Managing Stormwater – Natural Vegetation and Green Methodologies

Guidance for Municipalities in Suffolk County

Planning Commission

Suffolk County

COUNTY OF SUFFOLK

OFFICE OF THE COUNTY EXECUTIVE

Steve Levy
COUNTY EXECUTIVE

Suffolk County is pleased to present *Managing Stormwater: Natural Vegetation and Green Methodologies.* I encourage all of the towns and villages in Suffolk County to use this document as a guide to update their stormwater codes to incorporate these new environmentally sensitive techniques for managing stormwater runoff. In addition to this document, below are some of Suffolk County's stormwater initiatives.

Stormwater Management Program (SWMP)
Since 2004, the County has invested more than $20 million in stormwater remediation efforts. These efforts have included bringing the County into compliance with the Clean Water Act and the U.S. EPA Stormwater Management Phase II regulations. The Phase II requirements have been implemented by the NYSDEC under the SPDES General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). This permit requires operators of MS4s to develop a SWMP with the intent to implement programs and best management practices (BMPs) that reduce the discharge of pollutants typically associated with stormwater runoff and protect water quality to the maximum extent practicable.

Local Law No. 12-2008, A Local Law to Prohibit Illicit Discharges and Elicit Connections to Suffolk County's Municipal Separate Storm Sewer System, the Suffolk County Sanitary Code, and other existing County laws, regulations, policies, and procedures provide a legal basis for the County's SWMP. The SWMP has been implemented in order to protect the environment and to comply with Federal and State stormwater regulations.

In collaboration with Cornell Cooperative Extension (CCE) of Suffolk County, the County has developed the SWMP to reduce stormwater pollution through a multi-faceted approach. Elements of the program include identification and monitoring of stormwater discharges, control of stormwater runoff from County roads and construction sites, improved maintenance practices, and education and outreach services. For more information on the Suffolk County SWMP go to: www.suffolkstormwater.com

Green Technologies
Suffolk County is also implementing innovative "green" technologies for new stormwater remediation projects. Construction officially began on November 15th on a project to replace the existing asphalt shoulder of a section of County Road 80, Montauk Highway, with permeable asphalt pavement in order to remove stormwater pollutants prior to their discharge into the adjacent Weesuck Creek. This project will serve as a pilot for using permeable asphalt for County projects.

Another project, that is expected to start next fall, will construct a modified rain garden median in the center of the parking area at Meschutt Beach County Park to infiltrate and treat stormwater runoff that currently flows from the parking lot directly onto the beach via several beach access walkways.

In summary, Suffolk County is taking major steps to reduce stormwater pollution to our precious waterbodies. Prudent measures are being taken to protect our waterways so that all the countless benefits they provide will remain vital and available for the people of Suffolk County and for future generations.

Sincerely,

Steve Levy

Steve Levy

COUNTY OF SUFFOLK

STEVE LEVY
SUFFOLK COUNTY EXECUTIVE

SUFFOLK COUNTY PLANNING COMMISSION

DAVID L. CALONE
CHAIRMAN

THOMAS ISLES, AICP
DIRECTOR OF PLANNING

February 2, 2011

One of the core roles of the Suffolk County Planning Commission under state and county law is to identify and promote county-wide land use values and planning priorities.

Clearly, one of Suffolk County's most valuable assets is our water – the water that surrounds us and the water that is stored beneath us. These resources know no municipal boundary and yet benefit us all. Thus, it is imperative that all of Suffolk County's municipalities play a role in protecting these water assets.

Recently, new techniques have been developed – both on and off Long Island – to provide more environmentally sensitive ways to control and mitigate polluted storm water runoff. This resource guide on "Managing Storm Water – Natural Vegetation and Green Methodologies" is intended to serve as a resource to Suffolk's towns and villages and as a catalyst for municipalities to include these types of methodologies in municipal projects and codes.

Particular thanks for putting this resource guide together goes to Planning Commission members Adrienne Esposito and Sarah Lansdale as well as to Citizens Campaign for the Environment and Sustainable Long Island. This document would also not be possible without the significant expertise and effort of The Nature Conservancy and the Suffolk County Water Authority.

The County Planning Commission also is appreciative of County Executive Steve Levy's leadership in encouraging the incorporation of regional thinking into local municipal codes by providing Suffolk's municipalities with resources like this guide.

If you need assistance or additional information regarding storm water runoff management, please contact the Suffolk County Planning Commission at 853-5190.

Sincerely,

David L. Calone
Chairman

Steve Levy
County Executive

SUFFOLK COUNTY PLANNING COMMISSION

David L. Calone ~ **CHAIR**
Babylon

Constantine Kontokosta, P.E., AICP, LEED AP ~ **VICE CHAIR**
Village Under 5,000 Population

Adrienne Esposito ~ **SECRETARY**
Village Over 5,000 Population

Michael Kelly
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The Suffolk County Planning Commission acknowledges the following organizations for their contributions:
Citizens Campaign for the Environment
Suffolk County Water Authority
Sustainable Long Island
The Nature Conservancy

Please contact the Suffolk County Planning Commission and the Suffolk County Department of Planning if you need assistance or more information relating to storm water runoff management.

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STORMWATER

Runoff from stormwater is defined by the U.S. EPA as "generated when precipitation from rain and snowmelt events flows over land or impervious surfaces and does not percolate into the ground. As the runoff flows over the land or impervious surfaces (paved streets, parking lots, and building rooftops), it accumulates debris, chemicals, sediment or other pollutants that could adversely affect water quality if the runoff is discharged untreated.[1]"

What is Stormwater Management?

Under natural conditions, stormwater is absorbed into the ground, where it is filtered and ultimately replenishes aquifers or flows into streams, rivers and estuaries.

In developed areas, however, impervious surfaces such as pavement and building roofs prevent precipitation from naturally soaking into the ground. Instead, the water runs rapidly into storm drains and drainage ditches. The resulting rush of stormwater discharge can cause infrastructure damage, downstream flooding, and stream bank erosion. In addition, the bacteria and other pollutants not filtered from stormwater can contaminate streams, rivers, and coastal waters.

Stormwater management addresses these concerns through a variety of techniques, including strategic site design, measures to control the sources of runoff, and thoughtful landscape planning. Managing stormwater has multiple benefits which include environmental, economic and human health. Benefits include:

- Reduced and Delayed Runoff Volumes
- Enhanced Groundwater Recharge
- Reductions in pollutant discharge into rivers, streams, tributaries and bays
- Reduced Sewer Overflow Events
- Increased Carbon Sequestration
- Urban Heat Island Mitigation and Reduced Energy Demands
- Improved Air Quality
- Additional Wildlife Habitat and Recreational Space
- Improved Human Health

- Increased Land Values

Stormwater runoff is regulated under the National Pollutant Discharge Elimination System (NPDES), however most states implement the NPDES program as a state program – SPDES. The NPDES program covers the following activities: Municipal Separate Storm Sewer Systems, Construction Activities, and (Large) Industrial activities.[2] Stormwater runoff from these activities is considered point source pollution, or direct discharge.

Quick Checklist for Addressing Stormwater

Addressing stormwater runoff from direct discharge activities is only part of the solution. Protecting existing native vegetation and providing incentives to use vegetation to protect groundwater and surface water quality is a key part of successful stormwater management. In areas like Suffolk County where groundwater recharge is important to the long-term health and sustainability of a community, incentives to protect vegetation and recharge areas will ultimately result in money-saved for the municipality. The following is a quick checklist to help start assessing what measures can be taken to protect ground and surface water:

- ☐ Do you have zoning overlay districts specifically devoted to groundwater protection?
- ☐ Do you have written standards for handling storm water to incorporate with deed covenants and restrictions associated with zoning changes?
- ☐ Do your subdivision regulations allow for alternative design, storage and reuse of storm water on development parcels, on planned rights-of-way and within engineered structures, such as leaching basins, catch basins, recharge basins, perforated pipe?
- ☐ Do your site plan review requirements permit alternative stormwater design and rainscaping techniques such as temporary parking pavement waivers, roof and pavement drainage structures such as porous pavement, rain gardens, bio-retention basins, bio-swales, and green roofs?
- ☐ Do your codes contain incentives for the retention or re-establishment of existing native plantings and non-disturbance of natural recharge areas?
- ☐ Do your codes contain disincentives to discourage extensive fertilized vegetation, automatic irrigation, impervious surface and urban heat island effect and, conversely, to encourage drought-tolerant plants, no-mow meadowland, upgrade and renewal of natural process for site work?

Municipalities that have reassessed how they view stormwater – as a resource as opposed to a problem to be managed – have seen a variety of benefits. This guidance document will discuss solutions for municipalities as well as the benefits of implementation.

Managing Wet Weather with Green Infrastructure

Green infrastructure is an approach to wet weather management that is cost-effective, sustainable, and environmentally friendly. Green infrastructure management approaches and technologies infiltrate, evapotranspire, capture and reuse stormwater to maintain or restore natural hydrologies.

At the largest scale, the preservation and restoration of natural landscape features (such as forests, floodplains and wetlands) are critical components of green stormwater infrastructure. By protecting these ecologically sensitive areas, communities can improve water quality while providing wildlife habitat and opportunities for outdoor recreation.

On a smaller scale, green infrastructure practices include rain gardens, porous pavements, green roofs, infiltration planters, trees and tree boxes, and rainwater harvesting for non-potable uses such as toilet flushing and landscape irrigation.

The EPA provides an educational and comprehensive report on this at http://www.epa.gov/npdes/pubs/gi_action_strategy.pdf

METHODS TO INCREASE STORMWATER RECHARGE

The following are a sampling of methods municipalities can use to increase stormwater recharge on residential, commercial, municipal, and other properties. These are common references in green infrastructure and stormwater best management practice guidance documents.

ZONING OVERLAY DISTRICTS[3] – Overlay districts can be used to establish protection areas for specific uses, such as aquifer recharge.[4,5]

BIO-RETENTION BASIN – An area designed to accept and retain storm water, to slow or block either its discharge to surface water or its recharge to groundwater, to lessen erosion, and to allow for filtering of sediments, plant root uptake of nutrients, and biological control of the water. It may be equipped with various overflows or high water level bypasses to transport amounts of water exceeding its holding capacity.

BIO-SWALE – A linear area designed to capture, slow and distribute flowing water so that plants can absorb the water. These vegetated areas may be supplemented by under drains, overflows or other engineering devices to cope with unusual storm events.

DROUGHT-TOLERANT PLANT – Any of a variety of plants (including some considered weeds) that have a capacity to thrive with minimal available water or are able to store water for use during extended dry periods.

GREEN ROOF – A building roof that is engineered to be covered with low-maintenance growing plants that: Insulate in winter, cool the building in summer, reduce solar absorption, reduce precipitation run-off from roof surfaces, and improve interior Heating, Ventilating and Air Conditioning (HVAC) efficiency. Sometimes green roofs are used to mitigate Urban Heat Island Effect.

NATIVE PLANT – A plant, not introduced from outside the geographical area, that is genetically suited to thrive with no maintenance, in the undisturbed or original soils to which it is accustomed, with the natural levels of precipitation and temperature range historically found in the area.

NO-MOW MEADOW – An area planted with a variety of geographically appropriate grasses or wildflower mixtures such that it is only mowed once at the end of the growing season and generally is capable of reseeding or over-seeding itself. It can be designed to attract various birds, butterflies or other wildlife.

POROUS OR PERMEABLE PAVEMENT – A hard surface with load bearing capacity engineered to allow for the passage of water through it. The surface may be comprised of paving blocks with open corners, lattices or edges or asphalt/concrete mixes without "fines". Porous asphalt or concrete is usually not recommended for highway use and is usually underlain by carefully engineered layers of crushed rock, fabric filter cloth, piping or drains. If not properly maintained, it can be subject to failure by clogging of the pores.

RAINSCAPING – A generalized term for how all the various techniques to deal with precipitation on both hard (pervious and impervious) surfaces, and natural or soft surfaces can be used together on a site, to capture and use rainwater as a resource.

RAIN GARDEN – See "Bio-Swale", also outfitted with attractive ornamental plants and flowers, to pleasantly highlight landscape features, focal points or high-visibility on site.

EXAMPLES OF STORMWATER MANAGEMENT ORDINANCES & POLICIES

All ordinances are hyperlinked within the text. Full links are footnoted at the end of the document.

TOWN OF EAST HAMPTON, NY

The Town of East Hampton established a Harbor Overlay District to maintain or improve surface water quality. The district is also intended to maintain or improve wildlife habitat in these areas and to maintain or restore these waterways as closely as possible to their natural condition.[6]

FREDERICK COUNTY, MD

Frederick County's Forest Conservation ordinance recognizes why forestation is beneficial to human health and the environment and focuses on preservation.[7]

LOWER COLORADO RIVER AUTHORITY – TX

The Lake Travis Nonpoint Source Pollution Control Ordinance is aimed at reducing nonpoint source pollution in the Lake Travis area (a watershed near Austin, TX). The Lake Travis watershed is a sub-watershed of the Lower Colorado River.[8]

CROTON-ON-HUDSON, NY

Croton-on-Hudson's Wetlands and Watercourses ordinance protects wetlands and other natural stormwater management areas in order to prevent water contamination. Croton-on-Hudson uses this ordinance to establish a Water Control Commission.[9]

RHODE ISLAND

Rhode Island's ordinance is focused on vegetated coastal zone buffers. Rhode Island also seeks to protect ecologically sensitive areas and prevent contaminated runoff from non-point source pollution.[10, 11]

NAPA, CA

Napa's Riparian Habitat ordinance is focused on protecting native vegetation and restoring native vegetation. Napa's ordinance also takes additional measures to prevent streambank hardening which is detrimental to habitat and accelerates erosion.[12]

New York Case Studies on Green Infrastructure

SYRACUSE, NY

Onondaga County has begun a comprehensive, multi-faceted campaign entitled, "Save the Rain" www.savetherain.us. Its purpose is to generate awareness and increase public participation (both residential and commercial) to reduce polluted runoff into Onondaga Lake and its tributaries. Educational billboards are posted around the community and there is a grants program to help defray costs of property improvements (i.e. repaving a parking lot that can pay for the difference between conventional asphalt and permeable pavers). Additionally, a team of on-the-ground green infrastructure installers directly interact with communities in target sewersheds to implement several projects, i.e. increasing rain gardens, rain barrels, use of porous pavement, green roofs, cisterns and vegetative swales.

In addition to environmental and community benefits, green infrastructure projects in Onondaga County also avoid the higher costs of building regional treatment facilities, separating sewers, and the operation and maintenance associated with gray water treatment infrastructure. Two projects currently underway to provide financial resources for implementation are the Green Improvement Fund, which provides grants for green infrastructure in targeted areas and the Rain Barrel Program, which provides free rain barrels in targeted areas.

LINDENHURST, NY

The Lindenhurst Library is home to Long Island's first permeable pavement parking lots. The parking lot is designed with permeable paving stones, set in-between gravel, which sits atop 4 layers of different sized gravel. The water is able is infiltrate through the pavement and then is filtered through the various layers of gravel. This water would otherwise run-off as polluted stormwater into the Great South Bay. The parking lot also has bio-swales surrounding the perimeter with drought resistant plants that help to capture rain water to recharge it into the aquifer. Lindenhurst is prone to flooding and many areas surrounding the parking lot become flooded after heavy rains, with the exception of the parking lot. The project was built using $200,000 in stimulus funds, which covered 90% of the construction and engineering costs. To complete the project, the parking lot uses solar power to light the parking lot at night.

HICKSVILLE, NY

The Hicksville Water District worked with the company VeriGreen to install permeable pavement at one of their nitrate treatment facilities. The area of the project is about 400-500 square feet, located 3ft below grade. The water district originally wanted to use basic cement, but then would have had to set up leeching pools or pumps because of the high probability of flooding. Instead they

went with permeable pavers. The pavers are set on top of a layer of sand. The rainwater is able to seep back into the ground. The project was completed in the beginning of 2010. To date there have been no problems with flooding.

Other municipal case studies highlighting communities adopting green infrastructure for managing stormwater can be found at the EPA website;

http://cfpub.epa.gov/npdes/greeninfrastructure/gicasestudies.cfm#Municipal

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Footnotes:

[1] US EPA Stormwater Program - http://cfpub.epa.gov/npdes/home.cfm?program_id=6

[2] Ibid.

[3] Groundwater Overlay District Model Ordinance from The Stormwater Managers Resource Center – http://www.stormwatercenter.net/Model%20Ordinances/Source_Water_Protection/Model%20Groundwater%20Ordinance.htm

[4] Basic Aquifer Overlay Zoning Ordinance from Stratham, NH - http://www.stormwatercenter.net/Model%20Ordinances/Source_Water_Protection/Aquifer%20district%20ordinance.htm

[5] Salt Lake City, UT Ordinance Creating Recharge & Protection Zones - http://www.stormwatercenter.net/Model%20Ordinances/Source_Water_Protection/Groundwater%20Source%20Protection%20Overlay%20District%20.htm

[6] Town of East Hampton Harbor Overlay District – http://www.generalcode.com/webcode2.html (Select New York; Town of East Hampton; Section 255, Title 3, Subsections 70, 71, 73, 75, 79)

[7] Frederick County,MD Forest Resource Ordinance - http://www.stormwatercenter.net/Model%20Ordinances/misc__forest_conservation.htm

[8] Lake Travis Nonpoint Source Pollution Control Ordinance - http://www.stormwatercenter.net/Model%20Ordinances/misc__lake_travis.htm

[9] Croton-on-Hudson's Wetlands & Watercourses Ordinance - http://www.stormwatercenter.net/Model%20Ordinances/misc__wetlands.htm

[10] Rhode Island Coastal Zone Program - http://www.epa.gov/nps/ordinance/documents/A2b-RhodeIsland.pdf

[11] EPA Model Ordinance on Stream Buffers - http://www.epa.gov/nps/ordinance/mol1.htm

[12] Napa, CA Riparian Habitat Ordinance - http://www.epa.gov/nps/ordinance/documents/a2c-napa.pdf