PUTNAM VALLEY CENTRAL SCHOOL DISTRICT
PUTNAM VALLEY, NY

MS4PY3 STORMWATER PROGRAM

FACT SHEET # 5
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STORMWATER MANAGEMENT DESIGN MANUAL & GREEN INFRASTRUCTURE PRACTICES

FOR MORE INFORMATION CONTACT YOUR STORMWATER COORDINATOR:

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1. NYS Stormwater Management Design Manual

The New York State Stormwater Management Design Manual (Manual) was prepared by the Center for Watershed Protection for New York State Department of Environmental Conservation (NYSDEC) in August 2010.

As noted the purpose of the manual is threefold:

- To protect waters of the State of New York from adverse impacts of stormwater runoff
- To provide design standards on the most effective stormwater management approaches, including the incorporation of green stormwater practices
- To improve the quality of green stormwater practices relative to performance, community acceptance and environmental benefit

Specifically, the Manual was prepared to assist Architects/Engineers hired by the District on how to select, locate, size and design Stormwater Management Practices (SMPs) that comply with the State stormwater performance standards. The Manual contains appendices with more detailed information on landscaping, SMP construction specifications and step-by-step design examples and design tools.

The District should require Architects/Engineers engaged in any retrofit, rehabilitation or new construction at any permitted District properties to review the Manual and incorporate Stormwater Management Practices (SMPs) that comply with the State stormwater performance, as noted in the Manual.

2. Green Infrastructure Practices

Chapter 5 of the Manual covers Green Infrastructure Practices, a few of which are

described in this fact sheet. Green stormwater infrastructure practices, including proprietary practices developed by private entities, that can be implemented on school properties, include:

1. Rain Gardens/Bio-Retention Cells
A rain garden or bio-retention cell is a depressed area with porous backfill (material used to refill an excavation) under a vegetated surface. These areas often have an under drain to encourage filtration and infiltration (the process through which stormwater runoff penetrates into soil from the ground surface). Bio-retention cells provide groundwater recharge, pollutant removal, and runoff detention. Bio-retention cells are an effective solution in parking lots or urban areas where green space is limited.

2. Curb & Gutter Elimination
Curbs and gutters transport flow as quickly as possible to a stormwater drain without allowing for infiltration or pollutant removal. Eliminating curbs and gutters can increase sheet flow and reduce runoff volumes. Sheet flow, the form runoff takes when it is uniformly dispersed across a surface, can be established and maintained in an area that does not naturally concentrate flow, such as parking lots. Maintaining sheet flow by eliminating curbs and gutters and directing runoff into vegetated swales or bio-retention basins helps to prevent erosion and more closely replicate predevelopment hydraulic conditions. A level spreader, which is an outlet designed to convert concentrated runoff to sheet flow and disperse it uniformly across a slope, may also be incorporated to prevent erosion.

3. Grassed Swales
Grassed swales are shallow grass-covered hydraulic conveyance channels that help to slow runoff and facilitate infiltration. The suitability of grassed swales depends on land use, soil type, and slope, imperviousness of the contributing watershed, and dimensions and slope of the grassed swale system. In general, grassed swales can be used to manage runoff from drainage areas that are less than10 acres in size, with slopes no greater than 5 percent. Use of natural, low-lying areas is encouraged, where natural drainage courses can be preserved and utilized.

4. Infiltration Trenches
Infiltration trenches are rock-filled ditches with no outlets. These trenches collect runoff during a storm event and release it into the soil by infiltration. Infiltration trenches may be used in conjunction with another stormwater management device, such as a grassed swale, to provide both water quality control and peak flow attenuation.

5. Inlet Protection Devices
Inlet protection devices, also known as hydrodynamic separators, are flow-through structures with a settling or separation unit to remove sediments, oil and grease, trash, and other stormwater pollutants. This technology may be used as pre-treatment for other stormwater management devices. Inlet protection devices are commonly used in potential stormwater “hot spots”, where higher concentrations of pollutants are more likely to occur.

6. Permeable Pavement
Permeable pavement is an alternative to asphalt or concrete surfaces that allows stormwater to drain through the porous surface to a stone

reservoir underneath. The reservoir temporarily stores surface runoff before infiltrating it into the subsoil. The appearance of the alternative surface is often similar to asphalt or concrete, but it is manufactured without fine materials and instead incorporates void spaces that allow for storage and infiltration. Under drains may also be used below the stone reservoir if soil conditions are not conducive to complete infiltration of runoff.

7. Permeable Pavers

Permeable pavers promote groundwater recharge. Permeable interlocking concrete pavements (PICP) are concrete block pavers. that create voids on the corners of the pavers Concrete grid paver (CGP) systems are composed of concrete blocks made porous by eliminating finer particles in the concrete which creates voids inside the blocks; additionally, the blocks are arranged to create voids between blocks. Plastic turf reinforcing grids (PTRG) are plastic grids that add structural support to the topsoil and reduce compaction to maintain permeability. Grass is encouraged to grow in PTRG, so the roots will help improve permeability due to their root channels.

8. Vegetated Roofs

Green roofs consist of an impermeable roof membrane overlaid with a lightweight planting mix with a high infiltration rate and vegetated with plants tolerant of heat, drought, and periodic inundations. In addition to reducing runoff volume and frequency and improving runoff water quality, a green roof can reduce the effects of atmospheric pollution, reduce energy costs, and create an attractive environment. They have reduced replacement and maintenance costs and have longer life cycles compared to traditional roofs.

9. Vegetative Filter Strips

Filter strips are bands of dense vegetation planted downstream of a runoff source. The use of natural or engineered filter strips is limited to gently sloping areas where vegetative cover can be established and channelized flow is not likely to develop. Filter strips are well suited for treating runoff from roads and highways, roof downspouts, very small parking lots, and impervious surfaces.

10. Stormwater Planters

Stormwater planters are small landscaped stormwater treatment devices that can be placed above or below ground and can be designed as infiltration or filtering practices. Stormwater planters use soil infiltration and biogeochemical processes to decrease stormwater quantity and improve water quality, similar to rain gardens and green roofs but smaller in size. Stormwater planters are typically a few square feet of surface area compared to hundreds or thousands of square feet for rain gardens and green roofs. Types of stormwater planters include contained planters, infiltration planters, and flow-through planters.

11. Rain Barrels & Cisterns

Rain barrels and cisterns harvest rainwater for reuse. Rain barrels are placed outside a building at roof downspouts to store rooftop runoff for later reuse in lawn and garden watering. Rain barrels and cisterns are low-cost water conservation devices that reduce runoff volume and, for very small storm events, delay and reduce the peak runoff flow rates.