BMPs meeting these standards, or changes in the presumed performance of BMPs designed in accordance with the New Jersey Stormwater BMP Manual, the Department shall publish in the New Jersey Registers a notice of administrative change revising the applicable table. The most current version of the BMP Manual can be found on the Department’s website at:

[https://njstormwater.org/bmp\\_manual2.htm](https://njstormwater.org/bmp_manual2.htm).

- F. Where the BMP tables in the NJ Stormwater Management Rule are different due to updates or amendments with the tables in this ordinance the BMP Tables in the Stormwater Management rule at N.J.A.C. 7:8-5.2(f) shall take precedence.

<b>Best Management Practice</b>	<b>Stormwater Runoff Quality TSS Removal Rate (percent)</b>	<b>Stormwater Runoff Quantity</b>	<b>Groundwater Recharge</b>	<b>Minimum Separation from Seasonal High Water Table (feet)</b>
Cistern	0	Yes	No	--
Dry Well(a)	0	No	Yes	2
Grass Swale	50 or less	No	No	2(e) 1(f)
Green Roof	0	Yes	No	--
Manufactured Treatment Device(a) (g)	50 or 80	No	No	Dependent upon the device
Pervious Paving System(a)	80	Yes	Yes(b) No(c)	2(b) 1(c)
Small-Scale Bioretention Basin(a)	80 or 90	Yes	Yes(b) No(c)	2(b) 1(c)
Small-Scale Infiltration Basin(a)	80	Yes	Yes	2
Small-Scale Sand Filter	80	Yes	Yes	2
Vegetative Filter Strip	60-80	No	No	--

. (Notes corresponding to annotations (a) through (g) are found under Table 3)

<b>Table 2 Green Infrastructure BMPs for Stormwater Runoff Quantity (or for Groundwater Recharge and/or Stormwater Runoff Quality with a Waiver or Variance from N.J.A.C. 7:8-5.3)</b>				
<b>Best Management Practice</b>	<b>Stormwater Runoff Quality TSS Removal Rate (percent)</b>	<b>Stormwater Runoff Quantity</b>	<b>Groundwater Recharge</b>	<b>Minimum Separation from Seasonal High Water Table (feet)</b>
Bioretention System	80 or 90	Yes	Yes(b) No(c)	2(b) 1(c)
Infiltration Basin	80	Yes	Yes	2
Sand Filter(b)	80	Yes	Yes	2
Standard Constructed Wetland	90	Yes	No	N/A
Wet Pond(d)	50-90	Yes	No	N/A

*(Notes corresponding to annotations (a) through (g) are found under Table 3)*

<b>Table 3 BMPs for Groundwater Recharge, Stormwater Runoff Quality, and/or Stormwater Runoff Quantity only with a Waiver or Variance from N.J.A.C. 7:8-5.3</b>				
<b>Best Management Practice</b>	<b>Stormwater Runoff Quality TSS Removal Rate (percent)</b>	<b>Stormwater Runoff Quantity</b>	<b>Groundwater Recharge</b>	<b>Minimum Separation from Seasonal High Water Table (feet)</b>
Blue Roof	0	Yes	No	N/A
Extended Detention Basin	40-60	Yes	No	1
Manufactured Treatment Device(h)	50 or 80	No	No	Dependent upon the device
Sand Filter(c)	80	Yes	No	1
Subsurface Gravel Wetland	90	No	No	1
Wet Pond	50-90	Yes	No	N/A

Notes to Tables 1, 2, and 3:

(a) subject to the applicable contributory drainage area limitation specified at Section IV.0.2;

(b) designed to infiltrate into the subsoil;

(c) designed with underdrains;

(d) designed to maintain at least a 10-foot wide area of native vegetation along at least 50 percent of the shoreline and to include a stormwater runoff retention component designed to capture stormwater runoff for beneficial reuse, such as irrigation;

(e) designed with a slope of less than two percent;

(f) designed with a slope of equal to or greater than two percent;

(g) manufactured treatment devices that meet the definition of green infrastructure at Section II;

(h) manufactured treatment devices that do not meet the definition of green infrastructure at Section II.

- G. An alternative stormwater management measure, alternative removal rate, and/or alternative method to calculate the removal rate may be used if the design engineer demonstrates the capability of the proposed alternative stormwater management measure and/or the validity of the alternative rate or method to the municipality. A copy of any approved alternative stormwater management measure, alternative removal rate, and/or alternative method to calculate the removal rate shall be provided to the Department in accordance

with Section VI.B. Alternative stormwater management measures may be used to satisfy the requirements at Section IV.O only if the measures meet the definition of green infrastructure at Section II. Alternative stormwater management measures that function in a similar manner to a BMP listed at Section 0.2 are subject to the contributory drainage area limitation specified at Section 0.2 for that similarly functioning BMP. Alternative stormwater management measures approved in accordance with this subsection that do not function in a similar manner to any BMP listed at Section 0.2 shall have a contributory drainage area less than or equal to 2.5 acres, except for alternative stormwater management measures that function similarly to cisterns, grass swales, green roofs, standard constructed wetlands, vegetative filter strips, and wet ponds, which are not subject to a contributory drainage area limitation. Alternative measures that function similarly to standard constructed wetlands or wet ponds shall not be used for compliance with the stormwater runoff quality standard unless a variance in accordance with N.J.A.C. 7:8-4.6 or a waiver from strict compliance in accordance with Section IV.D is granted from Section IV.O.

- H. Whenever the stormwater management design includes one or more BMPs that will infiltrate stormwater into subsoil, the design engineer shall assess the hydraulic impact on the groundwater table and design the site, so as to avoid adverse hydraulic impacts. Potential adverse hydraulic impacts include, but are not limited to, exacerbating a naturally or seasonally high water table, so as to cause surficial ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal systems or other subsurface structures within the zone of influence of the groundwater mound, or interference with the proper functioning of the stormwater management measure itself.
- I. Design standards for stormwater management measures are as follows:
  - 1. Stormwater management measures shall be designed to take into account the existing site conditions, including, but not limited to, environmentally critical areas; wetlands; flood-prone areas; slopes; depth to seasonal high water table; soil type, permeability, and texture; drainage area and drainage patterns; and the presence of solution-prone carbonate rocks (limestone);
  - 2. Stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. 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. For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than one-third the width of the diameter of the orifice or one-third the width of the weir, with a minimum spacing between bars of one inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of Section VIII.C;
  - 3. Stormwater management measures shall be designed, constructed, and installed to be strong, durable, and corrosion resistant. Measures that are consistent with the relevant portions of the Residential Site Improvement Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this

- requirement;
4. Stormwater management BMPs shall be designed to meet the minimum safety standards for stormwater management BMPs at Section VIII; and
  5. The size of the orifice at the intake to the outlet from the stormwater management BMP shall be a minimum of two and one-half inches in diameter.
- J. Manufactured treatment devices may be used to meet the requirements of this subchapter, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department. Manufactured treatment devices that do not meet the definition of green infrastructure at Section II may be used only under the circumstances described at Section IV.O.4.
- K. Any application for a new agricultural development that meets the definition of major development at Section II shall be submitted to the Soil Conservation District for review and approval in accordance with the requirements at Sections IV.O, P, Q and R and any applicable Soil Conservation District guidelines for stormwater runoff quantity and erosion control. For purposes of this subsection, "agricultural development" means land uses normally associated with the production of food, fiber, and livestock for sale. Such uses do not include the development of land for the processing or sale of food and the manufacture of agriculturally related products.
- L. If there is more than one drainage area, the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards at Section IV.P, Q and R shall be met in each drainage area, unless the runoff from the drainage areas converge onsite and no adverse environmental impact would occur as a result of compliance with any one or more of the individual standards being determined utilizing a weighted average of the results achieved for that individual standard across the affected drainage areas.
- M. Any stormwater management measure authorized under the municipal stormwater management plan or ordinance shall be reflected in a deed notice recorded in the *{insert Office of the County Clerk or the registrar of deeds and mortgages of the county in which the development, project, project site, or mitigation area containing the stormwater management measure is located, as appropriate, to the municipality}*. A form of deed notice shall be submitted to the municipality for approval prior to filing. The deed notice shall contain a description of the stormwater management measure(s) used to meet the green infrastructure, groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards at Section IV.O, P, Q and R and shall identify the location of the stormwater management measure(s) in NAD 1983 State Plane New Jersey FIPS 2900 US Feet or Latitude and Longitude in decimal degrees. The deed notice shall also reference the maintenance plan required to be recorded upon the deed pursuant to Section X.B.5. Prior to the commencement of construction, proof that the above required deed notice has been filed shall be submitted to the municipality. Proof that the required information has been recorded on the deed shall be in the form of either a copy of the complete recorded document or a receipt from the clerk or other proof of recordation provided by the recording office.

However, if the initial proof provided to the municipality is not a copy of the complete recorded document, a copy of the complete recorded document shall be provided to the municipality within 180 calendar days of the authorization granted by the municipality.

- N. A stormwater management measure approved under the municipal stormwater management plan or ordinance may be altered or replaced with the approval of the municipality, if the municipality determines that the proposed alteration or replacement meets the design and performance standards pursuant to Section IV of this ordinance and provides the same level of stormwater management as the previously approved stormwater management measure that is being altered or replaced. If an alteration or replacement is approved, a revised deed notice shall be submitted to the municipality for approval and subsequently recorded with the *{insert appropriate Office of the County Clerk or the registrar of deeds and mortgages, as applies}* and shall contain a description and location of the stormwater management measure, as well as reference to the maintenance plan, in accordance with M above. Prior to the commencement of construction, proof that the above required deed notice has been filed shall be submitted to the municipality in accordance with M above.

O. Green Infrastructure Standards

1. This subsection specifies the types of green infrastructure BMPs that may be used to satisfy the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards.
2. To satisfy the groundwater recharge and stormwater runoff quality standards at Section IV.P and Q, the design engineer shall utilize green infrastructure BMPs identified in Table 1 at Section IV.F. and/or an alternative stormwater management measure approved in accordance with Section IV.G. The following green infrastructure BMPs

<b>Best Management Practice</b>	<b>Maximum Contributory Drainage Area</b>
Dry Well	1 acre
Manufactured Treatment Device	2.5 acres
Pervious Pavement Systems	Area of additional inflow cannot exceed three times the area occupied by the BMP
Small-scale Bioretention Systems	2.5 acres
Small-scale Infiltration Basin	2.5 acres
Small-scale Sand Filter	2.5 acres

3. To satisfy the stormwater runoff quantity standards at Section IV.R, the design engineer shall utilize BMPs from Table 1 or from Table 2 and/or an alternative stormwater management measure approved in accordance with Section IV.G.
4. If a variance in accordance with N.J.A.C. 7:8-4.6 or a waiver from strict compliance in accordance with Section IV.D is granted from the requirements of this subsection, then BMPs from Table

- 1, 2, or 3, and/or an alternative stormwater management measure approved in accordance with Section IV.G may be used to meet the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards at Section IV.P, Q and R.
5. For separate or combined storm sewer improvement projects, such as sewer separation, undertaken by a government agency or public utility (for example, a sewerage company), the requirements of this subsection shall only apply to areas owned in fee simple by the government agency or utility, and areas within a right-of-way or easement held or controlled by the government agency or utility; the entity shall not be required to obtain additional property or property rights to fully satisfy the requirements of this subsection. Regardless of the amount of area of a separate or combined storm sewer improvement project subject to the green infrastructure requirements of this subsection, each project shall fully comply with the applicable groundwater recharge, stormwater runoff quality control, and stormwater runoff quantity standards at Section IV.P, Q and R, unless the project is granted a waiver from strict compliance in accordance with Section IV.D.
- P. Erosion control, groundwater recharge and runoff quantity standards. This subsection contains minimum design and performance standards to control erosion, encourage and control infiltration and groundwater recharge, and control stormwater runoff quantity impacts of major development.
- i. The minimum design and performance standards for erosion control are those established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq. and implementing rules.
  - ii. The minimum design and performance standards for groundwater recharge shall be met by incorporating green infrastructure (GI), and are as follows:
    1. The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at § 330-5, either:
      - p. Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100% of the average annual preconstruction groundwater recharge volume for the site; or
      - q. Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from preconstruction to post-construction for the two-year storm is infiltrated.
    2. This groundwater recharge requirement does not apply to projects within the urban redevelopment area, or to projects subject to Subsection F(2)(c) below.
    3. The following types of stormwater shall not be recharged:
      - p. Stormwater from areas of high pollutant loading. "High pollutant loading areas" are areas in industrial and commercial developments where

solvents and/or petroleum products are loaded/unloaded, stored, or applied; areas where pesticides are loaded/unloaded or stored; areas where hazardous materials are expected to be present in greater than reportable quantities as defined by the United States Environmental Protection Agency (USEPA) at 40 CFR 302.4; areas where recharge would be inconsistent with a Department-approved remedial action work plan or landfill closure plan; and areas with high risks for spills of toxic materials, such as gas stations and vehicle maintenance facilities; and

q. Industrial stormwater exposed to source material. "Source material" means any material(s) or machinery, located at an industrial facility that is directly or indirectly related to process, manufacturing, or other industrial activities, which could be a source of pollutants in any industrial stormwater discharge to groundwater. Source materials include, but are not limited to, raw materials; intermediate products; final products; waste materials; by-products; industrial machinery and fuels; and lubricants, solvents, and detergents that are related to process, manufacturing, or other industrial activities that are exposed to stormwater.

4. The design engineer shall assess the hydraulic impact on the groundwater table and design the site so as to avoid adverse hydraulic impacts. Potential adverse hydraulic impacts include, but are not limited to, exacerbating a naturally or seasonally high water table so as to cause surficial ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal systems and other subsurface structures in the vicinity or downgradient of the groundwater recharge area.

iii. In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at § 330-5 of this article, complete one of the following:

1. Demonstrate through hydrologic and hydraulic analysis that, for stormwater leaving the site, post-construction runoff hydrographs for the two-, ten-, and one-hundred-year storm events do not exceed, at any point in time, the preconstruction runoff hydrographs for the same storm events;
2. Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the preconstruction condition, in the peak runoff rates of stormwater leaving the site for the two-, ten-, and one-hundred-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;
3. Design stormwater management measures so that the post-construction peak runoff rates for the two-, ten-, and one-hundred-year storm events are 50%, 75% and 80%,

respectively, of the preconstruction 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. The percentages shall not be applied to post-construction stormwater runoff into tidal flood hazard areas, if the increased volume of stormwater runoff will not increase flood damages below the point of discharge; or

- i. Any application for a new agricultural development that meets the definition of "major development" at § 330-2 shall be submitted to the appropriate Soil Conservation District for review and approval in accordance with the requirements of this section and any applicable Soil Conservation District guidelines for stormwater

4. In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with Subsection F(3)(a), (b) and (c) above shall only be applied if the increased volume of Stormwater runoff, change in timing, or increased rate of stormwater runoff could increase flood damages below the point of discharge. There is no analysis required if the stormwater is discharged directly into any ocean, bay, inlet, or reach of any watercourse between its confluence with any ocean, bay, or inlet, and downstream of the first water control structure.

Q. Stormwater runoff quality standards.

- i. Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff by 80% of the anticipated load from the developed site, expressed as an annual average. Stormwater management measures shall only be required for water quality control if an additional 1/4 acre of regulated motor vehicle impervious surface is being proposed on a development site. If the surface is considered regulated motor vehicle surface because the water quality treatment for an area of motor vehicle surface that is currently receiving water quality treatment either by vegetation or soil, by an existing stormwater management measure, or by treatment at a wastewater treatment plant is to be modified or removed, the project shall maintain or increase the existing TSS removal of the anticipated load expressed as an annual average.
- ii. The requirement to reduce TSS does not apply to any stormwater runoff in a discharge regulated under a numeric effluent limitation for TSS imposed under the New Jersey Pollutant Discharge Elimination System (NJPDES) rules, N.J.A.C. 7:14A, or in a discharge specifically exempt under a NJPDES permit from this requirement. Every major development, including any that discharge into a combined sewer system, shall comply with 2 above, unless the major development is itself subject to a NJPDES permit with a numeric effluent limitation for TSS or the NJPDES permit to which the major development is subject exempts the development from a numeric effluent limitation for TSS.
- iii. Water quality calculations shall take into account the distribution of rain from the water quality design storm, as reflected in Table 4. The calculation of the volume of runoff may take into account the implementation of



nonstructural and structural stormwater management measures.

**Table 4**

**Water Quality Design Storm Distribution**

<b>Time (minutes)</b>	<b>Cumulative Rainfall (inches)</b>	<b>Time (minutes)</b>	<b>Cumulative Rainfall (inches)</b>
0	0.0000	65	0.8917
5	0.0083	70	0.9917
10	0.0166	75	1.0500
15	0.0250	80	1.0840
20	0.0500	85	1.1170
25	0.0750	90	1.1500
30	0.1000	95	1.1750
35	0.1330	100	1.2000
40	0.1660	105	1.2250
45	0.2000	110	1.2334
50	0.2583	115	1.2417
55	0.3583	120	1.2500
60	0.6250		

iv. For purposes of TSS reduction calculations, Table 5, below, presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual, and TSS reduction shall be calculated based on the removal rates listed for the BMPs in Table 5. The BMP Manual may be obtained from the address identified in § 330-7 of this article, or found on the Department's website at [www.njstormwater.org](http://www.njstormwater.org). The BMP Manual and other sources of technical guidance are listed in § 330-7 of this article. Alternative removal rates and methods of calculating removal rates may be used if the design engineer provides documentation demonstrating the capability of these alternative rates and methods to the review agency. A copy of any approved alternative rate or method of calculating the removal rate shall be provided to the Department at the following address: Division of Watershed Management, New Jersey Department of Environmental Protection, PO Box 418, Trenton, New Jersey 08625-0418.

v. If more than one BMP in series is necessary to achieve the required TSS reduction of 80% for a site, the applicant shall utilize the following formula to calculate TSS reduction:

$$R = A + B - (A \times B)/100$$

Where

R = Total TSS percent load removal from application of both BMPs.

A = The TSS percent removal rate applicable to the first BMP.

B = The TSS percent removal rate applicable to the second BMP.

**Table 5**

**TSS Removal Rates for BMPs**

<b>Best Management Practice</b>	<b>TSS Percent Removal Rate</b>
Bioretention systems	80% to 90%
Constructed stormwater wetland	90%
*Extended detention basin	40% to 60%
Infiltration structure	80%
*Manufactured treatment device	50 % to 80%
*Sand filter	80%
Vegetative filter strip	60% to 80%
*Wet pond	50% to 90%

\*These BMPs will now require a waiver or variance to implement

- vi. If there is more than one on-site drainage area, the TSS removal rate of 80% shall apply to each drainage area, unless the runoff from the subareas converge on site, in which case the removal rate can be demonstrated through a calculation using a weighted average.
- vii. Stormwater management measures shall also 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. In achieving reduction of nutrients to the maximum extent feasible, the design of the site shall include nonstructural strategies and structural measures that optimize nutrient removal, while still achieving the performance standards in § 330-4P and Q of this article.
- viii. Additional information and examples are contained in the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in § 330-7 of this article.
- ix. In accordance with the definition of FW1 at N.J.A.C. 7:9B-1.4, stormwater management measures shall be designed to prevent any increase in stormwater runoff to waters classified as FW1.
- x. Special water resource protection areas shall be established along all waters designated Category One at N.J.A.C. 7:9B, and perennial or intermittent streams that drain into or upstream of the Category One waters as shown on the USGS Quadrangle Maps or in the County Soil Surveys, within the associated HUC14 drainage area. These areas shall be established for the protection of water quality, aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, and exceptional fisheries significance of those established Category One waters. These areas shall be designated and protected as follows:
  - 1. The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:

p. A three-hundred-foot special water resource protection area shall be provided on each side of the waterway, measured perpendicular to the waterway from the top of the bank outwards or from the center line of the waterway where the bank is not defined, consisting of existing vegetation or vegetation allowed to follow natural succession.

q. Encroachment within the designated special water resource protection area under Subsection G(x)(1)[a] above shall only be allowed where previous development or disturbance has occurred (for example, active agricultural use, parking area, or maintained lawn area). The encroachment shall only be allowed where the applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable. In no case shall the remaining special water resource protection area be reduced to less than 150 feet as measured perpendicular to the top of bank of the waterway or center line of the waterway where the bank is undefined. All encroachments proposed under this subsection shall be subject to review and approval by the Department.

2. All stormwater shall be discharged outside of and flow through the special water resource protection area and shall comply with the standard for off-site stability in the Standards For Soil Erosion and Sediment Control in New Jersey, established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq.

3. If stormwater discharged outside of and flowing through the special water resource protection area cannot comply with the standard for off-site stability in the Standards for Soil Erosion and Sediment Control in New Jersey, established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., then the stabilization measures in accordance with the requirements of the above standards may be placed within the special water resource protection area, provided that:

p. Stabilization measures shall not be placed within 150 feet of the Category One waterway;

q. Stormwater associated with discharges allowed by this section shall achieve a TSS post-construction removal rate of 95%;

r. Temperature shall be addressed to ensure no impact on the receiving waterway;

s. The encroachment shall only be allowed where the applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable;

t. A conceptual project design meeting shall be held with the appropriate Department staff and Soil Conservation District staff to identify necessary

stabilization measures; and

u. All encroachments proposed under this section shall be subject to review and approval by the Department.

4. A stream corridor protection plan may be developed by a regional stormwater management planning committee as an element of a regional stormwater management plan, or by a municipality through an adopted municipal stormwater management plan. If a stream corridor protection plan for a waterway subject to § 330-4G(x) has been approved by the New Jersey Department of Environmental Protection, then the provisions of the plan shall be the applicable special water resource protection area requirements for that waterway. A stream corridor protection plan for a waterway subject to § 330-4G(x) shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in § 330-4G(x)(1)[a] above. In no case shall a stream corridor protection plan allow the reduction of the special water resource protection area to less than 150 feet as measured perpendicular to the waterway subject to this subsection.

5. Section 330-4G(x) does not apply to the construction of one individual single-family dwelling that is not part of a larger development on a lot receiving preliminary or final subdivision approval on or before December 3, 2018, and that the motor vehicle surfaces are made up of permeable material(s) such as gravel, dirt, and/or shells.

#### **§ 330-5. Calculation of stormwater runoff and groundwater recharge.**

A. Stormwater runoff shall be calculated in accordance with the following:

- (1) The design engineer shall calculate runoff using one of the following methods:
  - (a) The USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in the NRCS National Engineering Handbook, Section 4, Hydrology and Technical Release 55, Urban Hydrology for Small Watersheds; or
  - (b) The Rational Method for peak flow and the Modified Rational Method for hydrograph computations.
- (2) For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the preconstruction condition of a site or portion thereof is a wooded land use with good hydrologic condition. The term "runoff coefficient" applies to both the NRCS methodology at § 330-5A(1)(a), above, and the Rational and Modified Rational Methods at § 330-5A(1)(b), above. A runoff coefficient or a groundwater recharge land cover for an existing condition may be used on all or a portion of the site, if the design engineer verifies that the hydrologic condition has existed on the site or portion of the site for at least five years without interruption prior to the time of application. If more than one land cover has existed on the site during the five years immediately prior to the time of application, the land cover with the lowest runoff

potential shall be used for the computations. In addition, there is the presumption that the site is in good hydrologic condition (if the land use type is pasture, lawn, or park), with good cover (if the land use type is woods), or with good hydrologic condition and conservation treatment (if the land use type is cultivation).

(3) In computing preconstruction stormwater runoff, the design engineer shall account for all significant land features and structures, such as ponds, wetlands, depressions, hedgerows, or culverts that may reduce preconstruction stormwater runoff rates and volumes.

(4) In computing stormwater runoff from all design storms, the design engineer shall consider the relative stormwater runoff rates and/or volumes of pervious and impervious surfaces separately to accurately compute the rates and volume of stormwater runoff from the site. To calculate runoff from unconnected impervious cover, urban impervious area modifications as described in the NRCS Technical Release 55, Urban Hydrology for Small Watersheds, and other methods, may be employed.

(5) If the invert of the outlet structure of a stormwater management measure is below the flood hazard design flood elevation, as defined at N.J.A.C. 7:13, the design engineer shall take into account the effects of tailwater in the design of structural stormwater management measures.

B. Groundwater recharge may be calculated in accordance with the following: The New Jersey Geological Survey Report GSR-32 A Method for Evaluating Ground-Water Recharge Areas in New Jersey, incorporated herein by reference, as amended and supplemented. Information regarding the methodology is available from the New Jersey Stormwater Best Management Practices Manual; at <http://www.state.nj.us/dep/njgs/>; or at New Jersey Geological Survey, 29 Arctic Parkway, PO Box 427, Trenton, New Jersey 08625-0427; (609) 984-6587.

### **§ 330-6. Solids and Floatable Materials Control Standards:**

A. Site design features identified under Section IV.F above, or alternative designs in accordance with Section IV.G above, to prevent discharge of trash and debris from drainage systems shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this paragraph, "solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard see Section VII.A.2 below.

1. Design engineers shall use one of the following grates whenever they use a grate in pavement or another ground surface to collect stormwater from that surface into a storm drain or surface water body under that grate:

i. The New Jersey Department of Transportation (NJDOT) bicycle safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines; or

ii. A different grate, if each individual clear space in that grate has an area of no more than seven (7.0) square inches, or is no greater than 0.5 inches across the smallest dimension.

Examples of 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 system floors used to collect stormwater from the surface into a storm drain or surface water body.

- iii. For curb-opening inlets, including curb-opening inlets in combination inlets, the clear space in that curb opening, or each individual clear space if the curb opening has two or more clear spaces, shall have an area of no more than seven (7.0) square inches, or be no greater than two (2.0) inches across the smallest dimension.

2. The standard in A.1. above does not apply:

- i. Where each individual clear space in the curb opening in existing curb-opening inlet does not have an area of more than nine (9.0) square inches;
- ii. Where the municipality agrees that the standards would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets;
- iii. Where flows from the water quality design storm as specified in N.J.A.C. 7:8 are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:
  - a. A rectangular space four and five-eighths (4.625) inches long and one and one-half (1.5) inches wide (this option does not apply for outfall netting facilities); or
  - b. A bar screen having a bar spacing of 0.5 inches.

Note that these exemptions do not authorize any infringement of requirements in the Residential Site Improvement Standards for bicycle safe grates in new residential development (N.J.A.C. 5:21-4.18(b)2 and 7.4(b)1).

- iv. Where flows are conveyed through a trash rack that has parallel bars with one-inch (1 inch) spacing between the bars, to the elevation of the Water Quality Design Storm as specified in N.J.A.C. 7:8; or
- v. Where the New Jersey Department of Environmental Protection 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.

### **§ 330-7. Sources for technical guidance.**

- A. Technical guidance for stormwater management measures can be found at the department website below, or in the documents listed at § 330-7A(1) and (2), below, which are available from Maps and Publications, New Jersey Department of Environmental Protection, 428 East State Street, PO Box 420, Trenton, New Jersey 08625; telephone (609) 777-1038.

[http://www.nj.gov/dep/stormwater/bmp\\_manual2.htm](http://www.nj.gov/dep/stormwater/bmp_manual2.htm).

- (1) Guidelines for stormwater management measures are contained in the New Jersey Stormwater Best Management Practices Manual, as amended. Information is provided on stormwater management measures such as, but not limited to, those listed in Tables 1, 2, and 3 in § 330-4.

- (2) The New Jersey Department of Environmental Protection Stormwater Management Facilities Maintenance Manual, as amended, found at the website below.

[https://www.njstormwater.org/maintenance\\_guidance.htm](https://www.njstormwater.org/maintenance_guidance.htm).

- B. Submissions required for review by the Department should be mailed to:

The Division of Water Quality, New Jersey Department of Environmental Protection, Mail Code 401-02B, PO Box 420, Trenton, New Jersey 08625-0420.

- C. Additional technical guidance for stormwater management measures can be obtained from the following:

- (1) The Standards for Soil Erosion and Sediment Control in New Jersey promulgated by the State Soil Conservation Committee and incorporated into N.J.A.C. 2:90. Copies of these standards may be obtained by contacting the State Soil Conservation Committee or any of the Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, PO Box 330, Trenton, New Jersey 08625; (609) 292-5540;
- (2) The Rutgers Cooperative Extension Service, 732-932-9306; and
- (3) The Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, PO Box 330, Trenton, New Jersey 08625; (609) 292-5540.

### **§ 330-8. Safety standards for stormwater management basins.**

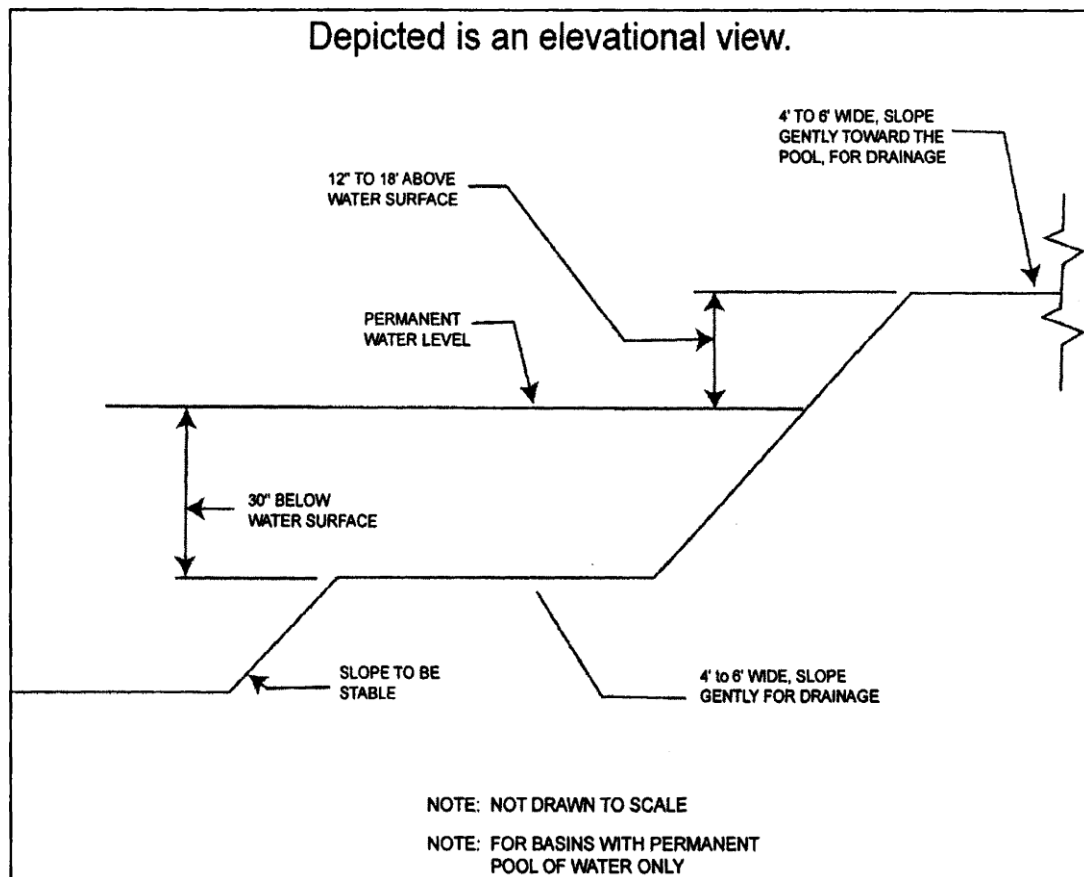
- A. This section sets forth requirements to protect public safety through the proper design and operation of stormwater management basins. This section applies to any new stormwater management basin. However, the provisions of this section are not intended to preempt more stringent municipal or county safety requirements for new or existing stormwater management basins. Municipal and county stormwater management plans and ordinances may, pursuant to their authority, require existing stormwater management basins to be retrofitted to meet one or more of the safety standards in § 330-8B(1), and (3) for trash racks, overflow grates, and escape provisions at outlet structures.
- B. Requirements for trash racks, overflow grates and escape provisions.
  - (1) A trash rack is a device designed to catch trash and debris and prevent the clogging of outlet structures. Trash racks shall be installed at the intake to the outlet from the stormwater management basin to ensure proper functioning of the basin outlets in accordance with the following:
    - (a) The trash rack shall have parallel bars, with no greater than six-inch spacing between the bars.
    - (b) The trash rack shall be designed so as not to adversely affect the hydraulic performance of the outlet pipe or structure.

- (c) The average velocity of flow through a clean trash rack is not to exceed 2.5 feet per second under the full range of stage and discharge. Velocity is to be computed on the basis of the net area of opening through the rack.
      - (d) The trash rack shall be constructed and installed to be rigid, durable, and corrosion-resistant, and shall be designed to withstand a perpendicular live loading of 300 psf.
    - (2) An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, such grate shall meet the following requirements:
      - (a) The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance.
      - (b) The overflow grate spacing shall be no less than two inches across the smallest dimension.
      - (c) The overflow grate shall be constructed and installed to be rigid, durable, and corrosion-resistant, and shall be designed to withstand a perpendicular live loading of 300 psf.
    - (3) For purposes of this Subsection B(3), escape provisions means the permanent installation of ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management basins. Stormwater management basins shall include escape provisions as follows:
      - (a) If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in § 330-8C, below, a freestanding outlet structure may be exempted from this requirement.
      - (b) Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than 2 1/2 feet. Such safety ledges shall be comprised of two steps. Each step shall be four feet to six feet in width. One step shall be located approximately 2 1/2 feet below the permanent water surface, and the second step shall be located one foot to 1 1/2 feet above the permanent water surface. See § 330-8D, below, for an illustration of safety ledges in a stormwater management basin.
      - (c) In new stormwater management basins, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than three horizontal to one vertical.
  - C. Variance or exemption from safety standards. A variance or exemption from the safety standards for stormwater management basins may be granted only upon a written finding by the appropriate reviewing agency (municipality, county, or Department) that the variance or exemption will not constitute a threat to public safety.
    - (1) In order to grant a variance from the stormwater management measures set forth in its approved municipal stormwater management plan and stormwater control ordinances, include a mitigation plan that identifies what measures are necessary potential mitigation projects,



and/or criteria to evaluate mitigation projects that can be used to offset the deficit by granting a variance in accordance with N.J.A.C. 7:8-4.6

- D. Illustration of safety ledges in a new stormwater management basin.



### § 330-9. Requirements for a site development stormwater plan.

- A. Submission of site development stormwater plan.
- (1) Whenever an applicant seeks municipal approval of a development subject to this article, the applicant shall submit all of the required components of the checklist for the site development stormwater plan at § 330-9C, below, as part of the submission of the applicant's application for subdivision or site plan approval.
  - (2) The applicant shall demonstrate that the project meets the standards set forth in this article.
  - (3) The applicant shall submit 15 copies of the materials listed in the checklist for site development stormwater plans in accordance with § 330-9C of this article.
- B. Site development stormwater plan approval. The applicant's site development project shall be reviewed as a part of the subdivision or site plan review process by the municipal board or official from which municipal approval is sought. That municipal board or official shall consult the engineer retained by the Planning and/or Zoning Board (as appropriate) to determine if all of the checklist requirements have been satisfied and to determine if the project meets the standards set forth in this article.
- C. Checklist requirements. The following information shall be required:

- (1) Topographic base map. The reviewing engineer may require upstream tributary drainage system information as necessary. It is recommended that the topographic base map of the site be submitted which extends a minimum of 200 feet beyond the limits of the proposed development, at a scale of one inch equals 200 feet or greater, showing two-foot contour intervals. The map, as appropriate, may indicate the following: existing surface water drainage, shorelines, steep slopes, soils, areas of potential soil erosion, perennial or intermittent streams that drain into or upstream of the Category One waters, wetlands and floodplains (with their appropriate transition area buffers), marshlands, pervious or vegetative surfaces, existing man-made structures, roads, bearing and distances of property lines, and significant natural and man-made features not otherwise shown.
- (2) Environmental site analysis: a written and graphic description of the natural and man-made features of the site and its environs. This description should include a discussion of soil conditions, slopes, wetlands, waterways, and vegetation on the site. Particular attention should be given to unique, unusual, or environmentally sensitive features and to those that provide particular opportunities or constraints for development.
- (3) Project description and site plan(s): a map (or maps) at the scale of the topographical base map indicating the location of existing and proposed buildings, roads, parking areas, utilities, structural facilities for stormwater management and sediment control, and other permanent structures. The map(s) shall also clearly show areas where alterations occur in the natural terrain and cover, including lawns and other landscaping, and seasonal high groundwater elevations. A written description of the site plan and justification of proposed changes in natural conditions should also be provided.
- (4) Land use planning and source control plan. This plan shall provide a demonstration of how the goals and standards of § 330-3 through §330-6 of this article are being met. The focus of this plan shall be to describe how the site is being developed to meet the objective of controlling groundwater recharge, stormwater quality, and stormwater quantity problems at the source by land management and source controls whenever possible.
- (5) Stormwater management facilities map. The following information, illustrated on a map of the same scale as the topographic base map, shall be included:
  - (a) Total area to be paved or built upon, proposed surface contours, land area to be occupied by the stormwater management facilities and the type of vegetation thereon, and details of the proposed plan to control and dispose of stormwater.
  - (b) Details of all stormwater management facility designs, during and after construction, including discharge provisions, discharge capacity for each outlet at different levels of detention, and emergency spillway provisions with maximum discharge capacity of each spillway.
- (6) Calculations.
  - (a) Comprehensive hydrologic and hydraulic design

calculations for the predevelopment and post-development conditions for the design storms specified in § 330-4 of this article.

- (b) When the proposed stormwater management control measures (e.g., infiltration basins) depend on the hydrologic properties of soils, then a soils report shall be submitted. The soils report shall be based on on-site boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soils present at the location of the control measure.
- (7) Maintenance and repair plan. The design and planning of the stormwater management facility shall meet the maintenance requirements of § 330-11 of this article.
- (8) Waiver from submission requirements. The municipal official or board reviewing an application under this article may, in consultation with the municipal engineer, waive submission of any of the requirements in § 330-9C(1) through (6) of this article when it can be demonstrated that the information requested is impossible to obtain or it would create a hardship on the applicant to obtain and its absence will not materially affect the review process.

#### **§ 330-10. Maintenance and repair.**

- A. Applicability. Projects subject to review as in § 330-10C of this article shall comply with the requirements of § 330-10B and C. In addition to normal required performance and maintenance bonds, the developer is required to post a two-year guarantee for preventive and corrective maintenance of the stormwater management measures in accordance with N.J.S.A. 40:55D-53.
- B. General maintenance.
  - (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; and 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. 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.
  - (3) If the maintenance plan identifies a person other than the owner as having responsibility for maintenance that plan shall include documentation of such person's or entity's agreement to assume responsibility, or of the owner's obligation to dedicate a stormwater management facility to

such person under an applicable ordinance or regulation.

- (4) Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project.
- (5) If the person responsible for maintenance identified under § 330-10B(2), above, is not a public agency, the maintenance plan and any future revisions based on § 330-10B(8) below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.
- (6) 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.
- (7) The person responsible for maintenance identified under § 330-10B(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.
- (8) The person responsible for maintenance identified under § 330-10B(2), above, shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.
- (9) The person responsible for maintenance identified under § 330-10B(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 § 330-10B(7) and (8), above.
- (10) The requirements of § 330-10B(4) and (5) do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency.

The owners of stormwater management facilities which are privately owned shall fund or otherwise guarantee the maintenance and inspection program for a period of no less than 10 years. The program shall identify the entity which is responsible for the requirements for maintenance and action to be taken by the municipality for failure of said maintenance, inspection process by the Borough and method to finance the program.

The Borough shall reserve the right to require the renewal of the program for a period of time determined by the Borough.

- (11) In the event that the stormwater management facility becomes a danger to public safety or public health, or if it is in need of maintenance or repair, the municipality shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have 14 days to effect maintenance and repair of the facility in a manner that is approved by the municipal engineer or his designee. The

municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair, the municipality or county may immediately proceed to do so and shall bill the cost thereof to the responsible person.

- C. Responsibility for inspection, repair and maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project.
- D. Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including, but not limited to, repairs or replacement to any associated appurtenance of the measure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; repair or replacement of linings; and restoration of infiltration function.

Stormwater management measure easements shall be provided by the property owner as necessary for facility inspections and maintenance and preservation of stormwater runoff conveyance, infiltration, and detention areas and facilities. The purpose of the easement shall be specified in the maintenance agreement.

- E. In the event that the stormwater management measure becomes a public health nuisance or danger to public safety or public health, or if it is in need of maintenance or repair, the Borough of Westville shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have 14 days to effect maintenance and repair of the facility in a manner that is approved by the Municipal Engineer or the Municipal Engineer's designee. The Borough of Westville, at its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair within the allowable time, the Borough of Westville may immediately proceed to do so with its own forces and equipment and/or through contractors. The costs and expenses of such maintenance and repair by the Borough of Westville shall be entered on the tax roll as a special charge against the property and collected with any other taxes levied thereon for the year in which the maintenance and repair was performed.
- F. Requirements for inspection, maintenance and repair of stormwater BMPs that rely on infiltration.

- 1. If a stormwater infiltration BMP is incorporated into the design of a major development, the applicant shall include the following requirements in its inspection, maintenance and repair plan:

- a. Once per month (if needed): mow side slopes, remove litter and debris,

stabilize eroded banks, repair erosion at inflow structure(s);

- b. After every storm exceeding one inch of rainfall: ensure that infiltration BMPs drain completely within 72 hours after the storm event. If stored water fails to infiltrate 72 hours after the end of the storm, corrective measures shall be taken. Raking or tilling by light equipment can assist in maintaining infiltration capacity and break up clogged surfaces;
- c. Four times per year (quarterly): inspect stormwater infiltration BMPs for clogging and excessive debris and sediment accumulation within the BMP, remove sediment (if needed) when completely dry;
- d. Two times per year: inspect for signs of damage to structures, repair eroded areas, check for signs of petroleum contamination and remediate;
- e. Once per year: inspect BMPs for unwanted tree growth and remove if necessary, disc or otherwise aerate bottom of infiltration basin to a minimum depth of six inches; and
- f. After every storm exceeding one inch of rainfall: inspect and, if necessary, remove and replace K5 sand layer and accumulated sediment to restore original infiltration rate.

2. Additional guidance for the inspection, maintenance and repair of stormwater infiltration BMPs can be found in the New Jersey BMP Manual.

G. Maintenance guarantee.

1. The applicant shall provide a maintenance guarantee in accordance with N.J.S.A. 40:55D-53 to ensure that all stormwater management measures required under the provisions of this chapter will be maintained in accordance with the specifications established herein.
2. Additionally, for those stormwater management measures that are to be inspected, maintained and repaired by a public agency, the Borough of Westville shall collect an up-front fee from the applicant in the amount the Borough of Westville determines is needed to provide long-term inspection, maintenance and repair of all stormwater management measures. This up-front fee shall be placed in a dedicated cash management account and

expended by the Borough of Westville for the sole purpose of conducting inspection, maintenance and repair activities for all stormwater management measures required under the applicant's major development application approval. The calculation of the fee shall be based upon the inspection, maintenance and repair plan (plan) required to be prepared by the applicant and approved by the Borough of Westville. The plan shall include an estimate of the present value of the cost to inspect, maintain and repair the stormwater management measure(s) in accordance with the plan for the useful life of those measure(s). The Borough of Westville shall furnish the applicant their published hourly rates as prescribed by their salary ordinance for public works' and other personnel having responsibilities associated with stormwater management. Added to this fee shall be an amount mutually determined by the Borough of Westville and the applicant to account for the reconstruction of stormwater management measures that are reasonably anticipated to be subject to long-term failure. After an agreed number of years, depending on the type of measure(s), the measure(s) will need to be reconstructed. The amount shall be based on the future value of the measure(s) being reconstructed. Both inflation rates and bank interest rates shall be based on the ten-year average published in the Wall Street Journal or other approved publication. Interest accruing in the account must also be accounted for at an agreed-upon interest rate, to arrive at an amount. The costs for reconstructing the measure(s) shall be taken from the engineer's probable cost estimate that is utilized to determine the amount of the required performance guarantee. It is acceptable to attach a percentage of failure to certain line items in the estimate.

3. Additionally, for those stormwater management measures that are to be inspected, maintained and repaired by a homeowners' association, condominium association or some other form of nonpublic ownership, no fee shall be collected by the Borough of Westville. Instead, the ownership entity shall establish and maintain a fund for the annual inspection and testing program, annual maintenance and repair program and annual contribution to a contingency fund for long-term reconstruction.
4. The initial costs agreed to for the annual inspection and testing program and annual maintenance and repair program shall be based upon actual itemized proposals offered to the applicant by prospective vendors. The annual cost expended on inspection, testing and maintenance shall be reported to the Borough of Westville to verify that maintenance is not being deferred and to inform the Borough of Westville on the magnitude of those services.
5. The contingency fund shall require sufficient funds to be committed for long-term reconstruction of the stormwater management measure(s). Major reconstruction activities will necessitate proper financial planning. After an agreed number of years, depending on the type of measure(s), the measure(s) will need to be reconstructed. The contingency fund in the financial

schedule shall be based on the future value of the measure being reconstructed. Both inflation rates and bank interest rates shall be based on the ten-year average published in the Wall Street Journal or other approved publication. Interest accruing in the account must also be accounted for at an agreed-upon interest rate, to arrive at an annual contribution amount.

- H. Nothing in this section shall preclude the municipality in which the major development is located from requiring the posting of a performance or maintenance guarantee in accordance with N.J.S.A. 40:55D-53.

**§ 330-11 Violations and penalties. [1]**

Any person who erects, constructs, alters, repairs, converts, maintains, or uses any building, structure or land in violation of this chapter shall be subject to the penalties as set forth in Chapter **1**, Article **I**, § **1-15**, General penalty.

**§ 330-12 When effective.**

This chapter shall take effect immediately upon the following: approval by the county review agency in accordance with N.J.S.A. 40:55D-97.

**§ 330-13 Appendixes.**

A. Methods for calculating groundwater recharge:

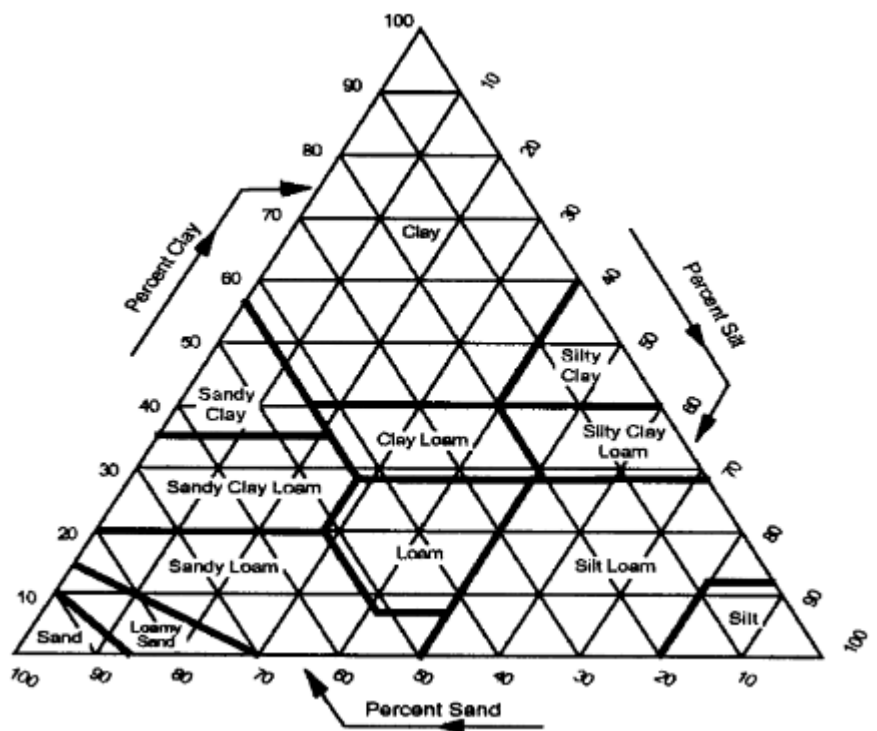
1. The New Jersey Geological Survey Report GSR-32: A Method for Evaluating Ground-Water Recharge Areas in New Jersey; available at <http://www.njgeology.org/geodata/dgs99-2.htm>.
2. The New Jersey Groundwater Recharge Spreadsheet (NJGRS); available in the New Jersey BMP Manual, Chapter 6, at [http://www.njstormwater.org/bmp\\_manual2.htm](http://www.njstormwater.org/bmp_manual2.htm).

B. NJDEP Nonstructural Strategies Point System. The New Jersey Stormwater Management Rules at N.J.A.C. 7:8-5.2(a) and § **330-4A** of this chapter require nonstructural stormwater management strategies to be incorporated into the site design of a major development. A total of nine strategies are to be used to the maximum extent practical to meet the groundwater recharge, stormwater quality and stormwater quantity requirements of the rules prior to utilizing structural stormwater and management measures. The New Jersey Nonstructural Stormwater Management Strategies Point System (NSPS) provides a tool to assist planners, designers and regulators in determining that the strategies have been used to the maximum extent practical at a major development as required by the rules. Refer online to <http://www.njstormwater.org> for information on the NSPS.

C. Soils.

1. USDA Soil Textural Triangle.





Source: United States Department of Agriculture.

2. Definitions. For the purposes of this section, the following terms shall have the meanings herein ascribed to them:

**A-HORIZON**

The uppermost mineral horizon in a normal soil profile. The upper part of the A-horizon is characterized by maximum accumulation of finely divided, dark-colored organic residues, known as "humus," which are intimately mixed with the mineral particles of the soil.

**ARTESIAN ZONE OF SATURATION**

A zone of saturation which exists immediately below a hydraulically restrictive horizon and which has an upper surface which is at a pressure greater than atmospheric, either seasonally or throughout the year.

**CHROMA**

The relative purity or strength of a color, a quantity which decreases with increasing grayness. Chroma is one of the three variables of soil color as defined in the Munsell system of classification.

**CLAY**

A particle size category consisting of mineral particles which are smaller than 0.002 millimeter in equivalent spherical diameter. Also, a soil textural class having more than 40% clay, less than 45% sand, and less than 40% silt, as shown in § **330-10C(1)** (USDA Soil Textural Triangle).

**CLAY LOAM**

A soil textural class having 27% to 40% clay and 20% to 45% sand, as shown in § **330-10C(1)** (USDA Soil Textural Triangle).

**COARSE FRAGMENT**

A rock fragment contained within the soil which is greater than two millimeters in equivalent spherical diameter or which is retained on a two-millimeter sieve.

**COUNTY SOIL SURVEY REPORT**

A report prepared by the United States Department of Agriculture, Natural Resources Conservation Service, which includes maps showing the distribution of soil mapping units throughout a particular county, together with narrative descriptions of the soil

series shown and other information relating to the uses and properties of the various soil series.

**DIRECT SUPERVISION**

Control over and direction of work carried out by others with full knowledge of and responsibility for such work.

**EQUIVALENT SPHERICAL DIAMETER**

Of a particle means the diameter of a sphere which has a volume equal to the volume of the particle.

**EXCESSIVELY COARSE HORIZON**

A horizon of limited thickness within the soil profile which provides inadequate removal of pollutants from stormwater due to a high coarse fragment content, excessively coarse texture and/or excessively rapid permeability.

**EXCESSIVELY COARSE SUBSTRATUM**

A substratum below the soil profile which extends beyond the depth of soil profile pits and borings and which provides inadequate removal of pollutants from stormwater due to a high coarse fragment content, excessively coarse texture and/or excessively rapid permeability.

**EXTREMELY FIRM CONSISTENCE**

A type of soil material whose moist aggregated mass crushes only under very strong pressure; cannot be crushed between the thumb and forefinger and shall be broken apart bit by bit.

**FIRM CONSISTENCE**

A type of soil material whose moist aggregated mass crushes under moderate pressure between the thumb and forefinger but resistance is distinctly noticeable.

**HARD CONSISTENCE**

A type of soil material whose dry aggregated mass is moderately resistant to pressure; can be broken in the hands without difficulty but is barely breakable between the thumb and forefinger.

**HUE**

The dominant spectral color, one of the three variables of soil color defined within the Munsell system of classification.

**HYDRAULICALLY RESTRICTIVE HORIZON**

A horizon within the soil profile which slows or prevents the downward or lateral movement of water and which is underlain by permeable soil horizons or substrata. Any soil horizon which has a saturated permeability less than 1.0 inch per hour is hydraulically restrictive.

**HYDRAULICALLY RESTRICTIVE SUBSTRATUM**

A substratum below the soil profile which slows or prevents the downward or lateral movement of water and which extends beyond the depth of profile pits or borings or to a massive substratum. A substratum which has a saturated permeability less than 1.0 inch per hour is hydraulically restrictive.

**LOAMY SAND**

A soil textural class, as shown in § **330-10C(1)** (USDA Soil Textural Triangle), that has a maximum of 85% to 90% sand with a percentage of silt plus 1.5 times the percentage of clay not in excess of 15; or a minimum of 70% to 85% sand with a percentage of silt plus 1.5 times the percentage of clay not in excess of 30.

**LOWER PLASTIC LIMIT**

The moisture content corresponding to the transition between the plastic and semisolid states of soil consistency. This corresponds to the lowest soil moisture content at which the soil can be molded in the fingers to form a rod or wire, 1/8 inches in thickness, without crumbling.

### **MOTTLING**

A color pattern observed in soil consisting of blotches or spots of contrasting color. The term "mottle" refers to an individual blotch or spot. The terms "color variegation," "iron depletion" and "iron concentration" are equivalent to the term "mottling." Mottling due to redoximorphic reactions is an indication of seasonal or periodic and recurrent saturation.

### **MUNSELL SYSTEM**

A system of classifying soil color consisting of an alphanumeric designation for hue, value and chroma, such as "7.5 YR 6/2," together with a descriptive color name, such as "strong brown."

### **O-HORIZON**

A surface horizon, occurring above the A-horizon in some soils, which is composed primarily of undecomposed or partially decomposed plant remains which have not been incorporated into the mineral soil.

### **PERCHED ZONE OF SATURATION**

A zone of saturation which occurs immediately above a hydraulically restrictive horizon and which is underlain by permeable horizons or substrata which are not permanently or seasonally saturated.

### **PIEZOMETER**

A device consisting of a length of metal or plastic pipe, open at the bottom or perforated within a specified interval, and used for the determination of depth to water, permeability or hydraulic head within a specific soil horizon or substratum.

### **PLATY STRUCTURE**

Is characterized by a soil aggregate which has one axis distinctly shorter than the other two and are oriented with the short axis vertical.

### **REGIONAL ZONE OF SATURATION**

A zone of saturation which extends vertically without interruption below the depth of soil borings and profile pits.

### **SANDY CLAY**

A soil textural class having 35% or more of clay and 45% or more of sand, as shown in § **330-10C(1)** (USDA Soil Textural Triangle).

### **SANDY LOAM**

A soil textural class, as shown in § **330-10C(1)** (USDA Soil Textural Triangle), that has a maximum of 20% clay, and the percentage of silt plus twice the percentage of clay exceeds 30, and contains 52% or more sand; or less than 7% clay, less than 50% silt, and between 43% and 52% sand.

### **SILT**

A particle size category consisting of mineral particles which are between 0.002 and 0.05 millimeter in equivalent spherical diameter. It also means a soil textural class having 80% or more of silt and 12% or less of clay, as shown in § **330-10C(1)** (USDA Soil Textural Triangle).

**SILT LOAM**

A soil textural class having 50% or more of silt and 12% to 27% of clay; or 50% to 80% of silt and less than 12% of clay, as shown in § **330-10C(1)** (USDA Soil Textural Triangle).

**SILTY CLAY**

A soil textural class having 40% or more of clay and 40% or more of silt, as shown in § **330-10C(1)** (USDA Soil Textural Triangle).

**SILTY CLAY LOAM**

A soil textural class having 27% to 40% of clay and less than 20% of sand, as shown in § **330-10C(1)** (USDA Soil Textural Triangle).

**SOIL AGGREGATE**

A naturally occurring unit of soil structure consisting of particles of sand, silt, clay, organic matter, and coarse fragments held together by the natural cohesion of the soil.

**SOIL COLOR**

The soil color name and Munsell color designation determined by comparison of the moist soil with color chips contained in a Munsell soil color book.

**SOIL CONSISTENCE**

The resistance of a soil aggregate or clod to being crushed between the fingers or broken by the hands. Terms for describing soil consistence are in N.J.A.C. 7:9A-5.3(h).

**SOIL HORIZON**

A layer within a soil profile differing from layers of soil above and below it in one or more of the soil morphological characteristics, including color, texture, coarse fragment content, structure, consistence and mottling.

**SOIL LOG**

A description of the soil profile which includes the depth, thickness, color, texture, coarse fragment content, mottling, structure and consistence of each soil horizon or substratum.

**SOIL MAPPING UNIT**

An area outlined on a map in a county soil survey report and marked with a letter symbol designating a soil phase, a complex of two or more soil phases, or some other descriptive term where no soil type has been identified.

**SOIL PHASE**

A specific type of soil which is mapped by the Natural Resources Conservation Service and which belongs to a soil series described within the county soil survey report.

**SOIL PROFILE**

A vertical cross section of undisturbed soil showing the characteristic horizontal layers or horizons of the soil which have formed as a result of the combined effects of parent material, topography, climate, biological activity and time.

**SOIL SERIES**

A grouping of soil types possessing a specific range of soil profile characteristics which are described within the county soil survey report. Each soil series may consist of several soil phases which may differ in slope, texture of the surface horizon or stoniness.

**SOIL STRUCTURAL CLASS**

One of the shape classes of soil structure described in N.J.A.C. 7:9A-5.3(g).

### **SOIL STRUCTURE**

The naturally occurring arrangement, within a soil horizon, of sand, silt and clay particles, coarse fragments and organic matter, which are held together in clusters or aggregates of similar shape and size.

### **SOIL TEST PIT**

An excavation made for the purpose of exposing a soil profile which is to be described.

### **SOIL TEXTURAL CLASS**

One of the classes of soil texture defined within the USDA system of classification. (Soil Survey Manual, Agricultural Handbook No. 18, USDA Soil Conservation Service, 1962.)

### **SOIL TEXTURE**

The relative proportions of sand, silt and clay in that portion of the soil which passes through a sieve with two-millimeter openings.

### **STATIC WATER LEVEL**

The depth below the ground surface or the elevation with respect to some reference level of the water level observed within a soil profile pit or boring, or within a piezometer, after this level has stabilized or become relatively constant with the passage of time.

### **SUBSTRATUM**

A layer of soil or rock material present below the soil profile and extending beyond the depth of soil borings or profile pits.

### **UNSUITABLE SOIL**

All soil other than suitable soil.

### **USDA SYSTEM OF CLASSIFICATION**

The system of classifying soil texture used by the United States Department of Agriculture which defines 12 soil textural classes based upon the weight percentages of sand, silt and clay in that portion of the soil which passes through a sieve with two-millimeter openings. The soil textural classes are shown graphically on the USDA Soil Textural Triangle, as shown in § **330-10C(1)**.

### **VALUE**

The relative lightness or intensity of a color, one of the three variables of soil color defined within the Munsell system of classification.

### **VERY FIRM CONSISTENCE**

Is characterized by a moist soil which crushes under strong pressure; barely crushable between the thumb and forefinger.

### **VERY HARD CONSISTENCE**

Is characterized by a dry soil which is resistant to pressure; can be broken in the hands only with difficulty; not breakable between the thumb and forefinger.

### **ZONE OF SATURATION**

A layer within or below the soil profile which is saturated with groundwater either seasonally or throughout the year. This includes both regional and perched zones.

3. Methods for assessing soil suitability for infiltration stormwater management BMPs. The results of a subsurface investigation shall serve as the basis for the site selection and design of stormwater infiltration BMPs. The subsurface investigation shall include, but not be limited to, a series of soil test pits and soil permeability tests conducted in accordance with the following:
  - a. All soil test pits and soil permeability results shall be performed

under the direct supervision of a professional engineer. All soil logs and permeability test data shall be accompanied by a certification by a professional engineer. The results and location (horizontal and vertical) of all soil test pits and soil permeability tests, both passing and failing, shall be reported to the Borough of Westville.

b. During all subsurface investigations and soil test procedures, adequate safety measures shall be taken to prohibit unauthorized access to the excavations at all times. It is the responsibility of persons performing or witnessing subsurface investigations and soil permeability tests to comply with all applicable federal, state and local laws and regulations governing occupational safety.

c. A minimum of two soil test pits shall be excavated within the footprint of any proposed infiltration BMP to determine the suitability and distribution of soil types present at the site. Placement of the test pits shall be within 20 feet of the basin perimeter, located along the longest axis bisecting the BMP. For BMPs larger than 10,000 square feet in area, a minimum of one additional soil test pit shall be conducted within each additional area of 10,000 square feet. The additional test pit(s) shall be placed approximately equidistant to other test pits, so as to provide adequate characterization of the subsurface material. In all cases, where soil and or groundwater properties vary significantly, additional test pits shall be excavated in order to accurately characterize the subsurface conditions below the proposed infiltration BMP. Soil test pits shall extend to a minimum depth of eight feet below the lowest elevation of the basin bottom or to a depth that is at least two times the maximum potential water depth in the proposed infiltration BMP, whichever is greater.

d. A soil test pit log shall be prepared for each soil test pit. The test pit log shall, at a minimum, provide the elevation of the existing ground surface, the depth and thickness (in inches) of each soil horizon or substratum, the dominant matrix or background and mottle colors using the Munsell system of classification for hue, value and chroma, the appropriate textural class as shown on the USDA textural triangle, the volume percentage of coarse fragments (larger than two millimeters in diameter), the abundance, size, and contrast of mottles, the soil structure, soil consistence, and soil moisture condition, using standard USDA classification terminology for each of these soil properties. Soil test pit logs shall identify the presence of any soil horizon, substratum or other feature that exhibits an in-place permeability rate less than one inch per hour.

e. Each soil test pit log shall report the depth to seasonally high water level, either perched or regional, and the static water level based upon the presence of soil mottles or other redoximorphic features, and observed seepage or saturation. Where redoxomorphic features, including soil mottles resulting from soil saturation, are present, they shall be interpreted to represent the depth to the seasonal high-water table unless soil saturation or seepage is observed at a higher level. When the determination of the seasonally high-water table shall be made in ground previously

disturbed by excavation, direct observation of the static water table during the months of January through April shall be the only method permitted.

f. Any soil horizon or substratum which exists immediately below a perched zone of saturation shall be deemed by rule to exhibit unacceptable permeability (less than one inch per hour). The perched zone of saturation may be observed directly, inferred based upon soil morphology or confirmed by performance of a hydraulic head test as defined at N.J.A.C. 7:9A-5.9.

g. Stormwater infiltration BMPs shall not be installed in soils that exhibit artesian groundwater conditions. A permeability test shall be conducted in all soils that immediately underlie a perched zone of saturation. Any zone of saturation which is present below a soil horizon which exhibits an in-place permeability of less than 0.2 inches per hour shall be considered an artesian zone of saturation unless a minimum one-foot-thick zone of unsaturated soil, free of mottling or other redoximorphic features and possessing a chroma of four or higher, exists immediately below the unsuitable soil.

h. A minimum of one permeability test shall be performed at each soil test pit location. The soil permeability rate shall be determined using test methodology as prescribed in N.J.A.C. 7:9A-6.2 (tube permeameter test), 6.5 (pit bailing test) or 6.6 (piezometer test). When the tube permeameter test is used, a minimum of two replicate samples shall be taken and tested. Alternative permeability test procedures may be accepted by the approving authority, provided the test procedure attains saturation of surrounding soils, accounts for hydraulic head effects on infiltration rates, provides a permeability rate with units expressed in inches per hour and is accompanied by a published source reference. Examples of suitable sources include hydrogeology, geotechnical or engineering text and design manuals, proceedings of American Society for Testing and Materials (ASTM) symposia, or peer-review journals. Neither a soil permeability class rating test, as described in N.J.A.C. 7:9A-6.3, nor a percolation test, as described in N.J.A.C. 7:9A-6.4, are acceptable tests for establishing permeability values for the purpose of complying with this chapter.

i. Soil permeability tests shall be conducted on the most hydraulically restrictive horizon or substratum to be left in place below the basin as follows: Where no soil replacement is proposed, the permeability tests shall be conducted on the most hydraulically restrictive horizon or

substratum within four feet of the lowest elevation of the basin bottom or to a depth equal to two times the maximum potential water depth within the basin, whichever is greater. Where soil replacement is proposed, the permeability tests shall be conducted within the soil immediately below the depth of proposed soil replacement or within the most hydraulically restrictive horizon or substratum to a depth equal to two times the maximum potential water depth within the basin, whichever is greater. Permeability tests may be performed on the most hydraulically restrictive soil horizons or substrata at depths greater than those identified above based upon the discretion of the design or testing engineer. The tested infiltration rate should then be divided by two to establish the soil's design permeability rate. Such division will provide a one-hundred-percent safety factor to the tested rate.

j. The minimum acceptable tested permeability rate of any soil horizon or substratum shall be one inch per hour. Soil materials that exhibit tested permeability rates slower than one inch per hour shall be considered unsuitable for stormwater infiltration. The maximum reportable tested permeability rate of any soil horizon or substratum shall be no greater than 20 inches per hour, regardless of the rate attained in the test procedure.

k. After all construction activities have been completed on the development site and the finished grade has been established in the infiltration BMP, a minimum of one permeability test shall be conducted within the most hydraulically restrictive soil horizon or substratum below the as-built BMP to ensure the performance of the infiltration BMP is as designed. Hand tools and manual permeability test procedures shall be used for the purpose of confirming BMP performance. In addition, the infiltration BMP shall be flooded with water sufficient to demonstrate the performance of the BMP. Test results shall be certified to the Municipal Engineer.

l. A groundwater mounding analysis shall be provided for each stormwater infiltration BMP. The groundwater mounding analysis shall calculate the maximum height of the groundwater mound based upon the volume of the maximum design storm. The professional engineer conducting the analysis shall provide the Municipal Engineer with the methodology and supporting documentation for the mounding analysis used and shall certify to the Borough of Westville, based upon the analysis, that the groundwater mound will not cause stormwater or groundwater to break out to the land surface or cause adverse impact to adjacent surface water



bodies, wetlands or subsurface structures, including but not limited to basements and septic systems. If there is more than one infiltration BMP proposed, the model shall indicate if and how the mounds will interact. The mounding analysis shall be calculated using the most restrictive soil horizon that will remain in place within the explored aquifer thickness, unless alternative analyses is authorized by the Municipal Engineer. The mounding analysis shall be accompanied by a cross section of the infiltration BMP and surrounding topography, and the mound analysis shall extend out to the point(s) at which the mound intersects with the preexisting maximum water table elevation.

m. The applicant shall demonstrate that stormwater Infiltration BMPs meet the seventy-two-hour drain time requirement established in § **330-5B(1)** of this chapter.

D. Pretreatment measures for infiltration BMPs. By reducing incoming velocities and capturing coarser sediments, pretreatment can extend the functional life and increase the pollutant removal capability of infiltration measures. Therefore, the installation of pretreatment measures is recommended for all development sites. Pretreatment measures may include, but are not limited to, the following:

1. Vegetative filter strips;
2. Bioretention systems. Used in conjunction with a bioretention system, the infiltration basin takes the place of the standard underdrain;
3. Sand filters;
4. Grassed swales; and
5. Detention basins.

E. Collection and conveyance.

1. Bicycle-safe inlet grates. Site development plans that incorporate site design features that help to prevent discharge of trash and debris from drainage systems shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this subsection, "solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids.
  - a. Design engineers shall use either of the following grates whenever they use a grate in pavement or another ground surface to collect stormwater from that surface into a storm drain or surface water body under that grate:
    1. The New Jersey Department of Transportation (NJDOT) bicycle-safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (April 1996); or

2. A different grate, if each individual clear space in that grate has an area of no more than seven square inches or is no greater than 0.5 inch across the smallest dimension. Examples of 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.
- b. Whenever design engineers use a curb-opening inlet, the clear space in that curb opening (or each individual clear space, if the curb opening has two or more clear spaces) shall have an area of no more than seven square inches or be no greater than two inches across the smallest dimension.
  - c. This standard does not apply:
    1. Where the review agency 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 these standards.
    2. Where flows from the water quality design storm are conveyed through any device (e.g., end-of-pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:
      - a. A rectangular space  $4 \frac{5}{8}$  inches long and  $1 \frac{1}{2}$  inches wide (this option does not apply for outfall netting facilities); or
      - b. A bar screen having a bar spacing of 0.5 inch.
    3. Where flows are conveyed through a trash rack that has parallel bars with one-inch spacing between the bars, to the elevation of the water quality design storm.
    4. Where the NJDEP 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.
2. Catch basins. Catch basins are storm drain inlets with or without sumps. Catch basins may provide pretreatment for other stormwater BMPs by capturing large sediments. The sediment and pollutant removal efficiency of catch basins depends on the size of the sump and the performance of routine maintenance to retain the available sediment storage space in the sump. Where catch basins with sumps are proposed, the minimum two-foot separation between the bottom of the sump and seasonally high-water table shall be provided.

3. Open or perforated conveyance piping. Where adequate separation to the seasonal high-water table exists, stormwater from the development site may be conveyed to a stormwater basin via a system of perforated pipes. These pipes may be made of PVC or corrugated metal and are available with perforations of varying size and spacing. Perforated pipe specifications shall be certified by a professional engineer. A professional engineer shall certify that perforated conveyance piping will not act to intercept the seasonal high-water table and convey groundwater to the stormwater basin. All open or perforated stormwater conveyance systems shall be installed with a minimum separation of two feet from the seasonal high-water table.

§ 330-14 **Additional sources for technical guidance.**

A. NJDEP technical guidance sources:

1. New Jersey BMP Manual: available from the Division of Watershed Management, New Jersey Department of Environmental Protection, P.O. Box 418, Trenton, New Jersey 08625; or online at <http://www.njstormwater.org>.
2. NJDEP Stormwater Management Facilities Maintenance Manual: available from the Division of Watershed Management, New Jersey Department of Environmental Protection, P.O. Box 418, Trenton, New Jersey 08625; or online at <http://njedl.rutgers.edu/ftp/PDFs/1188.pdf>.

B. Additional guidance sources:

1. New Jersey Pinelands Commission, P.O. Box 7, 15 Springfield Road, New Lisbon, New Jersey 08064; phone: 609-894-7300; website: <http://www.state.nj.us/pinelands>.
2. State Soil Conservation Committee Standards for Soil Erosion and Sediment Control in New Jersey: available from all State Soil Conservation Districts, including Burlington County Soil Conservation District, Tiffany Square, Suite 100, 1289 Route 38, Hainesport, New Jersey 08036; phone: 609-267-7410; fax: 609-267-3347; website: <http://bscd.org>.
3. State Soil Conservation Districts.
4. New Jersey Department of Transportation, P.O. Box 600, Trenton, NJ 08625-0600; phone: 609-530-3536; website: <http://www.state.nj.us/transportation>.

**BE IT FURTHER ORDAINED** that this Ordinance shall take effect immediately upon passage and publication according to law.

*Introduced: January 21, 2021*

*Adopted: February 18, 2021*

**BOROUGH OF WESTVILLE**

**Fritz H. Sims, Jr.**  
**MAYOR**

**ATTEST:**

**Kathleen Carroll**  
**DEPUTY MUNICIPAL CLERK**