

## ARTICLE XXII-B. STORMWATER MANAGEMENT.

### §2201-B. SCOPE & PURPOSE.

- A. Policy Statement. Flood control, groundwater recharge, and pollutant reduction through **nonstructural or low impact techniques shall be fully examined before** relying on structural Best Management Practices (BMP). Structural BMP's should be integrated with nonstructural stormwater management strategies and proper maintenance plans. Nonstructural strategies include both environmentally sensitive site design and source controls that prevent pollutants from being placed on the site or from being exposed to stormwater. Source control plans should be developed based upon physical site conditions and the origin, nature, and the anticipated quantity or amount of potential pollutants. Multiple stormwater management BMP's may be necessary to achieve the established performance standards for water quality, quantity, and groundwater recharge.
- B. Purpose. The purpose of this Ordinance is to establish minimum stormwater management requirements and controls for development.
- C. Applicability. This Ordinance shall be applicable to the following:
1. All major and minor site plans and subdivisions that require review, specifically the following:
    - a. Non-Residential 'major developments', as defined in §202; and
    - b. Residential 'major developments', which are not pre-empted by the Residential Site Improvement Standards (R.S.I.S.) per N.J.A.C. 5:21.
  2. All 'major developments' undertaken by the Township of Cherry Hill.
  3. 'Minor developments', as defined in §202, shall adhere to §2204-B, §2205-B.E and §2205-B.G, under the following conditions:
    - a. If an additional 1/4 acre of impervious surface is being proposed on a development site; and/or
    - b. Any subdivision or minor or major site plan approval, bulk (c) variances for open space, pursuant to N.J.S.A. 40:55D-70c.
- D. Compatibility. Planning and/or Zoning Board approvals issued for subdivisions and site plans, pursuant to this Ordinance, are to be considered an integral part of any land use 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 the Applicant's interpretation and application, the provisions of this Ordinance shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare. This Ordinance 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 Ordinance 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.

### §2202-B. DEFINITIONS.

In addition to the word usage in §201 and definitions provided in §202, the following definitions shall apply to this ordinance, per *Stormwater Management Rules* at N.J.A.C. 7:8-1.2.

- A. MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4): a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) that is owned or operated by the Township of Cherry Hill or other public body, and is designed and used for collecting and conveying stormwater.
- B. STORM DRAIN INLET: an opening in a storm drain used to collect stormwater runoff and includes, but is not limited to, a grate inlet, curb-opening inlet, slotted inlet, and combination inlet.

- C. TIME of CONCENTRATION: the time it takes for runoff to travel from the hydraulically most distant point of the watershed to the point of interest within a watershed.

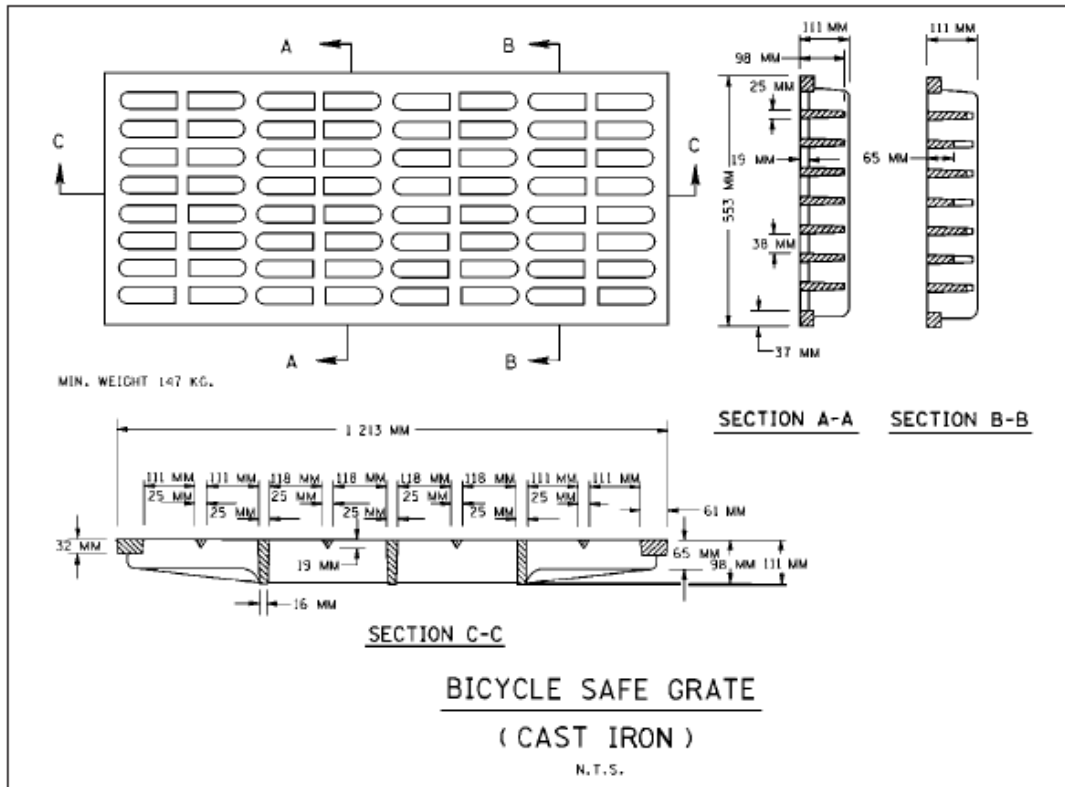
**§2203-B. DESIGN & PERFORMANCE STANDARDS.**

The following design and performance standards for stormwater management measures shall apply:

- A. They shall be developed to meet the erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards, in §2205-B. **To the maximum extent practicable, these standards shall be met by incorporating 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. They 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 are applicable under the *Cooper River Regional Stormwater Management Plan & amendments* (2004, amended 2006) and similar regional plans, adopted in accordance with NJDEP rules.
- C. Alternative standards shall 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*.

**§2204-B. STORM DRAIN INLET RETROFIT.**

- A. Purpose. To retrofit existing storm drain inlets that are in direct contact with repaving, repairing, reconstruction, or resurfacing or alterations of facilities on private property, to prevent the discharge of solids and floatables (such as plastic bottles, cans, food wrappers and other litter) to the municipal separate storm sewer system(s) operated by the Township of Cherry Hill so as to protect public health, safety and welfare, and to prescribe penalties for the failure to comply.
- B. Applicability. The repaving, repairing (excluding the repair of individual potholes), resurfacing (including top coating or chip sealing with asphalt emulsion or a thin base of hot bitumen), reconstructing or altering of any surface that is in direct contact with an existing storm drain inlet on such property.
- C. Exceptions. The following shall be exempt from storm drain inlet retrofit:
1. Residential lot with one single-family dwelling; or
  2. any site that meets the design standards in §2204-B.D, below, to control passage of solid and floatable materials; or
  3. any site that is retrofitted or replaced to meet the design standards in §2204-B.D, below, prior to the completion of the project.
- D. Design Standard. Storm drain inlets identified in §2204-B.B, above, shall comply with the following standards 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. Exemptions to this standard are in §2204-B.C.3.
1. Grates. 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:
    - a. The New Jersey Department of Transportation (NJDOT) bicycle safe grate, as described in Chapter 2.4 of the *NJDOT Bicycle Compatible Roadways and Bikeways Planning & Design Guidelines* (April 1996); or



Source: Standard Roadway Construction Details, NJDOT

- b. 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 basin floors.

2. Curb Opening Inlet. 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 (7) square inches, or be no greater than two (2”) inches across the smallest dimension.
3. Standard Exemptions. This standard does not apply to the following:
  - a. Where the Municipal Engineer, or Planning or Zoning Board Engineer if associated with a Board approval, agrees 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;
  - b. Where flows 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:
    - i. A rectangular space four and five-eighths (4 5/8”) inches long and one and one-half (1 1/2”) inches wide (this option does not apply for outfall netting facilities); or
    - ii. A bar screen having a bar spacing of 0.5” inches.

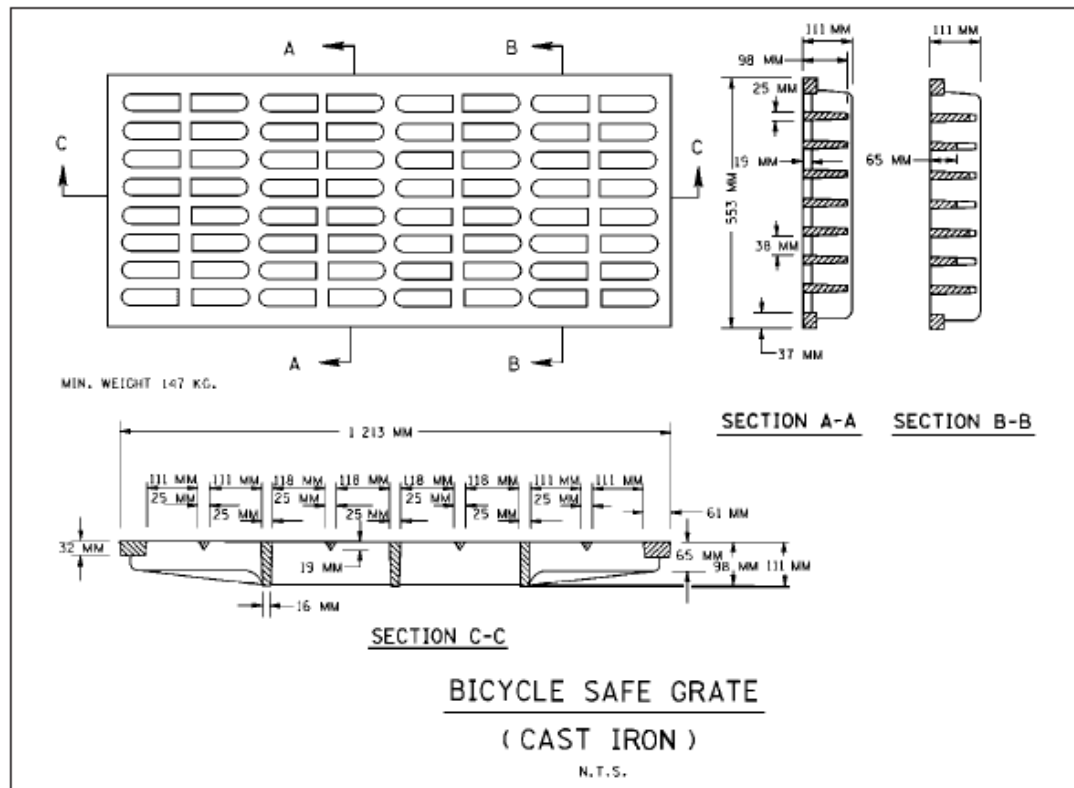
- c. Where flows are conveyed through a trash rack that has parallel bars with one-inch (1") spacing between the bars; or
  - d. Where the New Jersey Department of Environmental Protection (NJDEP) determines, pursuant to the *New Jersey Register of Historic Places Rules of N.J.A.C. 7:4-7.2(c)*, that action to meet this standard is an undertaking that constitutes an encroachment or will damage or destroy the New Jersey Register listed historic property.
- E. **Enforcement.** The compliance of retrofitting existing storm drain inlets, §2204-B, shall be enforced by the Zoning Officer in accordance with Article XI-A.

**§2205-B. MAJOR DEVELOPMENT REQUIREMENTS.**

- A. **Maintenance Plan.** Development shall incorporate a Maintenance Plan for the stormwater management measures incorporated into the design of a major development, in accordance with §2211-B.
- B. **Habitat Protection.** Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species, as documented in the New Jersey Department of Environmental Protection (NJDEP) *Landscape Project* or *Natural Heritage Database*, established under *N.J.S.A. 13:1B-15.147* through *15.150*, particularly *helonias bullata* (swamp pink) and/or *clemmys muhlnebergi* (bog turtle).
- C. **Exemptions.** The construction of the following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of §2205-B.F. & 2205-B.G.:
- 1. An underground utility line, provided that the disturbed areas are re-vegetated upon completion;
  - 2. An above-ground utility line, provided that the existing conditions are maintained to the maximum extent practicable; and
  - 3. A public pedestrian access, such as a sidewalk or trail with a maximum width of fourteen (14') feet, provided that the access is made of permeable material.
- D. **Waiver.** A waiver from strict compliance from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of §2205-B.F & §2205-B.G 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 applicant requesting the waiver can demonstrate the following:
- 1. There is a public need for the project that cannot be accomplished by any other means;
  - 2. An alternatives' analysis shows that through the use of nonstructural and structural stormwater management strategies and measures, the option selected complies with the requirements of §2205-B.F & §2205-B.G to the maximum extent practicable;
  - 3. In order to meet the requirements of §2205-B.F & §2205-B.G, existing structures currently in use, such as homes and buildings, would need to be condemned; and
  - 4. It does not own or have other rights to areas, including the potential to obtain through condemnation lands not falling under §2205-B.D.3 above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of §2205-B.F & §2205-B.G that were not achievable on-site.
- E. **Nonstructural Strategies.**
- 1. To the maximum extent practicable, the standards in §2205-B.F and §2205-B.G. shall be met by incorporating nonstructural stormwater management strategies set forth at §2205-B.E into the design. The nonstructural measures incorporated into the design of the project shall be identified by the applicant. If it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management measures identified in §2205-B.E.2 into

the design of a particular project, the strategy considered shall be identified and a basis provided for the contention.

2. Nonstructural stormwater management strategies incorporated into site design shall:
  - a. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
  - b. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;
  - c. Maximize the protection of natural drainage features and vegetation;
  - d. Minimize the decrease in the "time of concentration" from pre-construction to post construction.
  - e. Minimize land disturbance including clearing and grading;
  - f. Minimize soil compaction;
  - g. Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;
  - h. Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas;
  - i. Provide other source controls to prevent or minimize the use or exposure of pollutants at the site, in order to prevent or minimize the release of those pollutants into stormwater runoff. Such source controls include, but are not limited to:
    - i. Site design features that help to prevent the following
      - (a) accumulation of trash and debris in drainage systems, including features that satisfy §2205-B.E.3.
      - (b) discharge of trash and debris from drainage systems;
      - (c) harmful accumulations of pollutants at industrial or commercial developments; and/or spill containment thereof.
    - ii. When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the *Soil Erosion & Sediment Control Act, N.J.S.A. 4:24-39 et seq.*, and implementing rules.
3. Site design features identified under §2205-B.E.2.i 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.
  - a. Grate. Design engineers shall use either of the following grates whenever a grate is utilized 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, as described in Chapter 2.4 of the *NJDOT Bicycle Compatible Roadways and Bikeways Planning & Design Guidelines* (April 1996); or



Source: Standard Roadway Construction Details, NJDOT

- ii. A different grate, if each individual clear space in that grate has an area of no more than seven (7) 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 basin floors.

- b. Curb-Opening Inlet. 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 (7) square inches, or be no greater than two (2”) inches across the smallest dimension.
- c. Exemptions. This standard does not apply to the following:
  - i. Where the Municipal Engineer, or Planning or Zoning Board Engineer if associated with a Board approval, 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;
  - ii. Where flows from the water quality design storm, as specified in §2205-B.G.1, 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 5/8”) inches long and one and one-half (1 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” inches.

- iii. Where flows are conveyed through a trash rack that has parallel bars with one-inch (1") spacing between the bars, to the elevation of the water quality design storm as specified in §2205-B.G.1; or
  - iv. Where the New Jersey Department of Environmental Protection (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.
4. Any land area used as a nonstructural stormwater management measure to meet the performance standards for erosion control, groundwater recharge, and runoff quantity (§2205-B.F), as well as stormwater runoff quality (§2205-B.G), subject to the following:
    - a. a conservation deed restriction is filed with the Camden County Clerk's office; or
    - b. dedicated to the Township or County; or
    - c. subject to an approved equivalent restriction that the stormwater management measure approved by the Township, Planning Board, or Zoning Board is maintained in perpetuity.
  5. Guidance for nonstructural stormwater management strategies is available in the *New Jersey Stormwater Best Management Practices (BMP) Manual*. The BMP Manual may be obtained from the NJDEP or found on the NJDEP website at [www.njstormwater.org](http://www.njstormwater.org).
- F. Erosion Control, Groundwater Recharge & Runoff Quantity Standards.
1. 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.
    - a. The minimum design and performance standards for erosion control are those established under the *Soil Erosion & Sediment Control Act, N.J.S.A. 4:24-39 et seq.* and implementing rules.
    - b. The minimum design and performance standards for groundwater recharge are as follows:
      - i. Recharge. The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at §2206-B, demonstrate through hydrologic and hydraulic analysis either:
        - (a) The site and its stormwater management measures maintain 100% percent of the average annual pre-construction groundwater recharge volume for the site; or
        - (b) The increase of stormwater runoff volume from pre-construction to post-construction for the two-year storm is infiltrated.
      - ii. Recharge Exceptions. This groundwater recharge requirement does not apply to projects within the "urban redevelopment area," or to the following projects:
        - (a) 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 (EPA)* at 40 CFR 302.4; areas where recharge would be inconsistent with NJDEP 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
        - (b) Industrial Exposure. "Source material" means any material(s) or machinery, located at an industrial facility, which 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.

- iii. Mounding Analysis. 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.
- c. In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at §2206-B, complete one of the following:
  - i. Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the two, ten, and 100-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;
  - ii. Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the two, ten, and 100-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of existing land uses and projected land uses assuming full development under existing zoning and land use ordinances in the drainage area;
  - iii. Design stormwater management measures so that the post-construction peak runoff rates for the two, ten and 100 year storm events are 50, 75 and 80 percent, respectively, of the pre-construction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed. 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
  - iv. In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with §2205-B.F.1.c.i, §2205-B.F.1.c.ii and §2205-B.F.1.c.iii (above) shall only be applied if the increased volume of stormwater runoff could increase flood damages below the point of discharge.
2. Agricultural Development. Any application for a new agricultural development that meets the definition of major development at §2205-B shall be submitted to the Camden County Soil Conservation District for review and approval in accordance with the requirements of this section and any applicable Soil Conservation District guidelines for stormwater runoff quantity and erosion control. For the purposes of this section, “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 manufacturing of agriculturally related products.

G. Stormwater Runoff Quality Standards.

1. Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff by eighty (80%) percent 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 impervious surface is being proposed on a development site.** 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 Pollution Discharge Elimination System* (NJPDES) rules, *N.J.A.C. 7:14A*, or in a discharge specifically exempt under a NJPDES permit from this requirement. The water quality design storm is 1.25” inches of rainfall in two hours. Water quality calculations shall take into account the distribution of rain from the water quality design storm, as reflected in TABLE 1. The calculation of the volume of runoff may take into account the implementation of non-structural and structural stormwater management measures.
2. For purposes of TSS reduction calculations, TABLE 2 below presents the presumed removal rates for certain BMPs designed in accordance with the *New Jersey Stormwater Best Management Practices (BMP) Manual*. The BMP Manual may be obtained from the NJDEP ([www.njstormwater.org](http://www.njstormwater.org)). The BMP Manual and other sources of technical guidance are listed in §2212-B. TSS reduction shall be calculated based on the removal rates for the BMPs in TABLE 2 below. 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 NJDEP at the following address: Division of Watershed Management, New Jersey Department of Environmental Protection, PO Box 418 Trenton, New Jersey, 08625-0418.

**TABLE 1**  
**Water Quality Design Storm Distribution**

Time (Minutes)	Cumulative Rainfall (Inches)
0	0
5	0.0083
10	0.0166
15	0.025
20	0.05
25	0.075
30	0.1
35	0.133
40	0.166
45	0.2
50	0.2583
55	0.3583
60	0.625
65	0.8917
70	0.9917
75	1.05
80	1.084
85	1.117
90	1.15
95	1.175
100	1.2
105	1.225
110	1.2334
115	1.2417
120	1.25

**TABLE 2**  
**TSS Removal Rates for BMPs**

Best Management Practice	TSS Percent Removal Rate
Bioretention Systems	90
Constructed Stormwater Wetland	90
Extended Detention Basin	40-60
Infiltration Structure	80
Manufactured Treatment Device	See 2206-B.C
Sand Filter	80
Vegetative Filter Strip	60-80
Wet Pond	50-90

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

$$R = A + B - (AXB)/100$$

Where

- R = total TSS percent load removal from application of both BMPs, and
- A = the TSS percent removal rate applicable to the first BMP
- B = the TSS percent removal rate applicable to the second BMP

4. If there is more than one onsite drainage area, the eighty (80%) percent TSS removal rate 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.
5. 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 §2203-B.F and 2203-B.G.
6. 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.
7. Special Water Resource Protection Areas shall be established along all waters designated Category One, per *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 Camden County Soil Survey, 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:
  - a. Special Water Resource Protection Area shall be preserved and maintained in accordance with the following:
    - i. Buffer. A 300'-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 centerline of the waterway where the bank is not defined, consisting of existing vegetation or vegetation allowed to follow natural succession is provided.
    - ii. Encroachment. Encroachment within the designated Special Water Resource Protection Area, per §2205-B.G.7, shall only be allowed where previous development or disturbance has occurred (for example, active agricultural use, parking area or maintained lawn area). Any encroachment shall only be allowed where applicant demonstrates to the Planning or Zoning Board 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 centerline of the waterway where the bank is undefined. All encroachments proposed under this subparagraph shall be subject to review and approval by the NJDEP.
  - b. 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 & Sediment Control in New Jersey," established under the *Soil Erosion & Sediment Control Act*, *N.J.S.A. 4:24-39 et seq.* 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 & Sediment Control in New Jersey," established under the *Soil Erosion & 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:
    - i. Stabilization measures shall not be placed within 150' feet of the Category One waterway;
    - ii. Stormwater associated with discharges allowed under -G.7.b., shall achieve a 95 percent TSS post-construction removal rate;

- iii. Temperature shall be addressed to ensure no impact on the receiving waterway;
  - iv. 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;
  - v. A conceptual project design meeting shall be held with the Municipal Engineer, or Planning or Zoning Board Engineer if associated with a Board approval and Camden County Soil Conservation District staff to identify necessary stabilization measures and all encroachments proposed under this section shall be subject to review and approval by NJDEP.
- d. A Stream Corridor Protection Plan may be developed by a regional stormwater management planning committee as an element of *Cooper River Regional Stormwater Management Plan & amendments (2004, amended 2006)* and similar regional plans, or by the Township through the *Cherry Hill Stormwater Management Plan*. If a stream corridor protection plan for a waterway subject to §2205-B.G.8 has been approved by NJDEP 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 §2205-B.G.8 shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in §2205-B.G.7. 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.
- e. Exemption. The requirements of §2205-B.G.7 shall not apply to the construction of one individual single family dwelling, which is not part of a larger development on a lot receiving preliminary or final subdivision approval on or before February 2, 2004, provided that the construction began on or before February 2, 2009.
8. Additional information and examples are contained in the *New Jersey Stormwater Best Management Practices (BMP) Manual*, which is available at [www.njstormwater.org](http://www.njstormwater.org).

**§2206-B. CALCULATION OF STORMWATER RUNOFF & GROUNDWATER RECHARGE.**

- A. Stormwater Runoff. 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 & Dimensionless Unit Hydrograph*, as described in the *NRCS National Engineering Handbook Section 4 – Hydrology & 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 pre-construction 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 §2206-B.A.1.a and the Rational & Modified Rational Methods at §2206-B.A.1.b. 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 have 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 pre-construction stormwater runoff, the design engineer shall account for all significant land features and structures, such as ponds, wetlands, depressions, hedgerows, or culverts, which may reduce pre-construction 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.** Groundwater recharge may be calculated in accordance with 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 (BMP) Manual*; at <http://www.state.nj.us/dep/njgs/> (or at New Jersey Geological Survey, 29 Arctic Parkway, P.O. Box 427 Trenton, New Jersey 08625-0427; (609) 984-6587).

**§2207-B. STRUCTURAL STANDARDS.**

- A. Structural stormwater management measures shall be designed to the following standards:
1. To address the existing site conditions; including, for example, 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. 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 (1") 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 (1/3) the width of the diameter of the orifice or one-third (1/3) the width of the weir, with a minimum spacing between bars of one-inch and a maximum spacing between bars of six (6") inches. In addition, the design of trash racks must comply with the requirements of §2209-B.A.1.
  3. To be strong, durable, and corrosion resistant. Measures that are consistent with the relevant portions of the *Residential Site Improvement Standards (R.S.I.S.)* at *N.J.A.C. 5:21-7.3, 7.4, and 7.5* shall be deemed to meet this requirement.
  4. At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of two and one-half (2.5") inches in diameter.
  5. Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins, as outlined in §2209-B.
- B. Stormwater management measure guidelines are available in the *New Jersey Stormwater Best Management Practices Manual*. Other stormwater management measures may be utilized provided the design engineer demonstrates that the proposed measure and its design will accomplish the required water quantity, groundwater recharge and water quality design and performance standards established by §2203-B.

- C. Manufactured treatment devices may be used to meet the requirements of §2205-B of this Ordinance provided the pollutant removal rates are verified by the *New Jersey Corporation for Advanced Technology* and certified by the New Jersey Department of Environmental Protection.

**§2208-B. TOWNSHIP STANDARDS.**

A. Variances.

1. A variance from providing sufficient stormwater management basins may be requested of the Planning or Zoning Board, in accordance with *N.J.S.A. 40:55D-70c*. A variance may be granted if a finding that the deficiency will be mitigated by the construction of a stormwater project within the same subdrainage area (HUC-14). The mitigation project must provide the additional groundwater recharge benefits or protection from water quality (TSS removal) or quantity (rate of flow reduction) to compensate for the deficit from the design and performance standards resulting from the proposed project. The proposed project must meet the design and performance standards set forth in this stormwater ordinance.
2. If a suitable site cannot be located in the same sub-drainage area as the proposed development, as in §2208-B.A.1, the mitigation project may provide mitigation that is not equivalent to the impacts for which the exemption is sought, but that addresses the same issue.

For example, if an exemption is given because the peak rate of reduction of 50 percent for the two year storm cannot be met, the selected project may address reducing the orifice size at an existing stormwater management basin.

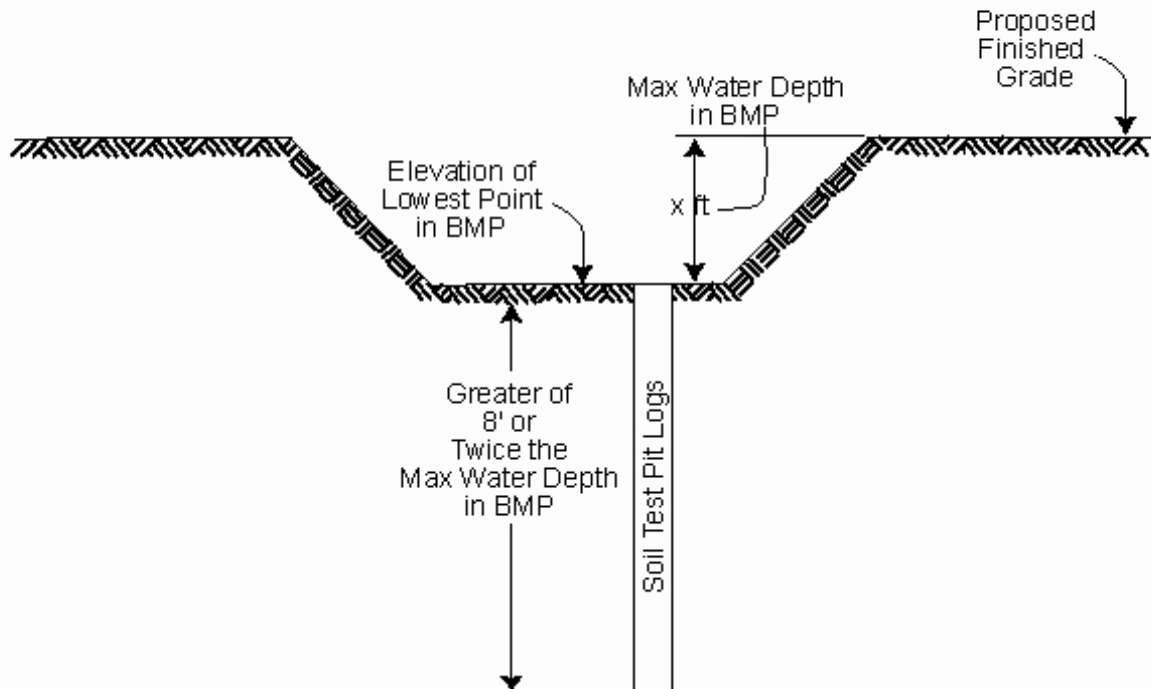
As another example, if an exemption is given because the removal of 80 percent of the Total Suspended Solids cannot be met, the selected project may provide a natural vegetated buffer around a lake edge to discourage the geese population and address water quality impacts due to fecal impairment.

3. Construction of real mitigation projects to offset the deficit from the design and performance standards resulting from the proposed project through §2208-B.A.1 or .2 is recommended. However, the Cherry Hill Planning or Zoning Board may permit a developer to provide full funding or partial funding to the Township for a project listed in the *Cherry Hill Stormwater Management Plan*. Partial funding or full funding must equal or exceed the value of providing the stormwater design on the development site. The value of full funding will include the value to implement the project, including costs to purchase property, easements and long term property maintenance.
  4. In order to justify a variance, an applicant must demonstrate that the variance for the development cannot be met due to unusual circumstances on the existing property. Variances are not recommended for greenfields, i.e. properties that are currently open space or have not been previously developed.
  5. In order to justify a variance, a preliminary stormwater management design and cost analysis of the stormwater system that would be required to meet the recharge, water quality (TSS removal) and water quantity (peak rate of reduction) stormwater management requirements of this Ordinance. This analysis will be utilized to determine and select the mitigation project to be constructed by the applicant.
  6. The developer must ensure the long term maintenance of the project, including the maintenance requirements under Chapters 8 and 9 of the NJDEP BMP Manual.
- B. Mitigation Projects. Exemptions or design waiver(s) are to be granted only upon the condition that the applicant provides one or more of the following mitigation projects of equal value within the same sub-watershed as delineated by the HUC 14. The selection of the mitigation project(s) are to be under the review and approval of the Planning or Zoning Board Engineer, as applicable. The mitigation projects proposed within the Township of Cherry Hill are listed in the *Cherry Hill Stormwater*

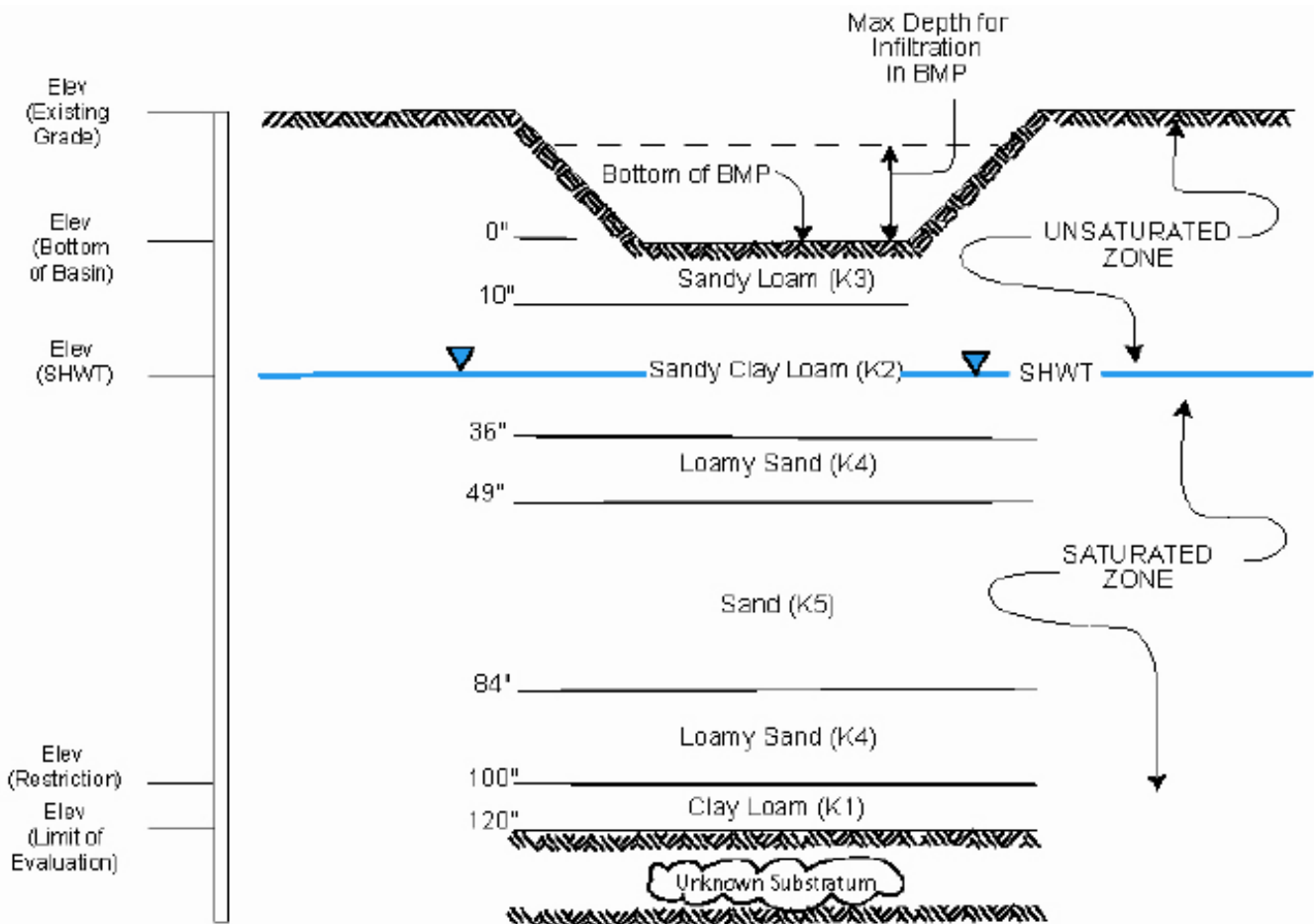
*Management Plan* and the list of mitigation projects will be updated and maintained by the Director of Public Works and the person responsible for the New Jersey Department of Environmental Protection NJPDES Municipal Separate Storm Sewer (MS4) Permit. The Mitigation Projects fall into the following basic categories:

1. Stormwater Outfall Retrofit. Provide retrofit measures at existing stormwater outfalls within the same HUC14 under the guidance of the Board Engineer and Municipal Engineer:
  - a. Outlet Structure Modifications (for example, repair of outfall condition through installation of drop manhole, upgraded outfall structure, rip-rap apron, or scour hole).
  - b. Installation of in-line or end-of-pipe Best Management Practice (BMP) as approved by the NJDEP to treat stormwater draining into an existing outfall. The approved treatment devices can be found on [www.njstormwater.org](http://www.njstormwater.org)
2. River, Stream or Lake Bank Stabilization. Stabilization projects to reduce the total suspended solids:
  - a. Stabilization of eroded river, creek or lake banks where public or private property or structures are threatened.
  - b. Stabilization of eroded river, creek or lake banks to reduce sediment deposition and improve water quality.
3. Stormwater Basin Retrofit. Stormwater Basin retrofit projects to provide water quality and recharge measures within the same HUC14. The retrofit of existing basins may be accomplished through one or more of the following applications:
  - a. Outlet Structure Modifications.
  - b. Regrading, Design and Landscaping, in accordance with §2208-B.F.
  - c. Elimination of Low Flow Channels.
  - d. Installation of in-line or end-of-pipe Best Management Practice (BMP), as approved by the NJDEP, to treat stormwater draining into an existing outfall. The approved treatment devices can be found on [www.njstormwater.org](http://www.njstormwater.org).
4. Stormwater Outfall Restoration. Mitigation of Existing Stormwater Outfalls within the same HUC14 shall be under the guidance of the Cherry Hill Township Engineer and/or Public Works Department. The retrofit of existing outfalls may be accomplished through a variety and/or combination of options to meet the mitigation costs required. Review of each existing outfall condition should be reviewed with the Township before selecting one or more of the following options:
  - a. Replacement of failed outfall structure with outlet protection.
  - b. Replacement with installation of drop manhole to set outfall structure at invert of stream channel with outlet protection.
  - c. Installation of in-line or end-of-pipe Best Management Practice (BMP) as approved by the NJDEP to pretreat stormwater before the outfall structure.
  - d. Disconnect outfall from receiving waterway to eliminate erosion condition. Permitted only with detailed hydrologic analysis and stability analysis of the receiving area.
5. Lake & Pond Management. The improvement of lake and ponds shall be mitigated by providing the following:
  - a. A comprehensive management plan and maintenance schedule for a publicly held lakes or ponds within Cherry Hill Township.
  - b. A lake edge stabilization project through the use of native plants and erosion control.
  - c. A geese management plan through the vegetation of lake edge to reduce the fecal impairment of the lake or pond.

- C. Underground Detention Basins. Underground detention facilities are not recommended as a design solution for residential development. The Township of Cherry Hill will not accept maintenance responsibility for underground stormwater detention facilities or stormwater outflow control structures located within stormwater inlets within the public right-of-way.
- D. Setbacks. Detention and/or infiltration basins shall not be permitted in any of the following locations:
  - 1. front yard setbacks, per the zone of which the subject basin is located within, and
  - 2. side yard setbacks, per the zone of which the subject basin is located within, and
  - 3. residential buffers, per Article 25, and
  - 4. sight triangle areas, per AASHTO standards, and
  - 5. within ten (10') feet of any property line.
- E. Soils. Soil analysis requirements for stormwater measures shall conform to *New Jersey Stormwater Best Management Practices Manual, Appendix E*, specifically the following:
  - 1. Explorations. Soil explorations (soil profile pits and soil borings) shall extend to whichever is greater of the following:
    - a. a minimum depth of eight (8') feet below the lowest elevation of the basin bottom; or
    - b. a depth of at least twice the maximum potential water depth in the proposed BMP.
  - 2. Permeability. Soil permeability tests shall be conducted on the most hydraulically restrictive horizon or substratum to be left in place below the BMP as follows:
    - a. When no soil replacement below the bottom of the BMP is proposed, permeability tests shall be conducted on whichever is greatest of the following:
      - i. the most hydraulically restrictive horizon or substratum above the SHWT; or
      - ii. bedrock within eight (8') feet of the lowest elevation of the basin bottom, or
      - iii. bedrock to a depth equal to twice the maximum potential water depth within the basin.
    - b. When soil replacement below the bottom of the BMP is proposed, permeability tests shall be conducted on whichever is greatest of the following:
      - i. the most hydraulically restrictive horizon or substratum below the depth of soil replacement and above the SHWT; or
      - ii. bedrock eight (8') feet below the elevation of the basin bottom, or
      - iii. bedrock to a depth equal to twice the maximum potential water depth within the basin.



- c. Artesian Conditions. Stormwater infiltration BMPs shall not be installed in soils that exhibit artesian groundwater conditions. Refer to N.J.A.C 7:9A-5:8 to recognize the zone of saturation. A hydraulic head test, as defined at N.J.A.C. 7:9A-5.9 shall be conducted in all soils that immediately underlie a perched zone of saturation to determine whether an artesian condition exists.
  - d. Fractured Bedrock. Stormwater infiltration BMPs relying on fractured bedrock for exfiltration shall not be installed without a minimum of two (2') feet between the bottom of the infiltration basin and the bedrock. Where the permeability rate of the bedrock is critical to the function of the basin, the design engineer shall demonstrate that appropriate testing methods as discussed in §2208-B.E.3are utilized to establish the permeability rates of the infiltration basin. The number of permeability tests shall be no less than the tests required for permeability in the soil.
3. Soil Tests. A minimum of one (1) permeability test shall be performed at each soil profile pit and soil boring location. Permeability rates can be determined as described in the Addendum using the *Tube Permeameter Test*, the *Percolation Test*, *Pit Bailing Test* or *Basin flooding test* (for bedrock). Also *ASTM D 3385 (Double-Ring infiltrometer)*, *USBR 7300-89 (Well Permeameter Method)*, or other Constant head permeability tests that utilize in-situ conditions and accompanied by a recognized published source reference can be used for establishing the permeability rates.



4. A soil log shall be prepared for each soil profile pit and soil boring. The soil boring log shall, at a minimum, provide the following:
- a. elevation of the existing ground surface and elevations of permeability test locations;
  - b. the depth and thickness of each soil horizon and the depth to the substratum;

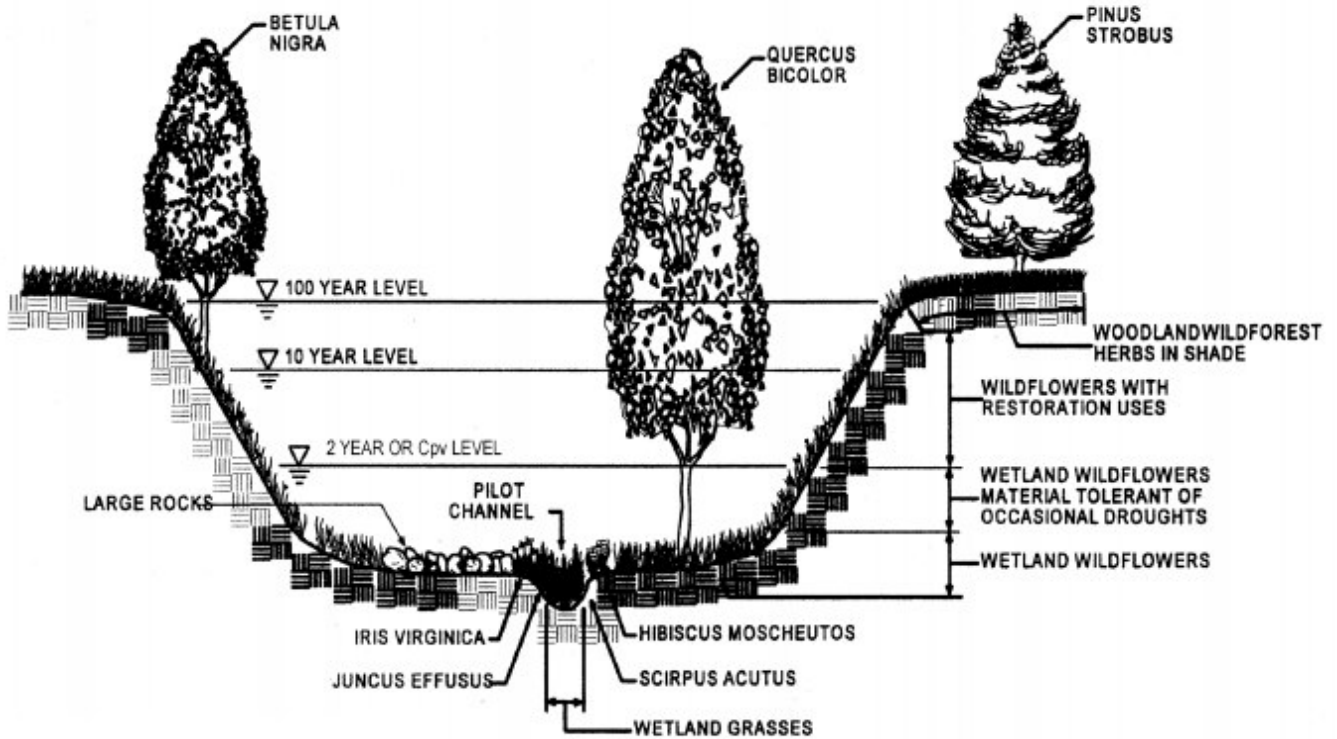
- c. the dominant matrix or background and mottle colors using the *Munsell* system of classification for hue, value and chroma;
- d. the appropriate textural class as shown on the USDA textural triangle; the volume percentage of coarse fragments larger than two (2) millimeters in diameter; the abundance, size, and contrast of mottles;
- e. the soil moisture condition, using standard USDA classification terminology;
- f. the presence of any soil horizon, substratum or other feature that exhibits an in-place permeability rate less than one (1") inch per hour; the depth and occurrence of soil restrictions including, but not limited to, abrupt textural boundaries likely to restrict the movement of water, fragipans, dense materials, bedrock, and ortstein;
- g. the depth to the seasonally high ground water level, either perched or regional;
- h. the static (stabilized) water level, presence of soil mottles or other redoximorphic features; and
- i. any observed seepage or saturation.

F. Landscaping & Design.

1. Intent. Detention and retention basins should appear as natural as possible, in addition to functionality, to be a community asset in addition to infrastructure. Essentially, during dry weather these basins will appear as shallow depressions in which native plants grow, while during periods of heavy rain the basins will appear as natural ponds. Detention basins are not intended as long-term seasonal water features; basins will be filled with water only during peak storm flows, after which time water levels will diminish.
2. Requirements. To achieve this goal, the following shall govern the design of basins in all non-residential developments and residential developments, unless superseded by the RSIS Subchapter 7:
  - a. Basins shall not be constructed of concrete or other human-made materials, except at spillways, inlets, and other such control structures.
  - b. The shape of the basin shall be irregular and asymmetrical in nature, maximizing the preservation of existing tree stands and vegetation.
  - c. The sides of basins shall be gently-sloping with a maximum slope ratio shall not exceed 4:1. A design waiver may be requested from the Planning or Zoning Board, provided additional stabilization methods are applied, such as turf reinforcement mats, erosion control blankets, and application of seed mixes with quick germination rates.
  - d. Mowing shall be prohibited in the Zone 1 of the basin and limited to a maximum of twice per year in Zone 2 and 3.
  - e. Only native species of landscaping shall be utilized, as listed in the *New Jersey Stormwater Best Management Practices Manual*.
  - f. The application of fertilizer shall be restricted, utilizing Integrated Pest Management (IPM) strategies to maintain basin plantings.
  - g. The use of fountains, falls, benches, educational signage, patios, walkways, overlooks and similar are encouraged around the periphery, to make the site as park-like as possible.
  - h. Landscaping should be a minimum of five (5') feet from basin infrastructure, including but not limited to a dam's toe of slope, perforated pipes, riser structure, low flow orifice, inlets, and similar.
3. Landscaping Zones. Stormwater basins, whether they function as retention or detention basins, all have a zone of influence generally based on the occurrence of storms, i.e. a series of concentric bands or planting zones, where various physical and environmental components such as soil type, water depth, water fluctuations, velocity, and slope, collectively and/or individually influence the kinds of plants which will tolerate such conditions and thrive. Each planting zone or band requires its own plant type to properly perform its mutually critical role. Plants have differing tolerances to inundation; the four zones described in this section will dictate which plants will survive where (every facility does not necessarily exhibit all of these zones). These zones are as follows:

TABLE 3  
Landscaping Zones

Zone	Storm Water Level	Hydrologic Conditions	Deciduous Trees	Evergreen Trees	Shrubs	Groundcover	Seed
1	2-Year Storm	regularly inundated	min. 1/10,000sf	not required	10% cover	25% cover	15 lbs/acre
2	10-Year Storm	periodically inundated	min. 1/6,000sf	not required	20% cover	50% cover	20 lbs/acre
3	100-Year Storm	infrequently inundated	min. 1/5,000sf	min. 1/10,000sf	30% cover	40% cover	20 lbs/acre
4	Basin Periphery (within 20')	seldom or never inundated	min. 1/3,000sf	min. 1/4,000sf	30% cover	30% cover	60 lbs/acre



Source: Claytor and Schueler 1997.

- a. **Zone 1 (2-Year Storm).** Zone One generally encompasses up to the two (2) year flood recurrence interval, which is a flood of extreme magnitude that has a fifty (50%) percent chance of happening in any year. This area commonly extends vertically about one (1') foot from the basin bottom. As this zone is regularly inundated, this area is the most difficult to establish since plants must be able to withstand inundation of water during storms, when wind might blow water into the area, or the occasional drought during the summer. To stabilize the soil in this zone, Zone 1 must have a vigorous cover. Types of landscaping, as required in TABLE 3, are as follows:
  - i. Deciduous trees shall be a minimum caliper (diameter) of two (2") inches, six (6") inches from the ground. Acceptable species include river birch (*betula nigra*), green ash (*fraxinus pennsylvanica*), white ash (*fraxinus americana*), red maple (*acer rubrum*), willow oak (*quercus phellos*), swamp white oak (*quercus bicolor*), sweetgum (*liquidambar styraciflua*), black gum (*nyssa sylvatica*), and American sycamore (*platanus occidentalis*).
  - ii. Evergreen trees are not required in this zone.
  - iii. Shrubs shall be a minimum of twenty-four (24") inches in height. Acceptable species include pussy willow (*salix discolor*), swamp rose (*rosa palustris*), buttonbush (*cephalanthus occidentalis*), highbush blueberry (*vaccinium spp.*), arrowwood (*viburnum dentatum*), spicebush (*lindera Benzoin*), sweetbells (*leucothoe racemosa*), sweet pepperbush (*clethra alnifolia*), winterberry (*ilex verticillata*), inkberry holly (*ilex glabra*), sweet bay magnolia (*magnolia*

- virginiana*), red osier/silky dogwood (*cornus stolonifera/amomum*), grey dogwood (*cornus racemosa*), black willow (*salix nigra*), and serviceberry (*amelanchier spp.*).
- iv. A natural seed mix of natural prairie, meadow or wildflower shall be utilized at 80 lbs/acre. Mixtures should include 20% Annual Ryegrass, 20% Fowl Bluegrass, 20% Foxsedge, 7% Ticklegrass, 5% Soft Rush, 5% Lurid Sedge, 5% Showy Tickseed Sunflower, 3% Green Bulrush, 3% Joe-Pye Weed, 3% Blue Vervain, 2% Nodding-Bur Marigold, 2% Rough Leaved Goldenrod, 2% Boneset, 1% Marsh Blazing Star, 1% Sensitive Fern, 1% Purple Stem Aster. Turf grass seed mixes, comprised primarily of Kentucky Bluegrass, Tall Fescue or Perennial rye is not permitted. Acceptable groundcover planting species include cardinal flower (*lobelia cardinalis*), blue flag iris (*iris versicolor*), sweet flag (*acorus calamus*), Marsh marigold (*caltha palustris*), swamp milkweed (*asclepias incarnata*), redtop (*agrostis spp.*), switchgrass (*panicum virgatum*), Canada bluejoint (*calamagrostis canadensis*), many bulrushes (*scirpus spp.*), and spike rushes (*eleocharis spp.*).
- b. Zone 2 (10 Year Storm). Zone Two is the area below the ten (10) year flood recurrence interval, which is a flood of extreme magnitude that has a ten (10%) percent chance of happening in any year. This zone generally extends from 1' to 4' feet above the basin floor. Plants in this zone are subject to periodic inundation after storms and may experience saturated or partly saturated soil. Types of landscaping, as required in TABLE 3, are as follows:
- i. Deciduous trees shall be a minimum caliper (diameter) of two (2") inches, six (6") inches from the ground. Acceptable species include green ash (*fraxinus pennsylvanica*), river birch (*betula nigra*), sweetgum (*liquidambar styraciflua*), American hornbeam (*carpinus caroliniana*), persimmon (*diospyros virginiana*), and red maple (*acer rubrum*).
  - ii. Evergreen trees are not required in this zone.
  - iii. Shrubs shall be a minimum of twenty-four (24") inches in height. Acceptable species include hollies (*illex spp.*), steeplebush (*spirea tomentosa*), serviceberry (*amelanchier arborea*), nannyberry (*viburnum lentago*), sweet pepperbush (*clethra alnifolia*), bayberry (*morella pensylvanica*), elderberry (*sambucus canadensis*), sweetbay magnolia (*magnolia virginiana*), hawthorn (*crataegus*), and shrub dogwoods (*cornus spp.*).
  - iv. A natural seed mix of natural prairie, meadow or wildflower shall be utilized at 20 lbs/acre. Mixtures should include 25% Annual Ryegrass, 15% Little Bluestem, 10% Fowl Bluegrass, 10% Partridge Pea, 10% Ticklegrass, 10% Sideoats Grama, 5% Blunt Broom Sedge, 4% Showy Tick Trefoil, 3% Black Eyed Susan, 3% Ox-Eye Sunflower, 2% Broom Sedge, 1% Zig-Zag Aster, 1 % Marsh Blazing Star, 1% Butterfly Milkweed. Turf grass seed mixes, comprised primarily of Kentucky Bluegrass, Tall Fescue or Perennial rye is not permitted. Acceptable groundcover planting species include asters (*aster spp.*), goldenrods (*solidago spp.*), beebalm (*monarda didyma*), bergamont (*monarda fistulosa*), lobelias (*lobelia spp.*), coneflower (*rudbeckia spp.*), violets (*viola spp.*), lilies (*lilium spp.*), primrose (*oenothera spp.*), milkwort (*polygala spp.*), and flatsedge (*cyperus spp.*).
- c. Zone 3 (100 Year Storm). Zone Three is the area below the one hundred (100) year flood recurrence interval, which is a flood of extreme magnitude that has a one (1%) percent chance of happening in any year. This zone is infrequently inundated by floodwaters that quickly recede in a day or less. It's important to stabilize the steep slopes characteristic of this zone and establish low maintenance natural vegetation. Types of landscaping, as required in TABLE 3, are as follows:
- i. Deciduous trees shall be a minimum of minimum caliper (diameter) of two (2") inches, six (6") inches from the ground. Acceptable species include American hornbeam (*carpinus caroliniana*), cherries (*prunus spp.*), willow oak (*quercus phellos*), hickories (*carya spp.*), and witch-hazel (*hamamelis virginiana*).
  - ii. Evergreen trees shall be a minimum of six (6') feet in height. Acceptable species include White Fir (*abies concolor*), Eastern Red Cedar (*juniperus virginiana*), Norway Spruce (*picea*

- abies*), Colorado Spruce (*picea pungens*), Japanese Black Pine (*pinus thunbergi*), and Douglas Fir (*pseudotsuga taxifolia*).
- iii. Shrubs shall be a minimum of twenty-four (24") inches in height. Acceptable species include phlox (*phlox spp.*), solomon's seal (*polygonatum biflorum*), many fescues (*festuca spp.*), many viburnums (*viburnum spp.*), and Virginia rose (*rosa virginiana*).
  - iv. A natural seed mix of natural prairie, meadow or wildflower shall be utilized at 80 lbs/acre. Acceptable species include phlox (*phlox spp.*) and many fescues (*festuca spp.*). Turf grass seed mixes, comprised primarily of Kentucky Bluegrass, Tall Fescue or Perennial rye is not permitted. Acceptable groundcover planting species include Trumpet creeper (*campsis radicans*), Wintercreeper Euonymus (*euonymus fortunei vegetus*), English Ivy (*hedera helix*), Shore Juniper (*juniperus conferta*), Andorra Juniper (*juniperus horizontalis plurnosa*), Packasandra (*pacysandra terminalis*), Virginia Creeper (*parthenocissus qitiuquefolia*), Grapes sp. (*vitis sp.*), and Myrtle (*vinca minor*).
- d. Zone 4 (Basin Periphery). Zone Four encompasses the area approximately twenty (20') feet above the one hundred (100) year flood recurrence interval, or top of the basin. The placement of plants in this zone is important since it is the most visible area and screen undesirable views, serve as a buffer, and provide shade to allow a greater variety of plant materials. Types of landscaping, as required in TABLE 3, are as follows:
- i. Deciduous trees shall be a minimum of minimum caliper (diameter) of two (2") inches, six (6") inches from the ground. Acceptable species include Basswood (*tilia americana*), Flowering Dogwood (*cornus florida*), Redbud (*cercis canadensis*), Sassafras (*sassafras albidum*), American Beech (*fagus grandifolia*), White Ash (*fraxinus americana*), Scarlet Oak (*quercus coccinea*), White Oak (*quercus alba*), and Black Oak (*quercus velutina*).
  - ii. Evergreen trees shall be a minimum of six (6') feet in height. Acceptable species include White Fir (*abies concolor*), Eastern Red Cedar (*juniperus virginiana*), Norway Spruce (*picea abies*), Colorado Spruce (*picea pungens*), Japanese Black Pine (*pinus thunbergi*), and Douglas Fir (*pseudotsuga taxifolia*).
  - iii. Shrubs shall be a minimum of twenty-four (24") inches in height. Acceptable species include Bayberry (*myrica pennsylvanica*), Blackhaw (*viburnum prunifolium*), Fragrant Sumac (*rhus aromatica*), Highbush Blueberry (*vaccinium corymbosum*), Inkberry (*ilex glabra*), Potentilla (*potentilla fruticosa*), Red Cedar (*juniperus virginiana*), and Serviceberry (*amelanchier canadensis*).
  - iv. Fine fescues (*festuca spp.*) and groundcover plantings are acceptable in this zone.
4. Process. Basin landscaping shall be shown on a landscaping plan or separate basin landscaping plan, as part of any site or subdivision plan application, per Article VIII-A.

#### **§2209-B. SAFETY STANDARDS.**

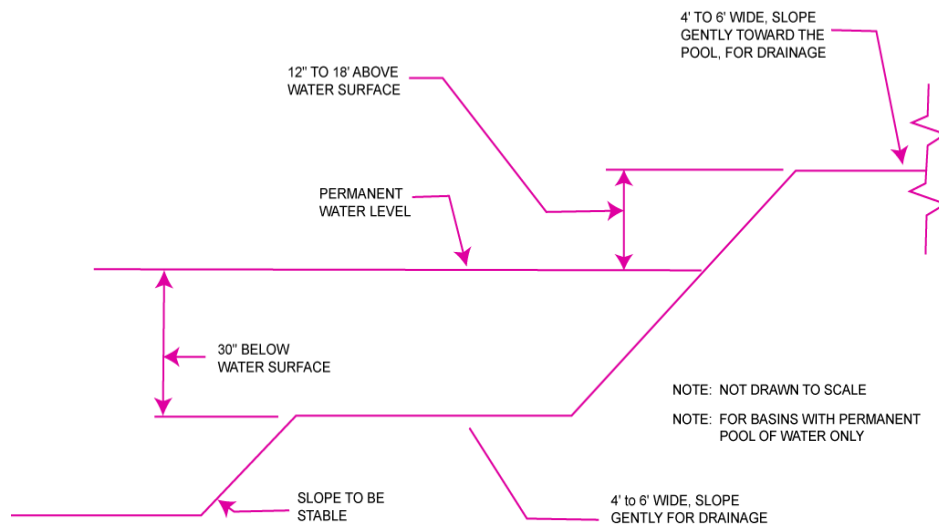
Safety standards shall be required to protect public safety through the proper design and operation of stormwater management basins, which shall apply to any new or modified stormwater management basin.

##### **A. Requirements.**

1. Trash Rack. 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 (6") 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 lbs./square foot.
2. Overflow Gate. 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 lbs./ft sq.
3. Escape Provisions. For purposes of stormwater basins, escape provisions mean 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 Planning or Zoning Board Engineer identified in §2209-B.B, a free-standing 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 two and one-half (2.5') feet. Such safety ledges shall be comprised of two steps. Each step shall be four to six (4-6') feet in width. One step shall be located approximately two and one-half feet below the permanent water surface, and the second step shall be located one to one and one-half feet above the permanent water surface. See below for an illustration of safety ledges in a stormwater management basin.

Depicted is an elevational view.



- c. In new stormwater management basins, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than 3 horizontal to 1 vertical.

B. Exemptions & Design Waivers. An exemption or design waiver from the safety standards for stormwater management basins may be granted only upon a written finding by the Township

Planning or Zoning Board, which shall deem that the exemption or design waiver will not constitute a threat to public safety.

**§2210-B. SITE DEVELOPMENT STORMWATER PLAN.**

**A. Requirement.**

1. All development subject to this Ordinance, which requires Planning or Zoning Board approval, shall require a site development stormwater plan that addresses items listed in the Checklist for the Site Development Stormwater Plan at §2210-B.D. This shall be submitted as part of the part of a complete Board application for subdivision or site plan approval.
2. The applicant shall demonstrate that the project meets the standards set forth in this Ordinance.
3. The applicant shall submit 3 double-sided paper copies and one electronic copy in .PDF or comparable format of the Stormwater Plan and any additional materials listed in the checklist, in accordance with §2210-B.D of this Ordinance.

**B. Approval.** All stormwater management facilities and infrastructure shall be reviewed as a part of the subdivision or site plan review process by the applicable Planning or Zoning Board, with the guidance and recommendations of 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 Ordinance.

**C. Location.** All stormwater management facilities and infrastructure in association with a major residential site plan shall be constructed on a separate lot specifically reserved for such purpose, unless otherwise approved by the Planning Board or Zoning Board of Adjustment, whichever the case may be. Where the area designated for stormwater management facilities are part of a residential major site plan, the areas devoted to these stormwater management purposes shall not be counted as part of the required open space.

**D. 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 1"=200' or greater, showing 2-foot contour intervals. The map as appropriate may indicate the following: existing surface water drainage, shorelines, steep slopes, soils, erodible soils, perennial or intermittent streams that drain into or upstream of the Category One waters, wetlands and flood plains along with their appropriate buffer strips, marshlands and other wetlands, pervious or vegetative surfaces, existing man-made structures, roads, bearing and distances of property lines, and significant natural and manmade features not otherwise shown.
2. **Environmental Site Analysis.** A written and graphic description of the natural and human-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 & 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 ground water elevations. A written description of the site plan and justification of proposed changes in natural conditions may also be provided.
4. **Land Use Planning & Source Control Plan.** This plan shall provide a demonstration of how the goals and standards of §2203-B, 2205-B, and 2206-B 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 pre-development and post-development conditions for the design storms specified in §2205-B of this Ordinance.
  - 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 onsite 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 & Repair Plan. The design and planning of the stormwater management facility shall meet the maintenance requirements of §2211-B.
8. Waiver from Submission Requirements. The applicable Board reviewing an application under this Ordinance may waive submission upon request of the applicant of any of the requirements in §2210-B.C.1 through 2210-B.C.7, if 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.

#### **§2211-B. MAINTENANCE & REPAIR.**

- A. Applicability. Projects subject to review as in §2201-B.C of this Ordinance shall comply with the requirements of §2211-B.B and 2211-B.C.
- B. Stormwater Maintenance Plan.
  1. The design engineer shall prepare a Stormwater Maintenance Plan for the stormwater management measures incorporated into the design of a major development.
  2. The Stormwater 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).
  3. Responsibility.
    - a. If the Stormwater 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.
    - b. 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.

- c. If the person responsible for maintenance identified under §2211-B.B.2 above is not a public agency, the maintenance plan and any future revisions based on §2211-B.B.3.e below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.
  - d. The requirements of §2211-B.B.3 do not apply to stormwater management facilities that are dedicated to and accepted by the Township or another governmental agency.
  - e. Maintenance Plan.
    - i. 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, shall be maintained by the responsible party, known as a Maintenance Plan.
    - ii. The effectiveness of the Maintenance Plan shall be evaluated at least once per year by the responsible party and adjust the plan and deed as needed.
    - iii. The Maintenance Plan and all associated documents shall be retained and made available, upon request, by any public entity with administrative, health, environmental, or safety authority over the site, by the responsible party.
  - f. Repair.
    - i. 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 non-vegetated linings.
    - ii. 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 fourteen (14) days to affect 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. Maintenance/Performance Bonds.
- 1. Responsibility for operation and maintenance of any stormwater management facilities, including periodic removal and disposal of accumulated particulate material and debris, shall remain with the owner or owners of the property, with permanent arrangements in place so that it shall pass to any successive owner, unless assumed by a government agency. If portions of the land are to be sold, legally binding arrangements shall be made to pass the basic responsibility to successors in title. These arrangements shall designate, for each project, the property owner, governmental agency or other legally established entity to be permanently responsible for maintenance.
  - 2. The applicant shall enter into an Stormwater Maintenance Agreement with the Township to ensure the continued operation and maintenance of the stormwater facility. This agreement shall be reviewed and approved by the applicable Board Engineer and Township Solicitor. This Agreement may include, but may not necessarily be limited to, personal guaranties, deed restrictions, covenant and bonds. In cases where property is subdivided and sold separately, a Homeowners Association (HOA) or similar permanent entity should be established as the responsible entity, absent an agreement by a governmental agency to assume responsibility. In addition, the applicant shall:
    - a. Describe in detail the mechanisms for maintenance, including:

- i. The types and quantities of equipment necessary for maintenance.
      - ii. The maintenance schedule in terms of maintenance activities required on annual basis.
      - iii. The methodology of maintaining all detention/ infiltration facilities on the site.
      - iv. The entity responsible for the maintenance activity.
      - v. The life expectancy of the stormwater facility.
    - b. Itemize costs associated with each of the items described in §2211-B.C.2.a, in addition to manpower, capital costs for equipment and foreseeable costs associated with repair of a system which fails.
    - c. Obtain approval from the applicable Board for all arrangements and values, per §2208-B.A.
  3. Developer Contribution. An exemption or design waiver(s) may be requested for the requirements outlined §2211-B.C.2 relating to the formation of a responsible entity for the long-term care and maintenance of stormwater management facilities by the Planning Board or Zoning Board, upon the Board's determination that both the area to be developed and the Township on whole would be better served by an agreed upon cash bequest to the designated stormwater management maintenance fund as established below:
    - a. The Township of Cherry Hill shall establish a separate fund to receive contributions from developers where the Planning Board or Zoning Board has determined that the formation of a responsible entity, for the long-term care and maintenance of stormwater management facilities, is not warranted or practical. These funds shall be utilized for the long-term care and maintenance of stormwater management facilities in such locations as deemed most beneficial to the residents of the Township by Township Council. The contribution shall be placed in the budget by way of a dedication by rider. The Township Council and the Mayor shall be provided with financial reports by the Township Controller, as to the status of said account.
    - b. Calculation. The amount of money to be contributed shall be calculated as follows:
      - i. \$50,000 for the first acre, or part thereof, of basin area, as calculated by the Planning or Zoning Board Engineer.
      - ii. \$25,000 for each additional acre, or part thereof, of basin area in excess of one acre, as calculated by the Planning or Zoning Board Engineer.
    - c. The amount of the developer's contribution for long-term basin maintenance shall be established by resolution of the Township Council, and updated as necessary.
    - d. Payment of the contribution required pursuant hereto shall be made prior to the signing of the final plans and/or deeds.
  4. In the event that any type of stormwater management facility becomes a threat to public safety or public health or is in need of maintenance, the Township shall so notify, in writing, the owner of the facility. From the notice, the owner shall have fourteen (14) days to perform such maintenance and repair on the facility in a manner that is approved by the Township Engineer. If the owner fails to perform such maintenance and repair on the facility within the required time period, the Township may immediately proceed to do so and shall bill the cost of such repairs to the owner of the facility.
- D. Nothing in this section shall preclude the Township 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*.

**§2212-B. SOURCES FOR TECHNICAL GUIDANCE.**

- A. Technical guidance for stormwater management measures can be found in the documents listed below, which are available from Maps and Publications, New Jersey Department of Environmental Protection, 428 East State Street, P.O. Box 420, Trenton, New Jersey, 08625; telephone (609) 777-1038.
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: bioretention systems, constructed stormwater wetlands, dry wells, extended detention basins, infiltration structures, manufactured treatment devices, pervious paving, sand filters, vegetative filter strips, and wet ponds.
  2. The New Jersey Department of Environmental Protection *Stormwater Management Facilities Maintenance Manual*, as amended.
- B. Additional technical guidance for stormwater management measures can be obtained from the following:
1. The "*Standards for Soil Erosion & 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*;
  2. Camden County Soil Conservation District, per *N.J.A.C. 2:90-1.3(a)4*, ([www.camdenscd.org](http://www.camdenscd.org));
  3. The Rutgers Cooperative Extension Service, (732) 932-9306 and Water Resources Program: Rain Garden Information Center (<http://water.rutgers.edu/main.htm>);
  4. *Part 630 Hydrology National Engineering Handbook*, United States Department of Agriculture (U.S.D.A.), Natural Resources Conservation Service (N.R.C.S.), (210-vi, NEH, September 1997) 1-1; and
  5. *New Jersey Residential Site Improvements Standards* (N.J.A.C. Title 5 Chapter 21), adopted January 6, 1997, revised January 22, 2008 (<http://www.state.nj.us/dca/divisions/codes/offices/rsis.html>).