

BOROUGH OF LAKE COMO



Beautiful Lake Como

STORMWATER MANAGEMENT PLAN

PREPARED FOR:
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MAIN STREET & REDMOND AVENUE
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1.0 INTRODUCTION

PMK Group (PMK) is pleased to present this Municipal Stormwater Management Plan (MSWMP) in accordance with the *Stormwater Management Rules (Rules, N.J.A.C. 7:8)*. This MSWMP documents the strategy for the Borough of Lake Como (Borough), formerly known as the Borough of South Belmar, to address stormwater-related impacts. The creation of this plan is required by the *Municipal Stormwater Regulations (N.J.A.C. 7:14A-25)* and contains all of the required elements described in the *Rules*. The plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new major development, defined as projects that disturb one or more acre of land or that are increasing impervious surface by one quarter acre or more. These standards are intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides baseflow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

According to *Monmouth County At-A-Glance* information, the total land area of the Borough is 0.20 square miles. Therefore, a “build-out” analysis is not required. However, the plan addresses the review and update of existing ordinances, the *Draft 2001 Master Plan*, and other planning documents to allow for project designs that include low impact development techniques. The final component of this plan is a mitigation strategy for when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the stormwater plan, specific stormwater management measures are identified to lessen the impact of existing development.

2.0 GOALS

This MSWMP is directed towards improvement of water quality in the Borough. The goals of this MSWMP are to:

- reduce flood damage, including damage to life and property;
- minimize, to the extent practical, any increase in stormwater runoff from any new development;
- reduce soil erosion from any development or construction project;
- assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
- maintain groundwater recharge;
- prevent, to the greatest extent feasible, an increase in nonpoint pollution;
- maintain the integrity of stream channels for their biological functions, as well as for drainage;
- minimize pollutants in stormwater runoff from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the state, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water;
- protect public safety through the proper design and operation of stormwater basins; and
- increase public awareness of stormwater management through public education.

Within the Borough's *Draft Master Plan*, the following goals were described:

- protect existing residential areas;
- provide development opportunities in vacant areas most suited for in-fill uses;
- provide adequate services and facilities for the present and projected population;
- preserve and enhance a visually desirable natural and man-made environment;
- promote the conservation and enhancement of open space and natural systems and resources, while preventing degradation of the natural and man-made environment through improper use of land;

- encourage coordination of the numerous public and private regulations and activities which influence land development towards a goal of producing efficient uses of land with appropriate development types and scales; and
- protect natural systems and environmental resources, including floodplains, freshwater and saltwater wetlands, streams, ponds, trees and vegetation, slopes, shorelines, wildlife, water and air quality, noise control, etc.

Within Monmouth County's *Growth Management Guide**, the following goal relative to water resources was identified:

- provide all of Monmouth County with a safe and pollution-free water environment, and conserve valuable water-oriented resources.

To achieve these goals, this plan outlines specific stormwater design and performance standards for new development and redevelopment. Additionally, the plan proposes stormwater management controls to address impacts from existing development. Preventative and corrective maintenance strategies are included in the plan to ensure long-term effectiveness of stormwater management facilities. The plan also outlines safety standards for stormwater infrastructure to be implemented to protect public safety.

*** THIS IS THE MONMOUTH COUNTY MASTER PLAN**

3.0 STORMWATER DISCUSSION

3.1 HYDROLOGIC CYCLE

The hydrologic cycle or water cycle (Figure 1) is the continuous circulation of water between the ocean, atmosphere and land. The driving force of this natural cycle is the sun. Water, stored in oceans, depressions, streams, rivers, waterbodies, vegetation and even land surface, continuously evaporates due to solar energy. This water vapor then condenses in the atmosphere to form clouds and fog. After water condenses, it precipitates, usually in the form of rain or snow, onto land surfaces and waterbodies. Precipitation falling on land surfaces is often intercepted by vegetation. Plants and trees transpire water vapor back into the atmosphere, as well as aid in the infiltration of water into the soil. The vaporization of water through transpiration and evaporation is called evapotranspiration. Infiltrated water percolates through the soil as groundwater, while surface water flows overland. Groundwater and surface water flow to major waterbodies and eventually flows to the Earth's seas and oceans. This constant process of evapotranspiration, condensation, precipitation, and infiltration comprises the hydrologic cycle.

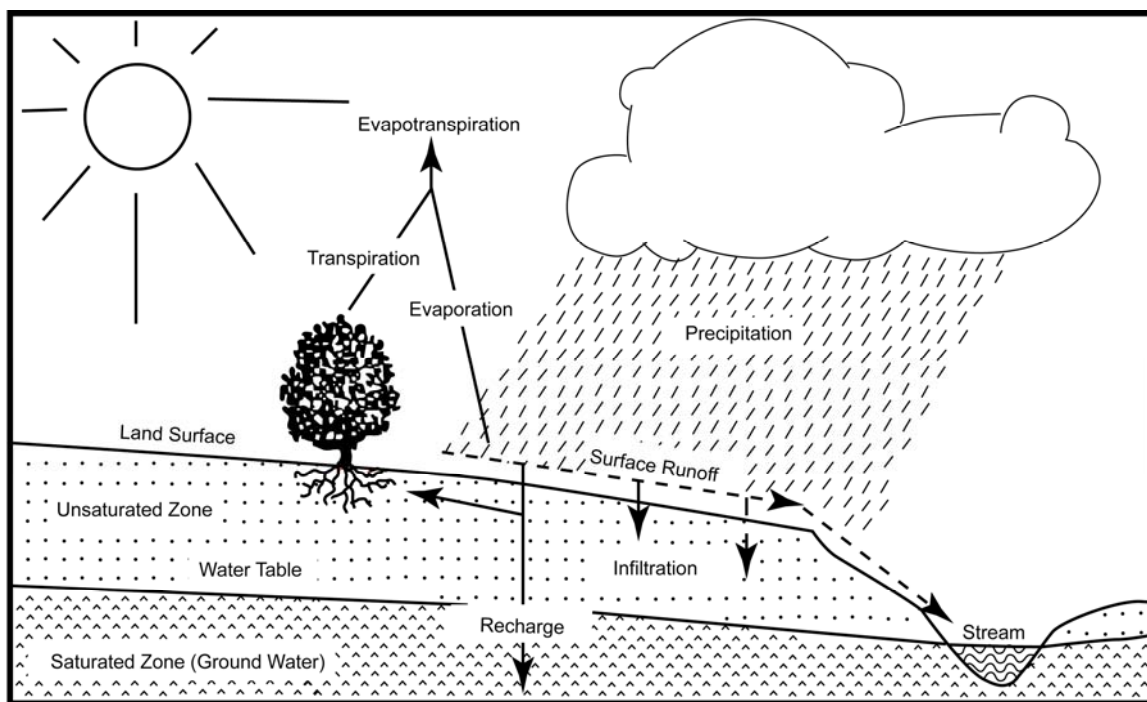


Figure 1: Groundwater Recharge in the Hydrologic Cycle

Source: New Jersey Geological Survey Report GSR-32

3.2 STORMWATER IMPACTS

Land development can dramatically alter the hydrologic cycle of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration. Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site.

Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration which, in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

Water quantity impacts combined with land development often adversely impacts stormwater quality. Impervious surfaces and cleared areas created by development collect pollutants from the atmosphere, fertilizers and pesticides, animal wastes, as well as pollutants from motor vehicle usage. Pollutants such as metals, suspended solids, hydrocarbons, pathogens, and nutrients collect and concentrate on impervious surfaces. During storm events, these pollutants are washed directly into municipal storm sewer systems.

In addition to chemical and biological pollution, thermal pollution can occur when water travels over heated impervious surfaces or collects in stormwater impoundments that are not shielded from the sun. Thermal pollution can affect aquatic habitats, adversely impacting cold water fish species such as trout. Removal of shade trees and stabilizing vegetation from stream banks also contributes to thermal pollution.

Proper stormwater management will help mitigate the negative impact of land development and its effect on stormwater. This MSWMP outlines the Borough's plan to improve stormwater quality, decrease stormwater quantity, and increase groundwater recharge. By managing stormwater, the Borough will improve the quality of aquatic ecosystems and restore some of the natural balance to the environment.

4.0 BACKGROUND

4.1 BOROUGH CHARACTERISTICS

The Borough encompasses a 0.2 square mile area in Monmouth County, New Jersey. The Borough is a residential community with a central commercial district. Lake Como and Polypod Brook are the only waterbodies in the Borough; however, the Borough is located less than 1,500 feet west of the Atlantic Ocean. The topography throughout the Borough is relatively flat. According to the *United States Department of Agriculture Soil Survey of Monmouth County, New Jersey*, the majority of the Borough is underlain by Klej loamy sand-Urban land complex soils with the remainder being underlain by Atsion sand.

Figure 2, Borough and its Waterways, illustrates the waterways in the Borough. Figure 3, USGS Topographic Map, depicts the Borough boundary on USGS quadrangle maps.

4.1.1 Population and Housing Trends

According to the *Draft 2001 Master Plan*, the Borough is saturated in terms of population due to the very small amount of vacant land available for development. *Monmouth County At-A-Glance* information indicates that the population of the Borough was 1,566 persons in 1980, 1,482 persons in 1990, and 1,806 persons in 2000.

Additionally, the *Monmouth County At-A-Glance* information indicates that the population projections for both 2010 and 2020 are 1,815 persons. The projections reflect the lack of developable land in the Borough.

According to *Monmouth County At-A-Glance* information, the number of total households has increased from 654 in 1980, to 663 in 1990, to 824 in 2000.

The number of housing units increased only slightly from 1990 to 2000. According to U.S. Census Bureau data, there were 1,107 housing units in the Borough in 2000, a 3% increase from 1,071 housing units in 1990.

4.1.2 Land Use

According to the *Draft 2001 Master Plan*, residential development comprises 91% of the Borough. According to information provided by the Lake Como Tax Collector, there are approximately 3.25 acres of privately-held vacant land in the Borough. It is unknown whether any of the 3.25 acres are constrained by wetlands or floodplains.

4.1.3 Water and Sewer Service

According to the *Draft 2001 Master Plan*, the Lake Como Department of Public Works provides potable water service to the Borough. The water source is New Jersey American Water Company.

The Borough is within the service area of the South Monmouth Regional Sewerage Authority (SMRSA) based in Wall Township. Wastewater flows from the Borough directly to the SMRSA Treatment Plant in Wall Township.

No septic tanks remain in use in the Borough.

4.1.4 State Development and Redevelopment Plan

The purpose of the *State Development and Redevelopment Plan (State Plan)* is to coordinate planning activities and establish State-wide planning objectives in the areas of land use, housing, economic development, transportation, natural resource conservation, agriculture and farmland retention, recreation, urban and suburban redevelopment, historic preservation, public facilities and services, and intergovernmental coordination. The *State Plan* designates planning areas that share common conditions with regard to development and environmental features:

- Areas for Growth: Metropolitan Planning Areas (PA-1), Suburban Planning Areas (PA-2) and Designated Centers in any planning area.
- Areas for Limited Growth: Fringe Planning Areas (PA-3), Rural Planning Areas (PA-4), and Environmentally Sensitive Planning Areas (PA-5). In these planning areas, planning should promote a balance of conservation and limited growth—environmental

constraints affect development and preservation is encouraged in large contiguous tracts.

- Areas for Conservation: Fringe Planning Area (PA-3), Rural Planning Areas (PA-4), and Environmentally Sensitive Planning Areas (PA-5).

According to NJDEP *iMap*, the entire Borough is located in the Metropolitan Planning Area, PA-1.

4.2 WATERWAYS

The following watercourse is located in or immediately adjacent to the Borough:

- Polypod Brook

The following waterbody is located in the Borough:

- Lake Como

Lake Como is not a tidal waterbody. Figure 2, Borough and its Waterways, illustrates the waterways in the Borough.

The Borough is located within Watershed Management Area (WMA #12), subtitled Monmouth Watersheds. A Watershed Management Area is subdivided into smaller drainage area units which are defined as HUC-14s. The term “HUC-14” is from the hydrologic unit code system developed by the United States Geological Service for delineating and identifying drainage areas. The system starts with the largest possible drainage areas and progressively smaller subdivisions of the drainage area are delineated and numbered in a nested fashion. A drainage area with a hydrologic unit code (HUC) designation with 14 numbers, or HUC-14, is one of several sub-watersheds of a larger watershed. There are portions of two (2) HUC-14s within the Borough:

- 02030104090080 – Wreck Pond Brook (below Route 35)
- 02030104090060 – Shark River (below Remsen Mill gauge)

Figure 7, Hydrologic Units (HUC-14s), illustrates the HUC-14s within the Borough.

Polypod Brook, located in the Wreck Pond Brook HUC-14 drainage area, is classified as FW2-NT / SE1 (C-2). FW2 is the general surface water classification applied to those fresh waters that are not designated as FW1 or Pinelands waters. NT (non trout) means fresh waters that have not been designated in *N.J.A.C. 7:9B-1.15(b)* through *(h)* as trout production or trout maintenance waters. SE1 is the general surface water classification applied to saline waters of estuaries, where the designated uses are shellfish harvesting in accordance with *N.J.A.C. 7:12*; maintenance, migration and propagation of the natural and established biota; primary and secondary contact recreation; and any other reasonable uses. C-2 (Category Two) waters means those waters not designated as Category One.

The *Watershed Management Area 12: South Coast Issues List*, provided by the Monmouth County Planning Board, identified the following prioritized issues that may be/are relative to the Borough:

- Prevention of plastics entering storm drains
- Minimization of runoff from construction and roadways, which are known sources of non-point source pollution
- Bulkheaded waterways interfere with wildlife and wetlands habitats
- A Community awareness program is needed to educate citizens about non-point source pollution
- Storm drain identification is needed
- Identification of hazardous/contaminated sites is needed

Additionally, the following regional issue is not yet prioritized:

- Lack of adequate groundwater recharge is in danger of impacting the water supply.

4.3 WATER QUALITY

The NJDEP has established an Ambient Biomonitoring Network (AMNET) to document the health of the state's waterways. There are over 800 AMNET sites throughout the state of New Jersey. These sites are sampled for benthic macroinvertebrates by NJDEP on a five-year cycle. Streams are classified as non-impaired, moderately impaired, or severely impaired based on the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to benthic macroinvertebrate community dynamics.

AMNET data is not available for the Polypod Brook.

In addition to the AMNET data, the NJDEP and other regulatory agencies collect biological and chemical water quality data on the streams in the state. The *New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d)) (Integrated List)* is required by the federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. This combined report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. The *Integrated List* is composed of the following five (5) Sublists:

- Sublist 1: Attaining the water quality standard and no use is threatened.
- Sublist 2: Attaining some of the designated uses; no use is threatened; and insufficient or no data is available to determine if the remaining uses are attained or threatened.
- Sublist 3: Insufficient or no data and information to determine if any designated use is threatened.
- Sublist 4: Impaired or threatened for one or more designated uses but does not require the development of a TMDL.
- Sublist 5: The water quality standard is not attained. The waterway is impaired or threatened for one or more designated uses by a pollutant(s), and requires a TMDL.

A TMDL is the amount of a pollutant that can be accepted by a waterbody without causing an exceedance of water quality standards or interfering with the ability to use a waterbody for one or more of its designated uses. The allowable load is allocated to the various sources of the pollutant, such as stormwater and wastewater discharges, which require a New Jersey Pollutant

Discharge Elimination System (NJPDES) permit to discharge, and nonpoint source, which includes stormwater runoff from agricultural areas and residential areas, along with a margin of safety. Provisions may also be made for future sources in the form of reserve capacity. An implementation plan is developed to identify how the various sources will be reduced to the designated allocations. Implementation strategies may include improved stormwater treatment plants, adoption of ordinances, reforestation of stream corridors, retrofitting stormwater systems, and other BMPs.

The following are the watercourses with their locations, sublist, and sublist constituents:

- Lake Como is on Sublist 5 for Phosphorus.

No data is available for Polypod Brook.

A TMDL has not yet been proposed for Lake Como .

The Cooperative Coastal Monitoring Program (CCMP) is a joint effort between the NJDEP, the Monmouth County Department of Health, and local health agencies. During the bathing beach season, 61 stations are monitored on a weekly basis for enterococcus bacteria. The single sample maximum allowable density of enterococci in marine waters is 104 per 100 ml of sample. Any sample that exceeds 104 will be resampled to confirm the original result. A second sample greater than 104 will require a beach closing until a sample result is again within the standard. A *Beach Report* for the 20th Avenue Bathing Beach in Belmar, New Jersey indicates that from June 21, 2004 to June 13, 2005, the allowable density of enterococci was exceeded only once on July 6, 2004 (310 enterococci).

4.4 WATER QUANTITY

According to the Federal Emergency Management Agency (FEMA) *Flood Insurance Rate Map* (FIRM) for the Borough of Lake Como, North Boulevard, located immediately north of Lake Como, and Parkway, located perpendicular to North Boulevard, are the only streets in the Borough known to experience flooding during heavy rainfall events.

Please refer to Figure 5, Floodplain Map.

4.5 GROUNDWATER RECHARGE

The placement of impervious surfaces (pavement and structures) affects the rate of groundwater recharge. Therefore, highly developed areas have a lower groundwater recharge rate than less developed areas. According to NJDEP digital GIS data, recharge rates in the commercial area of the Borough are generally between 1 to 8 inches per year. The high-density residential area of the Borough has a groundwater recharge rate generally between 9 and 11 inches per year. The medium-density residential area of the Borough has a groundwater recharge rate generally between 12-15 inches per year.

Please refer to Figure 4, Groundwater Recharge Areas.

4.6 WELLHEAD PROTECTION AREAS

Public community water systems either pipe water for human consumption to at least 15 service connections used by year-round residents, or regularly serve at least 25 year-round residents (e.g. municipality or subdivision). There are no mapped public community water supply wells or wellhead protection areas located in the Borough.

Figure 5, Wellhead Protection Areas, depicts the absence of wells and wellhead protection areas in the Borough.

5.0 DESIGN AND PERFORMANCE STANDARDS

The Borough has adopted the design and performance standards for stormwater management measures as presented in *N.J.A.C. 7:8-5* to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards include the language for maintenance of stormwater management measures consistent with the *Rules* at *N.J.A.C. 7:8-5.8 Maintenance Requirements*, and language for safety standards consistent with *N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins*.

Specifically, the Borough shall require the design engineer to prepare a maintenance plan for the stormwater management measure that is proposed by the major development. This maintenance plan shall contain specific preventative and corrective maintenance tasks and schedules, cost estimates and responsible party contact information. Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including repairs and replacement, removal of sediment, debris and trash, restoration of erosion, snow and ice removal, fence repair or replacement, restoration of vegetation and repair or replacement of non vegetated linings. The person responsible for maintenance shall keep detailed logs and records of all inspections and work orders. The person responsible for maintenance shall evaluate the effectiveness of the maintenance measures contained in the maintenance plan at least once per year and make adjustments as necessary. In the event of non compliance, the Borough will notify the responsible party in writing. The responsible party then has fourteen (14) days to conduct the required maintenance and/or repair sufficient to the Borough. If the responsible party does not act, the Borough can make repairs/conduct the maintenance and bill the cost of same to the responsible party. During construction, Borough inspectors will perform periodic inspections of the construction of the project to ensure that the stormwater management measures are constructed and function as designed.

Safety standards have also been adopted in the Borough's Stormwater Control Ordinance. These standards are intended to protect the public safety through proper design and operation of new stormwater management basins. Trash racks are required to be installed at the intake to the outlet of the basin to ensure proper functioning. The trash rack shall meet the specifications

as detailed in the Borough's Stormwater Control Ordinance. Additionally, all overflow grates designed to prevent obstruction of the overflow structure shall also be designed in accordance with the requirements contained in the Borough's Stormwater Control Ordinance. Stormwater management basins shall also include escape provisions, which include the installation of ladders, steps, rungs, or other features that provide easily accessible means of egress from the basin. Safety ledges shall also be constructed on the slopes of all new basins having a permanent pool of water deeper than two and one half feet and shall be comprised of two steps. The design requirements for both the required escape provisions and safety ledges are contained in the Borough's Stormwater Control Ordinance.

The Borough reserves the right to require retrofit of existing stormwater management basins to meet any or all of the safety requirements.

6.0 PLAN CONSISTENCY

There are no Regional Stormwater Management Plans (RSWMPs) being proposed at this time. Additionally, it appears no TMDLs have been developed for the Borough's waters. If any RSWMPs or TMDLs are developed in the future, this MSWMP will be updated to be consistent.

The Borough is currently utilizing the *Residential Site Improvement Standards (RSIS)* at *N.J.A.C. 5:21*. The MSWMP is consistent with the *RSIS*. The municipality will utilize the most current update of the *RSIS* in the stormwater management review of residential areas. This MSWMP will be updated to be consistent with any future updates to the *RSIS*.

As stated earlier in Section 4.1.4, State Development and Redevelopment Plan, the entire Borough is located in the Metropolitan Planning Area, PA-1.

The entire Borough is located in the *Coastal Area Facilities Review Act (CAFRA)* zone. Therefore, any development within the Borough must comply with *the Coastal Permit Program Rules* at *N.J.A.C. 7:7*.

During construction, Borough inspectors will perform periodic inspections of on-site soil erosion and sediment control measures and report any inconsistencies to the Freehold Soil Conservation District.

7.0 NONSTRUCTURAL STORMWATER MANAGEMENT STRATEGIES

The *Draft 2001 Master Plan* and Chapters XII (Streets and Sidewalks), XV (Flood Damage Prevention) and XVII (Development Regulations) of the Borough Code were reviewed with regard to incorporating nonstructural stormwater management strategies. Below is a list of recommended revisions to existing ordinances and new strategies that the Borough should consider implementing in order to incorporate the NJDEP's nonstructural strategies for stormwater management. It should be noted that the Borough is near full development and future development projects may not meet the "major development" criteria. The definition of major development is provided in Section 2 of the Stormwater Control Ordinance provided in Appendix 1. Development and redevelopment projects not meeting the definition of "major development" must comply with the current Borough ordinances.

7.1 MASTER PLAN REVIEW

7.1.1 Stream Encroachment Permit

According to the *Draft 2001 Master Plan*, a stream encroachment permit is required for any stream crossing or the discharge of surface waters into a stream or other body of water (Page 5). This statement should be amended to "All flood plain and watercourse activities must comply with the NJDEP *Flood Hazard Area Control Act Rules (N.J.A.C. 7:13)*, which contain detailed regulations regarding development in and maintenance of the flood plain and the watercourses that create them."

7.2 ORDINANCE REVIEW

7.2.1 Chapter XII: Streets and Sidewalks

Section 12-1.2: Methods of Construction

Section 12-1.2a indicates that sidewalks and curbs shall be constructed of concrete. Language should be added to this section to require applicants to design sidewalks to discharge stormwater to grass areas where feasible to disconnect these impervious surfaces, or use permeable paving materials where appropriate.

7.2.2 Chapter XV: Flood Damage Prevention

Section 15-4.1 Establishment of a Development Permit

Section 15-4.1 details the information that is required for a development permit application. Since all flood plain and watercourse activities must comply with the NJDEP *Flood Hazard Area Control Act Rules (N.J.A.C. 7:13)*, this section should be amended to require that “proof or statement of compliance with the *Flood Hazard Area Control Act Rules (N.J.A.C. 7:13)*” be provided as part of the development permit application.

Section 15-4.3d Alteration of Watercourses

Section 15-4.3d discusses alteration of watercourses. The ordinance states that when alteration of a watercourse is proposed, the Borough Administrator shall:

- 1.) Notify adjacent communities and the Department of Environmental Protection prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Insurance Administration, and,
- 2.) Require that maintenance is provided within the altered or relocated portion of the watercourse so that the flood carrying capacity is not diminished.

This section is inconsistent with the NJDEP *Flood Hazard Area Control Act Rules (N.J.A.C. 7:13)*. Therefore, this section should be amended to state: “Alteration of watercourses is prohibited except where necessary to control existing flooding and or erosion which threatens life or property or in cases in which the New Jersey Department of Environmental Protection (NJDEP) determines that the effects of channelization are offset by the resulting restoration or improvement of the natural characteristics of the nearby environment. Any alteration to a watercourse requires an NJDEP-issued permit.”

Additionally, the ordinance should be amended to state: “The NJDEP *Flood Hazard Area Control Act Rules (N.J.A.C. 7:13)* contains detailed regulations regarding development in and maintenance of the flood plain and the watercourses that create them. All flood plain and watercourse activities must comply with the NJDEP regulations.”

Section 15-4.3e Interpretation of FHBM [Flood Hazard Boundary Map] Boundaries

Section 15-4.3e states that the Borough Administrator shall make interpretations where needed, as to the exact location of the boundaries of the areas of special flood hazards (for example, where there appears to be a conflict between a mapped boundary and actual field conditions).

This section is inconsistent with State regulations. Therefore, this section should be amended to state: "In areas where there appears to be a conflict between a mapped boundary and actual field conditions, the flood elevation shall be established by a New Jersey Licensed Land Surveyor based on the Flood Insurance Rate Map (FIRM) flood elevations."

7.2.3 Chapter XVII: Development Regulations

Section 17-10.7 Off Street Parking, Loading and Driveways

Section 17-10.7a(1) states the following:

- (a) Except for detached dwelling units, a screen planting of a dense evergreen material not less than four (4) feet in height shall be provided between the off-street parking areas and any lot line of street line except where a building intervenes or where the distance between such areas and the lot line or street line is greater than 150 feet.
- (b) All loading areas shall be landscaped and screened sufficiently to obscure the view of the parked vehicles and loading platforms from any public street, adjacent residential district or uses and the front yards of adjacent commercial and industrial uses. Such screening shall be by a fence, wall, planting or combination of the three and shall not be less than four (4) feet in height.
- (c) Each off-street parking shall have a minimum area equivalent to one (1) parking space per every thirty (30) parking spaces landscaped with one-half (1/2) of the spaces having shrubs no higher than three (3) feet and the other one-half (1/2) having trees with branches no lower than seven (7) feet. Such spaces shall be distributed throughout the parking area in a manner not impairing visibility.

The language of this section should be amended to require the use of native vegetation, which requires less fertilization and watering than non-native species, to the maximum extent practicable, before utilizing another means of screening, such as fences or walls. Additionally, language should be included to allow buffer areas to be used for stormwater management by disconnecting impervious surfaces and treating runoff from these impervious surfaces. The amount of landscaped areas used and designated as stormwater management areas should be kept within reason. Landscaped areas should not be 100% designated as stormwater management areas.

Section 17-10.7a(3)(b) states that curbing or wheel stops shall be located to prevent any part of a vehicle from overhanging internal sidewalks or landscaped areas. This section should be amended to allow vehicle overhang into a vegetated area where practical.

Section 17-10.7a(6)(a) states that parking spaces may be on, above or below the surface of the ground. The Borough should encourage the use of parking structures, rather than surface lots, where practical. Additionally, the Borough should encourage shared parking where applicable.

Section 17-10.7a(6)(b) provides specific parking space requirements for professional offices. These requirements are generally based on floor area (FA). The Low Impact Development Parking Space Ratios provided by the NJDEP indicate that ratios at professional office buildings shall be less than 3.0 spaces per 1,000 square feet (sf) of FA. According to this section, the parking ratio is one (1) parking space per 200 sf of floor area (5 spaces per 1,000 sf of floor area). The parking ratios should be reduced to meet the Low Impact Development ratios where practical.

This section does not reference a minimum size for parking stalls. Therefore, this section should be amended to state that the minimum parking stall size shall be 9 feet by 18 feet.

Section 17-14.4: Sidewalks

Section 17-14.4b indicates that sidewalks shall be constructed with a one quarter (1/4") inch slope toward the curb. Sidewalks should be graded to discharge to grass areas where possible. Additionally, pervious paving materials should be allowed, where practical.

Section 17-19: Buffers

This section details buffer area and landscaping requirements within any non-residential zone. The language of this section should be amended to require the use of native vegetation, which requires less fertilization and watering than non-native species, to the maximum extent practicable, before utilizing another means of screening, such as fences or walls. Additionally, language should be included to allow buffer areas to be used for stormwater management by disconnecting impervious surfaces and treating runoff from these impervious surfaces.

7.3 NEW ORDINANCES

Minimization of Turf Grass Lawn Areas

In order to minimize turf grass lawn areas, a new ordinance should be established to discourage enlargement of existing turf lawn areas without proper justification.

Unconnected Impervious Areas

Disconnection of impervious areas can occur in both low density development and high density commercial development, provided sufficient vegetated area is available to accept dispersed stormwater flows. Areas for disconnection include parking lot or cul-de-sac islands, lawn areas and other vegetated areas.

Applicants should be required to disconnect impervious surfaces, where practical, to promote pollutant removal and groundwater recharge.

Soil Movement

Currently, there is no ordinance regarding soil movement in the Borough. Therefore, an ordinance should be created which states that all soil activities must comply with New Jersey's *Soil Erosion and Sediment Control Standards*. During construction, Borough inspectors should perform periodic inspection of on-site soil erosion and sediment control measures and report any inconsistencies to the Freehold Soil Conservation District.

Tree Protection

A new ordinance should be created to allow trees to be removed only within 20 feet around the perimeter of any area to be occupied by a building, driveway, drainage field, recreation area (tennis courts, swimming pools or similar facilities). Removal of trees beyond this “footprint” of 20 feet should be restricted.

Driveways

An ordinance should be created to establish a minimum driveway width to 9 feet for one lane and 18 feet for two lanes. Additionally, this section should be amended to allow the use of pervious paving materials to minimize stormwater runoff and promote groundwater recharge.

Vegetated Open Channels

The use of vegetated channels, rather than the standard concrete curb and gutter configuration, can decrease flow velocity, and allow for stormwater filtration and re-infiltration. Triangular channels are not preferred due to the associated maintenance issues; parabolic or trapezoidal channels are preferred.

Section 5.3(b)8 of the *Rules* indicates that nonstructural stormwater management strategies incorporated into site design shall provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas. The Borough has no existing ordinances regarding the use of vegetated open channels. Therefore, a new ordinance should be adopted to encourage the use of vegetated open channel conveyance instead of the standard curb and gutter design where practical. One design option is for vegetated channels that convey smaller storm events, and provide an overflow into a storm sewer for larger storm events.

Stormwater Control Ordinance

The Stormwater Control Ordinance, provided in Appendix 1, should be inserted in its entirety.

8.0 LAND USE / BUILD OUT ANALYSIS

Since the entire land area of the Borough is 0.20 square miles in total, a detailed land use analysis for the Borough is not required.

Figure 6 illustrates the land use in the Borough based on 1995/97 GIS information from NJDEP. As shown, the Borough is primarily comprised of high- and medium-density residential areas with a modest central commercial district.

The Zoning Map currently utilized by the Borough is shown in Figure 8. It should be noted that the Borough is currently finalizing the Master Plan and when approved a revised Zoning Map will be available.

Wetlands and floodplains are located in the southern portion of the Borough. These lands are constrained by regulatory development restrictions. Figure 9 illustrates the constrained lands within the Borough.

Small development projects not meeting the definition of “major development” must comply with existing ordinances.

9.0 MITIGATION PLANS

This mitigation plan is provided for proposed development or redevelopment projects that seek a variance or exemption from the Township's Stormwater Control Ordinance or the Stormwater Management Rules at N.J.A.C 7:8 . The Stormwater Management Rules, N.J.A.C. 7:8, establish design and performance standards for management of stormwater that address water quality, water quantity and recharge. These standards are to be met on the site of the proposed development and, to the maximum extent practicable, using nonstructural stormwater management strategies. Approval of the option to utilize a mitigation plan and choice of mitigation plan shall be under the sole discretion of the Borough agency providing review, i.e. Board of Adjustment, Planning Board, Borough Council and the Borough Engineer.

Any relief from this MSWMP or the *Rules* via the mitigation plan option shall utilize an option to provide equal or greater, quantifiable benefit than the specific relief being sought. For example, if a relief for stormwater quality is sought for a particular project, the necessary amount of stormwater quality improvements shall be accomplished via the mitigation plan. Calculations shall be provided indicating the parameter of relief being sought along with equal or greater benefit via the mitigation plan option. These calculations shall be reviewed and approved by the Borough Engineer before being approved by the appropriate reviewing authority.

In general, the mitigation project must be implemented in the same drainage area as the proposed development and the applicant must ensure the long-term maintenance of the project.. If a suitable site cannot be located in the same drainage area as the proposed development, a mitigation project may be recommended that is not within the same drainage area but does provide an equal relief. In the case of mitigation plan options that do not address the variance or relief sought, the applicant may create a new mitigation option or provide a cash contribution to the Borough of Lake Como which will be used by the Borough for Borough-wide drainage improvements and stormwater management improvement planning. The amount of the contribution shall be based on the relief being sought, the applicant's opinion on the cost impacts to meet this Plan and the *Rules*, and the discretion of the Borough agency providing review, i.e. Board of Adjustment, Planning Board, Borough Council and the Borough Engineer.

In order to select an appropriate mitigation project to respond to a requested waiver/exemption , an assessment of the impact that would result from the requested deviation from full compliance with the standard(s) in the drainage area affected by the proposed project is required. For example, a waiver for stormwater quantity requirements must focus on the impacts of increased runoff on flooding, considering both quantity and location. Stormwater quality mitigation must aim to prevent an increase in pollutant load to the waterbodies that would be affected by the waiver/exemption. Ground water recharge mitigation must seek to maintain the baseflow and aquifer recharge in the area that would be affected by the waiver/exemption. For the purpose of this discussion, the term “sensitive receptor” is used to refer to a specific area or feature that would be sensitive to the impact assessed above. Selection of an appropriate mitigation project for a requested waiver/exemption must adhere to the following requirements:

1. The project must be within the same area that would contribute to the receptor impacted by the project. *Note that depending on the specific performance standard waived, the sensitive receptor and/or the contributory area to that receptor may be different.* If there are no specific sensitive receptors that would be impacted as the result of the grant of the waiver/exemption, then the location of the mitigation project can be located anywhere within the municipality, and should be selected to provide the most benefit relative to an existing stormwater problem in the same category (quality, quantity or recharge).
2. Legal authorization must be obtained to construct the project at the location selected. This includes the maintenance and any access needs for the project in the future.
3. The project should be close to the location of the original project, and if possible, be located upstream at a similar distance from the identified sensitive receptor. This distance should not be based on actual location, but on a similar hydraulic distance to the sensitive receptor. For example, if the project for which a waiver is obtained discharges to a tributary, but the closest location discharges to the main branch, it may be more beneficial to identify a location discharging to the same tributary.

4. If sensitive receptors are addressed, it is preferable to have one location that addresses any and all of the performance standards waived, rather than one location for each performance standard.

5. It must be demonstrated that implementation of the mitigation project will result in no adverse impacts to other properties.

6. Mitigation projects that address stormwater runoff quantity can provide storage for proposed increases in runoff volume, as opposed to a direct peak flow reduction. Applicants can fund analyses to identify potential mitigation projects that could be used to address deficits in complying with each of the performance standards. However, the funding option shall only be allowed where the project requesting the waiver will have no measurable impact with respect to flooding, erosion, water quality degradation, etc. The funding option may also be appropriate in situations where the size of an individual project requesting a waiver/exemption is small, or the degree of deficit in complying with the design and performance standard(s) is small. In such cases, the receipt of the financial contribution shall satisfy the mitigation obligation for the project.

The following information is required for each waiver granted from the performance standard(s).

- **Impact from noncompliance.** Provide a table quantifying what would be required for the project to achieve the standards, the extent to which this value will be achieved on site and the extent to which the value must be mitigated off site.

- **Narrative and supporting information regarding the need for the waiver including:** The waiver cannot be due to a condition created by the applicant. If the applicant can comply with the Stormwater Management Rules through a reduction in the scope of the project, the applicant has created the condition and a waiver **cannot** be issued.

Provide a discussion and supporting documentation of the site conditions peculiar to the subject property that prevent the construction of a stormwater management facility that would achieve full compliance with the design and performance standards. Site conditions may include soil

type, the presence of karst geology, acid soils, a high groundwater table, unique conditions that would create an unsafe design, as well as conditions that may provide a detrimental impact to public health, welfare, and safety.

Demonstration that the granting of the requested waiver/exemption would not result in an adverse impact that would not be compensated for by off site mitigation.

- **Sensitive Receptor:** Identify the sensitive receptor(s) related to the performance standard from which a waiver is sought. Demonstrate that the mitigation site contributes to the same sensitive receptor.
- **Design of the Mitigation Project:** Provide the design details of the mitigation project. This includes, but is not limited to, drawings, calculations, and other information needed to evaluate the mitigation project.
- **Responsible Party:** List the party or parties responsible for the construction and the maintenance of the mitigation project. Documentation must be provided to demonstrate that the responsible party is aware of, has authority to, and accepts the responsibility for construction and maintenance..
- **Maintenance:** Include a maintenance plan that addresses the maintenance criteria at N.J.A.C. 7:8-5.8. In addition, if the maintenance responsibility is being transferred to the municipality or another entity, the entity responsible for the cost of the maintenance must be identified. The municipality may provide the option for the applicant to convey the mitigation project to the municipality, if the applicant provides for the cost of maintenance in perpetuity.
- **Permits:** Obtain any and all necessary local, State or other applicable permits for the mitigation measure or project must be obtained prior to the municipal approval of the project for which mitigation is being provided.
- **Construction:** Demonstrate that the construction of the mitigation project coincides with the construction of the proposed project. A certificate of occupancy or final approval by the

municipality for the project requiring mitigation cannot be issued until the mitigation project or measure receives final approval.

A municipality may waive one or more of the design and performance standards for projects reviewed under the Municipal Land Use Law, or for projects undertaken by the municipality that are not subject to MLUL. Waivers for linear development projects must be evaluated using the requirements under N.J.A.C. 7:8-5.2(e), which includes the requirement to address mitigation for the performance standard for which strict compliance was not obtained. Where the Department issues a permit that includes a stormwater management review and an associated waiver under the provisions of the specific permit, the municipality is not required to further consider the project under the provisions of the municipal mitigation plan. However, the municipality may choose to require mitigation for projects receiving a waiver from the Department.

The applicant can select one of the following projects listed to compensate for the deficit from the performance standards that would be created by the granting of a waiver/exemption . The applicant will also be responsible for any State, Federal, County or local approvals required to implement the mitigation project. More detailed information on the projects can be obtained from the Borough Engineer. A current list of mitigation projects shall be maintained by the Borough Engineer. Listed below are specific projects that may be used to address the mitigation requirement.

9.1 STORMWATER QUALITY

- Retrofit specific streets or commercial locations to provide new, Type “B” water quality inlet castings compliant with the new *Rules*.
- Perform sanitary sewer repairs to decrease pollutant loading and investigate/repair possible connections between the storm sewer system and the sanitary sewer system. Areas to be provided by the Borough Engineer.
- Provide stormwater quality relief via a mechanical treatment device and/or low impact development technique in areas prone to stormwater quality impacts.

9.2 STORMWATER QUANTITY AND GROUNDWATER RECHARGE

No mitigation options relative to stormwater quantity and flooding or groundwater recharge are available at this time. A list of mitigation options will be developed as issues, if any, arise.

APPENDIX 1: Stormwater Control Ordinance

Section 1: Scope and Purpose

- A. **Policy Statement**
Flood control, groundwater recharge, and pollutant reduction through nonstructural or low impact techniques shall be explored before relying on structural BMPs. Structural BMPs 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 BMPs may be necessary to achieve the established performance standards for water quality, quantity, and groundwater recharge.
- B. **Purpose**
It is the purpose of this ordinance to establish minimum stormwater management requirements and controls for “major development,” as defined in Section 2.
- C. **Applicability**
1. This ordinance 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. Non-residential major developments; and
b. Aspects of residential major developments that are not pre-empted by the Residential Site Improvement Standards at N.J.A.C. 5:21.
2. This ordinance shall also be applicable to all major developments undertaken by the Borough of Lake Como.
- D. **Compatibility with Other Permit and Ordinance Requirements**
Development approvals issued for subdivisions and site plans pursuant to this ordinance 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 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.

Section 2: Definitions

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance 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.

“CAFRA Planning Map” means 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.

“CAFRA Centers, Cores or Nodes” means those areas within boundaries accepted by the Department pursuant to N.J.A.C. 7:8E-5B.

“Compaction” means the increase in soil bulk density.

“Core” means a pedestrian-oriented area of commercial and civic uses serving the surrounding municipality, generally including housing and access to public transportation.

“County review agency” means 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:

A County planning agency; or

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” means the New Jersey Department of Environmental Protection.

“Designated Center” means a State Development and Redevelopment Plan Center as designated by the State Planning Commission such as urban, regional, town, village, or hamlet.

“Design engineer” means 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” means 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.

“Drainage area” means a geographic area within which stormwater, sediments, or dissolved materials drain to a particular receiving waterbody or to a particular point along a receiving waterbody.

“Environmentally critical areas” means 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 well head 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.

“Empowerment Neighborhood” means 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.

“Erosion” means the detachment and movement of soil or rock fragments by water, wind, ice or gravity.

“Impervious surface” means a surface that has been covered with a layer of material so that it is highly resistant to infiltration by water.

“Infiltration” is the process by which water seeps into the soil from precipitation.

“Major development” means any “development” that provides for ultimately disturbing one or more acres of land or increasing impervious surface by one quarter acre or more. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation.

“Municipality” means any city, Borough, town, Borough, or village.

“Node” means an area designated by the State Planning Commission concentrating facilities and activities which are not organized in a compact form.

“Nutrient” means a chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the development of organisms.

“Person” means any individual, corporation, company, partnership, firm, association, The Borough of Lake Como, or political subdivision of this State subject to municipal jurisdiction pursuant to the Municipal Land Use Law , N.J.S.A. 40:55D-1 et seq.

“Pollutant” means 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, ground waters or surface waters of the State, or to a domestic treatment works. “Pollutant” includes both hazardous and nonhazardous pollutants.

“Recharge” means the amount of water from precipitation that infiltrates into the ground and is not evapotranspired.

“Sediment” means 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” means the lot or lots upon which a major development is to occur or has occurred.

“Soil” means all unconsolidated mineral and organic material of any origin.

“State Development and Redevelopment Plan Metropolitan Planning Area (PA1)” means 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” is defined as 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” means 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 runoff” means water flow on the surface of the ground or in storm sewers, resulting from precipitation.

“Stormwater management basin” means 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” means 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 non-stormwater discharges into stormwater conveyances.

“Tidal Flood Hazard Area” means a flood hazard area, which may be influenced by stormwater runoff from inland areas, but which is primarily caused by the Atlantic Ocean.

“Urban Coordinating Council Empowerment Neighborhood” means a neighborhood given priority access to State resources through the New Jersey Redevelopment Authority.

“Urban Enterprise Zones” means 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” is defined as 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.

“Waters of the State” means 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” means an area that is inundated or saturated by surface water or ground water 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.

Section 3: General Standards

- A. Design and Performance Standards for Stormwater Management Measures
 1. 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 Section 4. 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.
 2. The standards in this ordinance 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 are applicable under a regional stormwater management plan or Water Quality Management Plan adopted in accordance with Department rules.

Section 4: Stormwater Management Requirements for Major Development

- A. The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with Section 10.
- B. Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department’ 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 muhlenbergi* (bog turtle).

- C. The following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Sections 4.F and 4.G:
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 Sections 4.F and 4.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 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 nonstructural and structural stormwater management strategies and measures, the option selected complies with the requirements of Sections 4.F and 4.G to the maximum extent practicable;
 3. The applicant demonstrates that, in order to meet the requirements of Sections 4.F and 4.G, 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 D.3 above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of Sections 4.F and 4.G that were not achievable on-site.
- E. Nonstructural Stormwater Management Strategies
1. To the maximum extent practicable, the standards in Sections 4.F and 4.G shall be met by incorporating nonstructural stormwater management strategies set forth at Section 4.E into the design. The applicant shall identify the nonstructural measures incorporated into the design of the project. If the applicant contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management measures identified in Paragraph 2 below into the design of a particular project, the applicant shall identify the strategy considered and provide a basis 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. "Time of concentration" is defined as 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;
 - 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:
 - (1) Site design features that help to prevent accumulation of trash and debris in drainage systems, including features that satisfy Section 4.E.3. below;
 - (2) Site design features that help to prevent discharge of trash and debris from drainage systems;
 - (3) Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and
 - (4) When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules.
3. Site design features identified under Section 4.E.2.i.(2) above 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 4.E.3.c below.
- 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 (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.

- 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 (7.0) square inches, or be no greater than two (2.0) 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 as specified in Section 4.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 inches long and one and one-half inches wide (this option does not apply for outfall netting facilities); or
 - (b) A bar screen having a bar spacing of 0.5 inches.
 - (3) 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 Section 4.G.1; or
 - (4) 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.
4. Any land area used as a nonstructural stormwater management measure to meet the performance standards in Sections 4.F and 4.G shall be dedicated to a government agency, subjected to a conservation restriction filed with the appropriate County Clerk's office, or subject to an approved equivalent restriction that ensures that measure or an equivalent stormwater management measure approved by the reviewing agency is maintained in perpetuity.
5. Guidance for nonstructural stormwater management strategies is available in the New Jersey Stormwater Best Management Practices

Manual. The BMP Manual may be obtained from the address identified in Section 7, or found on the Department's website at www.njstormwater.org.

- F. Erosion Control, Groundwater Recharge and 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 and 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:
 - (1) The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at Section 5, either:
 - (a) Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100 percent of the average annual pre-construction groundwater recharge volume for the site; or
 - (b) Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the 2-year storm is infiltrated.
 - (2) This groundwater recharge requirement does not apply to projects within the "urban redevelopment area," or to projects subject to (3) below.
 - (3) The following types of stormwater shall not be recharged:
 - (a) 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 (EPA) at 40 CFR 302.4; areas where recharge would be inconsistent with 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
 - (b) 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.

c. In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at Section 5, 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, 10, and 100-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;
- (2) 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, 10, and 100-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of existing land uses and projected land uses assuming full development under existing zoning and land use ordinances in the drainage area;
- (3) Design stormwater management measures so that the post-construction peak runoff rates for the 2, 10 and 100 year storm events are 50, 75 and 80 percent, respectively, of the pre-construction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the

proposed development or project is to be constructed. 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

- (4) In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with (1), (2) and (3) above shall only be applied if the increased volume of stormwater runoff could increase flood damages below the point of discharge.

2. Any application for a new agricultural development that meets the definition of major development at Section 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 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 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.

Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)
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		

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 Manual. The BMP Manual may be obtained from the address identified in Section 7, or found on the Department’s website at www.njstormwater.org. The BMP Manual and other sources of technical guidance are listed in Section 7. 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 the Department at the following address: Division of Watershed Management, New Jersey Department of Environmental Protection, PO Box 418 Trenton, New Jersey, 08625-0418.
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

Table 2: TSS Removal Rates for BMPs	
Best Management Practice	TSS Percent Removal Rate
Bioretention Systems	90
Constructed Stormwater Wetland	90
Infiltration Structure	40-60
Extended Detention Basin	80
Manufactured Treatment Device	See Section 6.C
Sand Filter	80
Vegetative Filter Strip	60-80
Wet Pond	50-90

4. If there is more than one onsite drainage area, the 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 Sections 4.F and 4.G.
6. Additional information and examples are contained in the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in Section 7.
7. 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.
8. 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:
 - a. The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:
 - (1) 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.
 - (2) Encroachment within the designated special water resource protection area under Subsection (1) 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 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 centerline of the waterway where the bank is undefined. All encroachments proposed under this subparagraph shall be subject to review and approval by the Department.

- 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 and Sediment Control in New Jersey," established under the Soil Erosion and Sediment Control Act , N.J.S.A. 4:24-39 et seq.
- c. 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:
 - (1) Stabilization measures shall not be placed within 150 feet of the Category One waterway;
 - (2) Stormwater associated with discharges allowed by this section shall achieve a 95 percent TSS post-construction removal rate;
 - (3) Temperature shall be addressed to ensure no impact on the receiving waterway;
 - (4) 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;
 - (5) A conceptual project design meeting shall be held with the appropriate Department staff and Soil Conservation District staff to identify necessary stabilization measures; and
 - (6) All encroachments proposed under this section shall be subject to review and approval by the Department.
- d. 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 Section 4.G(8) has been approved by the 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 G.8 shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in G.8.a.(1) 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.

- e. Paragraph G.8 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 February 2, 2004, provided that the construction begins on or before February 2, 2009.

Section 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 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 Section 5.A.1.a and the Rational and Modified Rational Methods at Section 5.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, that 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 may be calculated in accordance with the following:
1. 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, P.O. Box 427 Trenton, New Jersey 08625-0427; (609) 984-6587.

Section 6: Standards for Structural Stormwater Management Measures

- A. Standards for structural stormwater management measures are as follows:
1. Structural stormwater management measures shall be designed to take into account 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. Structural 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 (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 inches. In addition, the design of trash racks must comply with the requirements of Section 8.D.
 3. Structural 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. At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of two and one-half inches in diameter.
 5. Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at Section 8.
- 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 Section 4 of this ordinance.
- C. Manufactured treatment devices may be used to meet the requirements of Section 4 of this ordinance, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.

Section 7: Sources for Technical Guidance

- A. Technical guidance for stormwater management measures can be found in the documents listed at 1 and 2 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 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, P.O. 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, P.O. Box 330, Trenton, New Jersey, 08625, (609) 292-5540.

Section 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.
Note to the Applicant: 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 Sections 8.B.1, 8.B.2, and 8.B.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 lbs/ft sq.
 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 lbs./ft sq.
 3. For purposes of this paragraph 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:

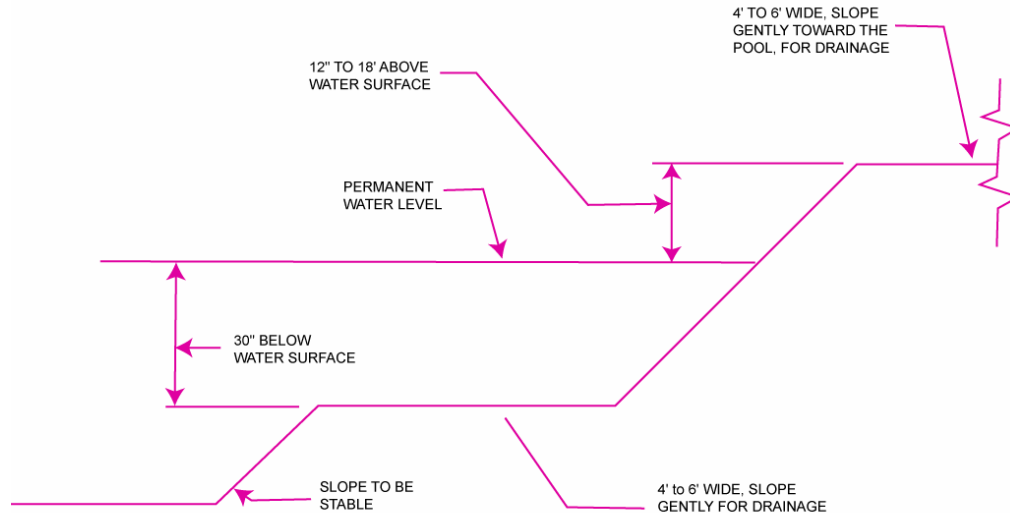
- a. If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Section 8.C a free-standing outlet structure may be exempted from this requirement.
- b. Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than two and one-half feet. Such safety ledges shall be comprised of two steps. Each step shall be four to six 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 Section 8.D 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 3 horizontal to 1 vertical.

C. Variance or Exemption from Safety Standards

1. 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.

D. Illustration of Safety Ledges in a New Stormwater Management Basin

Depicted is an elevational view.



NOTE: NOT DRAWN TO SCALE

NOTE: FOR BASINS WITH PERMANENT POOL OF WATER ONLY

Section 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 ordinance, the applicant shall submit all of the required components of the Checklist for the Site Development Stormwater Plan at Section 9.C 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 ordinance.
 3. The applicant shall submit fifteen (15) copies of the materials listed in the checklist for site development stormwater plans in accordance with Section 9.C of this ordinance.
- 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 ordinance.
- 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 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 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 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 and Source Control Plan**
This plan shall provide a demonstration of how the goals and standards of Sections 3 through 6 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 Section 4 of this ordinance.
 - b. When the proposed stormwater management control measures (e.g., infiltration basins) depends 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 and Repair Plan
The design and planning of the stormwater management facility shall meet the maintenance requirements of Section 10.
8. Waiver from Submission Requirements
The municipal official or board reviewing an application under this ordinance may, in consultation with the Borough Engineer, waive submission of any of the requirements in Sections 9.C.1 through 9.C.6 of this ordinance 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.

Section 10: Maintenance and Repair

- A. Applicability
 1. Projects subject to review as in Section 1.C of this ordinance shall comply with the requirements of Sections 10.B and 10.C.
- 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. 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.
4. If the person responsible for maintenance identified under Section 10.B.2 above is not a public agency, the maintenance plan and any future revisions based on Section 10.B.7 below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.
5. 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.
6. The person responsible for maintenance identified under Section 10.B.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.
7. The person responsible for maintenance identified under Section 10.B.2 above shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.
8. The person responsible for maintenance identified under Section 10.B.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 Sections 10.B.6 and 10.B.7 above.
9. The requirements of Sections 10.B.3 and 10.B.4 do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency.
10. 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 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.
11. A two year maintenance guarantee in accordance with N.J.S.A. 40:55D-53 shall be posted for the maintenance of the stormwater facilities.

12. Guidelines for developing a maintenance and inspection program are provided in the New Jersey Stormwater Best Management Practices Manual and the NJDEP Ocean County Demonstration Study, Stormwater Management Facilities Maintenance Manual, dated June 1989 available from the NJDEP, Watershed Management Program.)
- B. 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.

Section 11: Penalties

Any person who shall violate the provisions of this ordinance shall, upon conviction, suffer and pay the penalty as per the schedule set forth in the Municipal Ordinances of the Borough of Lake Como and/or State Statute.

Section 12: Effective Date

This ordinance shall take effect immediately upon the approval by the County review agency, or sixty (60) days from the receipt of the ordinance by the County review agency if the County review agency should fail to act.

Section 13: Severability

If the provisions of any section, subsection, paragraph, subdivision, or clause of this ordinance shall be judged invalid by a court of competent jurisdiction, such order of judgment shall not affect or invalidate the remainder of any section, subsection, paragraph, subdivision, or clause of this ordinance.