

Coordinating New Stormwater Design Standards with Municipal Regulations

**Ellen Hahn, CPESC/CPSWQ
Stormwater Specialist**

New York State Department of
Environmental Conservation

**David Kubek, CPESC/CPSWQ
Senior Planner**

Central New York Regional Planning &
Development Board



WHY IS STORMWATER MANAGEMENT A CONCERN?

➤ Pollutants

- Sediment and Turbidity
 - Damages aquatic habitat and impacts recreational uses
- Phosphorus
 - Causes algal blooms and leads to anoxic conditions
- Potentially toxic substances
 - Nitrogen
 - Pathogens
 - Metals
 - Oil and grease
 - Floatables
 - Chlorides



WHY IS STORMWATER MANAGEMENT A CONCERN?

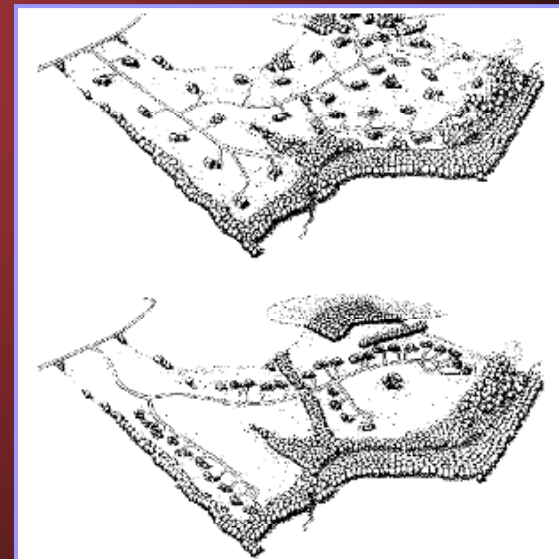
➤ Stormwater Volume and Flow



- Impervious = paved surfaces, rooftops
- Addition of impervious surfaces increases runoff
 - Because it cannot filter into the ground, flows more rapidly to bodies of water
 - No opportunity for plant uptake
 - Flooding and erosion
 - Lack of groundwater recharge
- Damages and costs
 - Culvert, road, and bridge repairs
 - Maintenance of drainage structures
 - Emergency management in floods

LAND USE REGULATIONS USED TO ADDRESS STORMWATER ISSUES

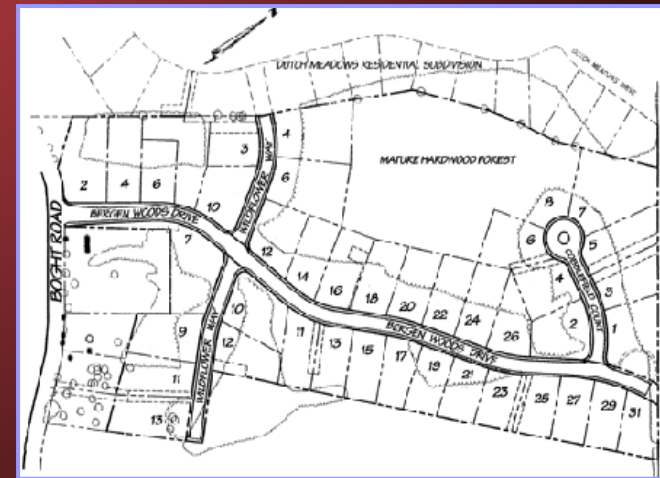
- Comprehensive plans
 - Determine desired land uses and community character
- Smart Growth and Low Impact Development
 - Permanent preservation of natural features within a development
- Zoning
 - Environmental protection overlay districts
 - Special use permits
 - Performance zoning
 - Area variances
 - Incentive zoning
 - Cluster development



A site developed using open space design principles (bottom) maintains more undeveloped common space than the conventional development plan (top) (Source: Arendt, 1996)

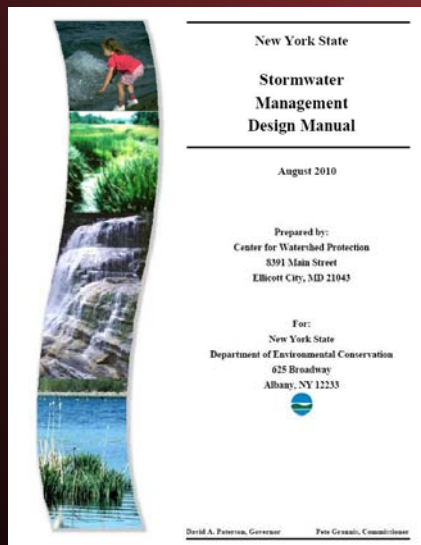
LAND USE REGULATIONS USED TO ADDRESS STORMWATER ISSUES

- Local laws
 - Open Space Preservation
 - Water Resource Protection
 - Wetland Preservation
- Planning Board approvals
 - Subdivision Review
 - Site Plan Review
 - State Environmental Quality Review (SEQR)



STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

- Prepared by the developer for any project that will result in one acre or more of soil/land disturbance
 - **Disturbance** = grading, excavating, clearing of vegetation with stump removal, stockpiling, demolition
 - The SWPPP contains drawings, details and narrative that describe process to:



- Keep sediment and other pollutants from entering drainage systems and bodies of water during construction
- Control the quantity and quality of stormwater leaving the site after construction is complete
 - Must be based on August 2010 Stormwater Management Design Manual (Includes new Chapters 3, 4, 5, 9, and 10)

REVIEW BOARD RESPONSIBILITIES

- Responsibilities of Planning and/or Zoning Boards
 - Complete a review of Stormwater Pollution Prevention Plan (SWPPP) documents to ensure that all components and documentation are present
 - Municipality certifies that based on their review, SWPPP meets permit requirements
 - Municipality may seek technical and legal review of the SWPPP
 - Owner and engineer retain liability for calculations and design elements

PLANNING SIGNIFICANCE OF BETTER SITE DESIGN AND GREEN INFRASTRUCTURE

- Both MS4 and non-MS4 review boards must assess the use of these techniques in proposals
 - Designers now must incorporate these principles into SWPPPs
- Updates to local codes may be necessary to take advantage of benefits and reduce difficulty of project design
- Developments that utilize these practices have lesser impacts on drainage infrastructure and the natural environment
- Preserving natural features and open space results in more attractive communities and better places to live

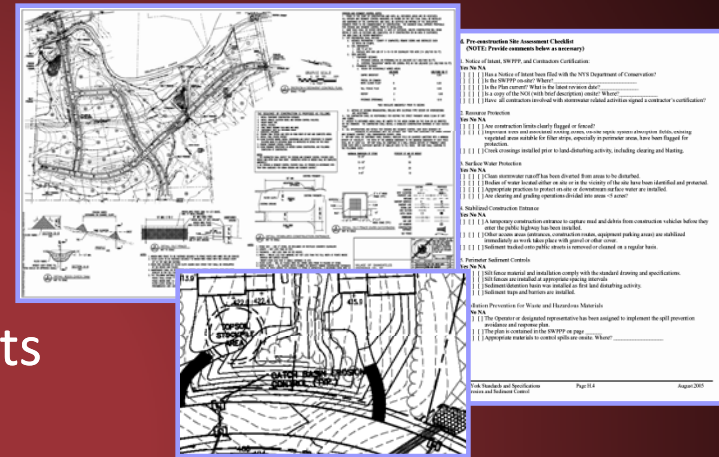
GREEN INFRASTRUCTURE BENEFITS

- Reduced pollutant discharges
- Reduced hydrological impacts on streams and stream banks
- Reduced flooding
- Increased groundwater recharge and base flow
- Reduced energy consumption
- Lesser urban heat island effect
- Improved air quality
- Carbon sequestering
- Community and aesthetic benefits of green space

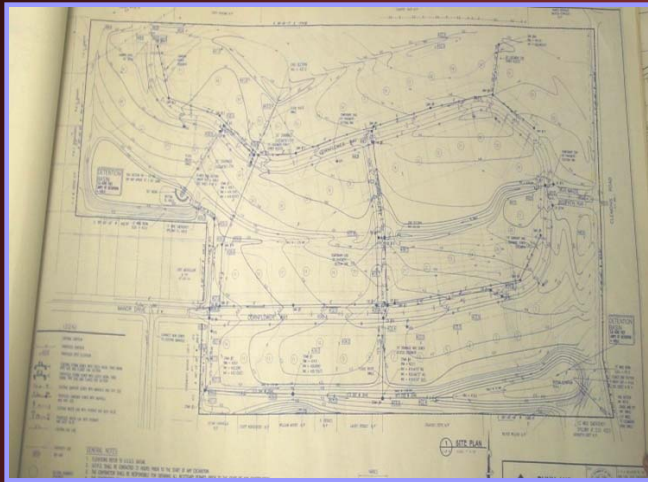
PLAN REVIEW PROCESS

➤ SWPPP Review takes place through one of the following:

- Subdivision Review
 - Most residential developments
- Site Plan Review
 - Some multi-family residential and most other types of development
- Review by Planning Department or Code Enforcement Office
 - Small projects such individual single family homes not subject to subdivision or site plan review, disturb ≥ 1 acre
 - Decision to accept SWPPP is not made by a Review Board



PLAN REVIEW PROCESS



➤ Presubmission Conference

- Opportunity to discuss stormwater and drainage-related concerns with applicant prior to developing SWPPP

➤ Preliminary subdivision plat or site development plan phase

- Opportunity for developer and municipality to identify and resolve potential areas of conflict with the project
- Draft SWPPP submitted at this stage
- Layout of project and identification of permanent stormwater practices provided

PLAN REVIEW PROCESS

- Preliminary plat or site development plan phase (ctd.)
 - Municipal professional planning staff, if available, should perform comprehensive review of site plans and/or plats
 - Technical experts (e.g. engineering, legal, environmental) may be retained to examine aspects of SWPPP design
 - State Environmental Quality Review determination made
 - Environmental Impact Statement required if significant impact on environment (SWPPP assessed in detail)
 - Public hearing held – comments on SWPPP accepted
 - Decision on whether or not to grant tentative approval

PLAN REVIEW PROCESS

- Final plat or site development plan phase
 - Review board performs a final check on the tentatively approved site plan or plat (and SWPPP)
 - Verify that any required modifications have been incorporated – may include changes to SWPPP, such as:
 - Site layout considerations and rationale
 - Water quality or quantity calculations
 - Practice selection, specifications or location
 - Documentation or certification issues



PLAN REVIEW PROCESS

- Final plat or site development plan phase (ctd.)
 - Public hearing is held
 - Determination on final plat or site plan is made
 - Review board may require developer to post performance bond, letter of credit, or cash escrow
 - Guarantees completion of improvements such as:
 - Roads and infrastructure
 - Stormwater management practices and landscaping
 - Establishment of drainage districts
 - Fund maintenance and repair of stormwater management practices and drainage structures
 - Fee paid by property owners who benefit from system

QUIZ QUESTION

True or False: MS4s are required to review SWPPPs of all projects that disturb one acre of land or greater, even those not subject to Subdivision Review, Site Plan Review, or a zoning variance.

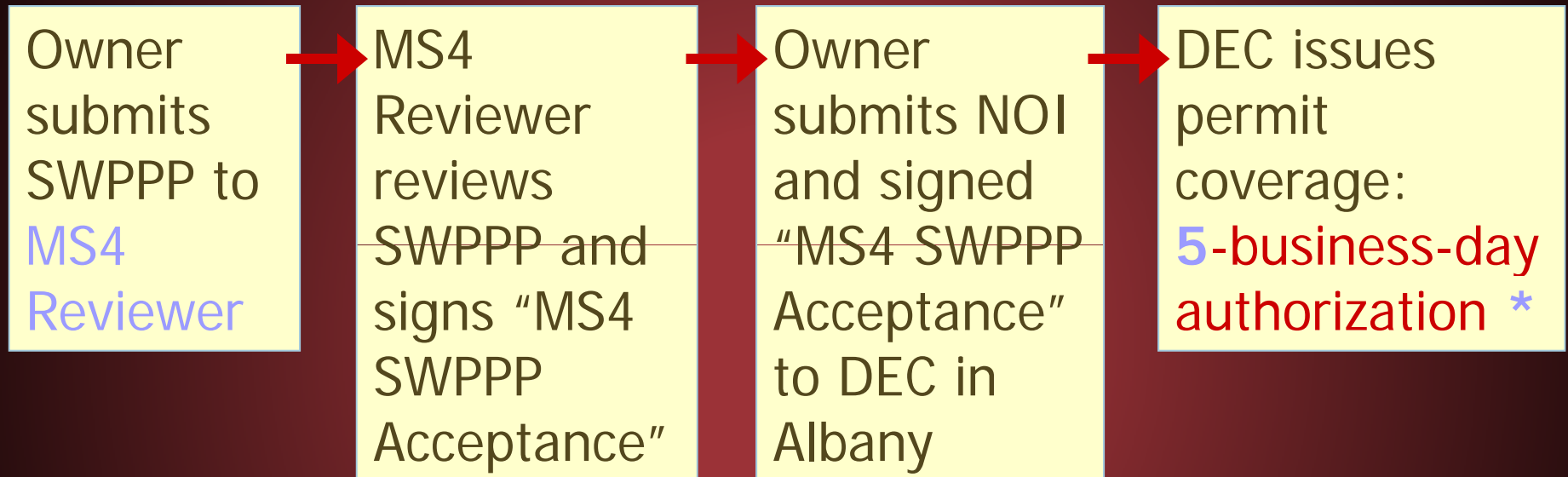
- A. True
- B. False

ANSWER

True or False: MS4s are required to review SWPPPs of all projects that disturb one acre of land or greater, even those not subject to Subdivision Review, Site Plan Review, or a zoning variance.

- A. True
- B. False

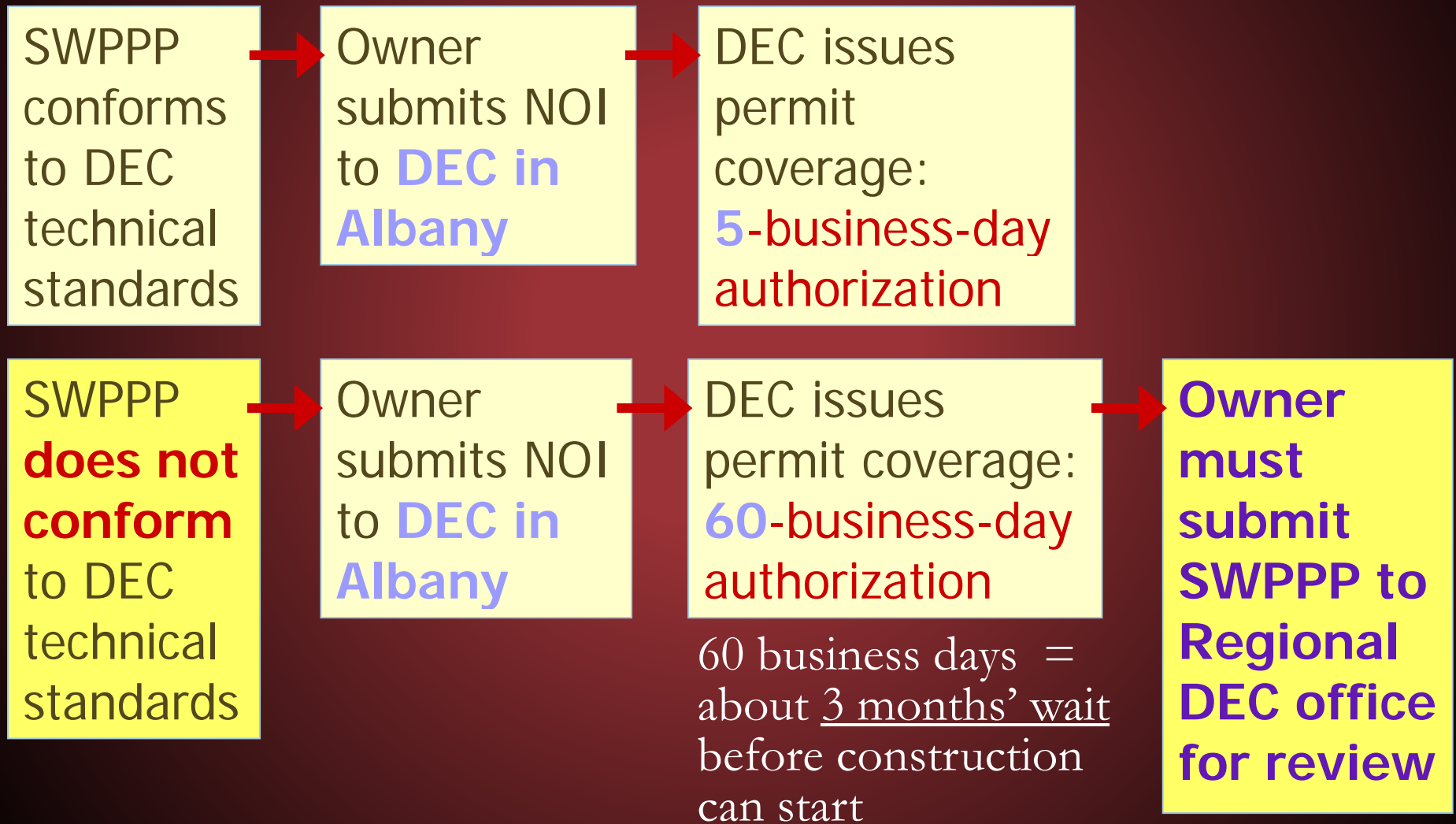
Obtaining Permit Coverage – Projects within Regulated Traditional Land Use Control MS4s



To find MS4 boundaries, check the Stormwater Interactive Map at: <http://www.dec.ny.gov/imsmaps/stormwater/viewer.htm>

* Permit coverage begins in 5 business days (including projects with SWPPPs that are not in conformance with technical standards – IF the MS4 reviewer accepts it)

Obtaining Permit Coverage – Projects Not Located in Regulated MS4s



SWPPP REVIEW IMPLEMENTATION

➤ DEC Regions will:

- Continue review of 60-business-day authorizations – *outside of regulated MS4s*
- Provide technical assistance to MS4s on SWPPP reviews
- Continue review of SWPPPs for all regulated projects needing other DEC permits
- “Spot Check” MS4s’ SWPPP reviews

MUNICIPAL SWPPP REVIEW

DEC does not review all Stormwater Pollution Prevention Plans and encourages local governments to review the plans

Reasons why stormwater plans should be reviewed locally:

- Local review may be the only review
- Assurance of quality and longevity of stormwater management systems
- Municipalities have a responsibility to ensure that stormwater impacts are mitigated
- Protection of municipal infrastructure and natural resources



SWPPP COMPONENTS

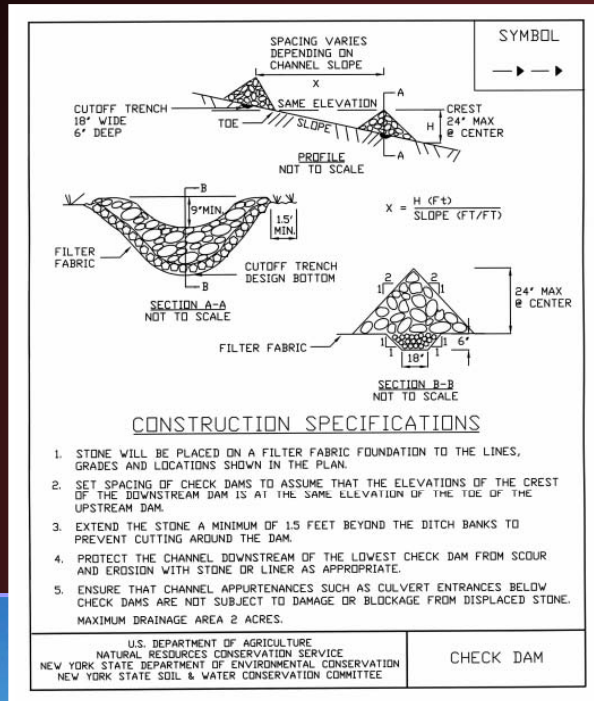
- Narrative Report
- Location and Resources Maps
- Existing Conditions Plans
- Future Conditions Plans
- Sequence of Construction
- Practice Specifications and Details
- Site Log/Certifications
- Routine Inspections by Qualified Inspector
- Maintenance Plan
- Post-Construction Stormwater Management Design/Details
- Hydrologic Analysis
- Runoff Reduction Practices



SWPPP REVIEW

➤ Review Board checks for the following components of the *Erosion and Sediment Control Plan*:

- Narrative describing rationale for selecting practices
- Calculations if sizing is required
- Drawings and details specifying materials, dimensions, etc.
- Practices located on the site plans
- Method and frequency for maintenance of practices



SWPPP REVIEW

- SWPPPs containing permanent post-construction stormwater management practices (water quality and quantity)
 - Generally required for projects with disturbance ≥ 1 acre that create new impervious surface and/or alter drainage patterns
 - Exceptions:
 - Linear utility projects that do not create impervious surface
 - Agricultural BMPs and buildings disturbing less than 5 acres
 - Athletic fields with no associated impervious surface
 - Environmental enhancement or slope stabilization projects
 - Spoil stockpiling or demolition where site will be re-vegetated

(Continued next slide)

SWPPP REVIEW

- SWPPPs containing permanent post-construction stormwater management practices (water quality and quantity)
 - Exceptions (ctd.):
 - Bicycle/walking trails, sidewalks not associated with other improvements
 - Single-family residential projects that meet these criteria:
 - Disturb only 1 to 5 acres total
 - Less than 25% of the site impervious at the end of construction
 - Not in a TMDL watershed or discharging to a waterbody on the 303(d) list
 - Appendix B of Construction General Permit contains a more detailed list (<http://www.dec.ny.gov/chemical/43133.html>)

SWPPP REVIEW

- Post-Construction Stormwater Management Practices
 - Delineation of pre- and post-construction drainage areas
 - Soils and land use data inputs for calculations completed
 - For each drainage area, calculation of:
 - Water quality volume (90% runoff volume event)
 - Runoff reduction volume (water quality volume eliminated through runoff reduction practices)
 - Channel protection volume (24-hour extended detention of 1-year storm runoff volume)
 - 10-year and 100-year flood protection (peak flow attenuation to pre-development conditions)
 - Waived if no peak flow increase
 - NYSDEC-designated 5th order streams

QUIZ QUESTION

True or False: The New York State Department of Environmental Conservation reviews all SWPPPs.

- A. True
- B. False

ANSWER

True or False: The New York State Department of Environmental Conservation reviews all SWPPPs.

- A. True
- B. False

CONVENTIONAL SITE DESIGN

Collect
Concentrate
Convey
Centralized
Control



Old "Good Drainage" Paradigm

RAIN GARDEN

“New” Treatment Train Approach



Credit: HWG

FIVE STEP PLANNING PROCESS (Ch. 3)

Site planning to preserve natural areas and reduce impervious cover to MEP

Calculate Water Quality Volume (WQv)

Apply GI practices to meet the Runoff Reduction Volume (RRv) to MEP

Apply standard practices to treat remaining WQv

Apply Volume and Rate controls for 1, 10 and 100 year storm events



RUNOFF REDUCTION (Ch. 5)



Avoid Impact

- Preserve Natural Resources



Reduce Impact

- Reduce Impervious Cover



Manage Impact

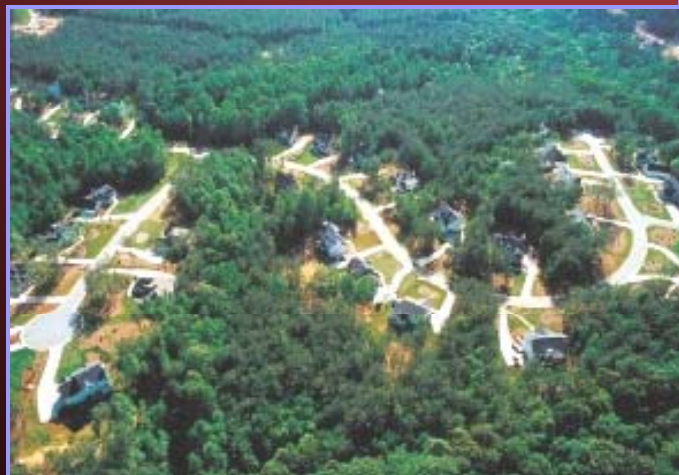
- Apply GI Techniques

STEP 1: SITE PLANNING

- Apply “Preservation of Natural Resources” and “Reduction of Impervious Cover’ planning techniques
- SWPPP must include evaluation of GI planning techniques
- Includes municipal involvement, local ordinances, etc.

SITE PLANNING – Preservation of Natural Resources

- Preservation of undisturbed areas
- Preservation of buffers around natural resources
- Reduction of clearing and grading
- Locating development in less sensitive areas
- Open space design



AVOIDING THE IMPACTS OF STORMWATER RUNOFF

➤ Reduce Construction Footprints

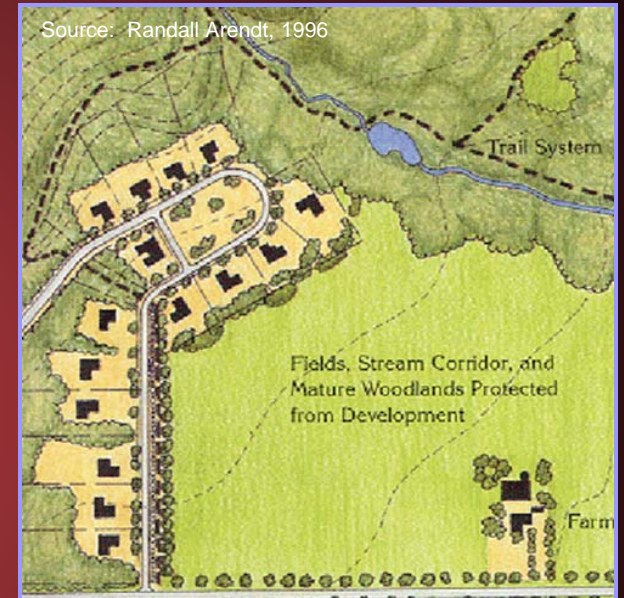
- Restrict clearing and grading to minimum required for building and road footprints, construction access, and safety setbacks
- Limits of disturbance shown in design and flagged in construction
- Use phased grading rather than mass grading of the whole site



AVOIDING THE IMPACTS OF STORMWATER RUNOFF

➤ Preserve riparian buffers

- Vegetated buffers surrounding bodies of water:
 - Remove stormwater pollutants and naturally infiltrate runoff
 - Ensure that structures are outside floodplains and provide safety zone
 - Can often be preserved without impacting the sale value of a property
- Mechanism to preserve (easement, land trust purchase, stream setback requirement, etc.) is recommended



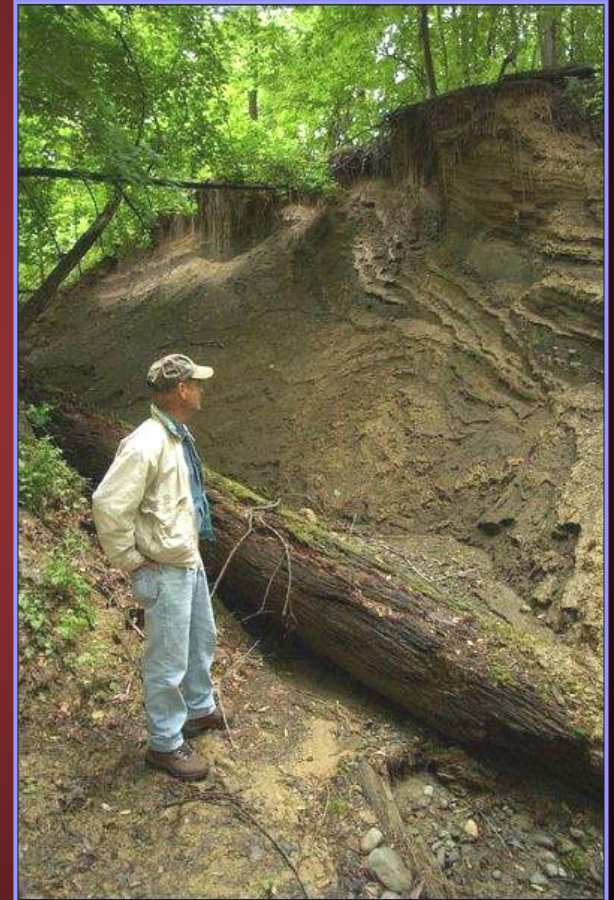
AVOIDING THE IMPACTS OF STORMWATER RUNOFF



- Locate development in less sensitive areas
 - Fit development to the site conditions (not vice versa!)
 - Preserve wetlands, floodplains, stream channels and banks, buffers, forest, and steep slopes
 - Refer to environmental overlay districts or open space preservation plan

AVOIDING THE IMPACTS OF STORMWATER RUNOFF

- Locate development in less sensitive areas (ctd.)
 - Avoid building on soils that:
 - Are erosive or unstable
 - steep slopes
 - poorly consolidated silts
 - expansive clays
 - Have high infiltration rates and groundwater recharge importance
 - low-lying sandy or gravelly soils



AVOIDING THE IMPACTS OF STORMWATER RUNOFF

- Preserve natural hydrology to the extent possible
 - Avoid flattening hills and valleys and changing drainage paths
 - Preserve natural stream and floodplain functions
 - Maintain natural connection between streams and floodplains
 - Consider watershed-level impacts - redirecting flow between watersheds can cause:
 - Flooding and erosion in one basin, reduced base flow in another
 - Interference with groundwater recharge patterns
 - Changes in cumulative volumes and timing of peak flows in receiving waters

Undeveloped Land



Source: Armit, Woodell, Conservation Design for Subdivisions, Page 3

Section 5.1 Avoid, Minimize, Preserve

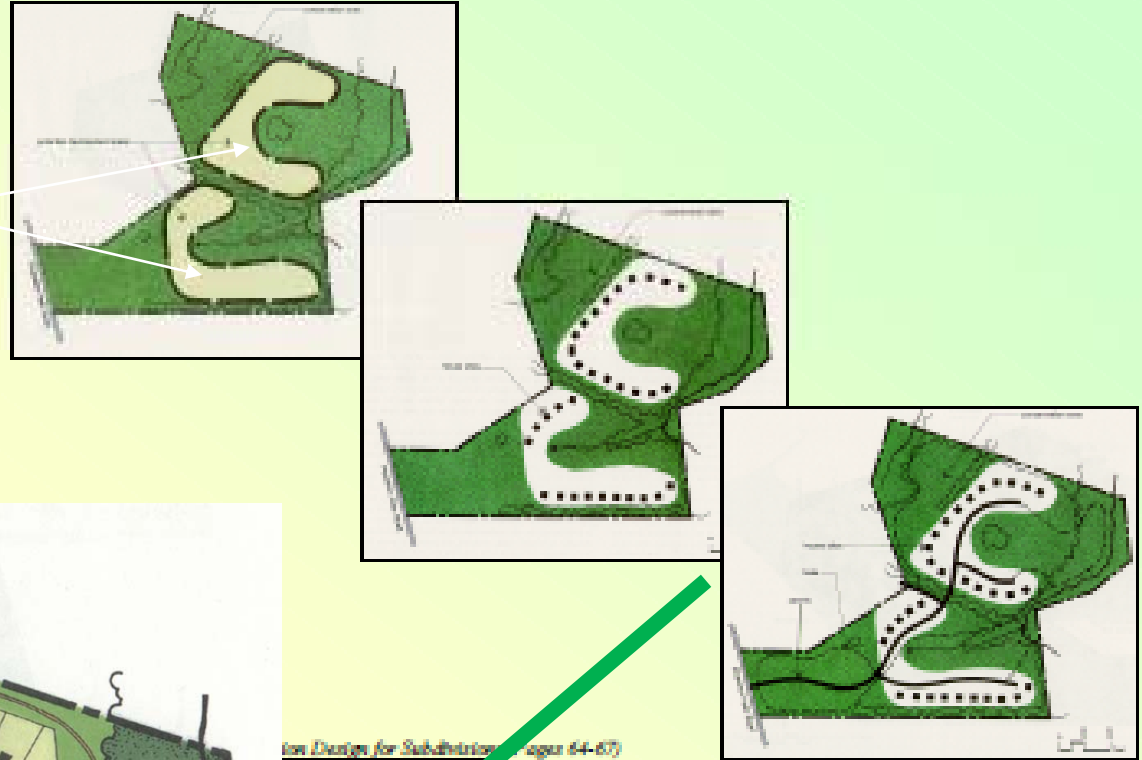
- Preservation of Natural Areas
- Avoidance of Sensitive Areas
- Minimize Clearing and Grading
- Open Space/Conservation Design

Conventional Subdivision Design



0 50 100

Identify Potential Developable Areas



ion Changes for Subdivision (pages 64-67)

Source: Randall Arendt

Section 5.1

- Delineate and protect
- Build on C & D soils
- Preserve A & B for infiltration



REQUIRED: Restore soil porosity in areas that have been compacted

REDUCING THE IMPACTS OF STORMWATER RUNOFF

➤ Narrower Streets and Sidewalks

– Lower standard street widths

- Parking on both sides of street plus one full lane of traffic may be unnecessary
- Large vehicles (school buses, fire trucks, etc.) can access streets with one traffic lane and parking on one side
- Replace large cul-de-sacs with T-shaped “hammerheads” or loop roads, or add vegetated islands

– Sidewalk reduction options - safe as traditional sidewalks

- Narrower sidewalks
- Sidewalks only on one side of the street



REDUCING THE IMPACTS OF STORMWATER RUNOFF



Photos courtesy US EPA

➤ Reduce Minimum Parking Requirements

- Don't base available parking on maximum anticipated use of lot
 - Lesser parking requirements result in fewer spaces being empty most of the year
- Other ways to reduce impervious surface
 - Pervious overflow areas
 - Compact-only spaces
 - Shared parking

REDUCING THE IMPACTS OF STORMWATER RUNOFF

- Relax height restrictions to lessen roof coverage and building footprint
 - Increased building height = less impervious area for same amount of floor space
 - Higher densities in one area preserve open space in another
- Open space design
 - “Clusters” development - reduces construction cost, infrastructure needs
 - Setbacks, frontages, and lot sizes are reduced
 - Retaining vegetated open space in layout provides groundwater recharge, runoff attenuation, and nutrient removal
 - Property often more desirable to buyer



QUIZ QUESTION

Which of the following is *NOT* considered a Better Site Design practice for runoff reduction according to the NYSDEC Design Standards?

- A. Vegetated Buffers
- B. Reduction of Construction Footprints
- C. Locating Development in Less Sensitive Areas
- D. Grass Seeding and Mulching

ANSWER

Which of the following is *NOT* considered a Better Site Design practice for runoff reduction according to the NYSDEC Design Standards?

- A. Vegetated Buffers
- B. Reduction of Construction Footprints
- C. Locating Development in Less Sensitive Areas
- D. Grass Seeding and Mulching

STEP 2 – WATER QUALITY VOLUME CALCULATION

- Determine WQv based on final site plan
- $WQv = (P)(Rv)(A)/12$ (Chapter 4)
 - P = Rainfall from 90 percentile storm
 - Rv = Runoff coefficient – depends on percent of site with impervious surface
 - A = Contributing area (includes pervious and impervious areas)
- Go to Step 3

STEP 3 – APPLICATION OF GI PRACTICES

- Apply GI practices and Standard SMPs with RRv capacity to reduce 100% WQv
- When RRv provided $>$ or $=$ 100% WQv from Step 2, go to Step 5



GI PRACTICES

RUNOFF REDUCTION BY AREA

(AVOID AND/OR REDUCE IMPACT)

- Conservation of natural areas
- Sheetflow to riparian buffers or filter strips
- Vegetated open swale
- Tree planting/tree box
- Disconnection of rooftop runoff
- Stream daylighting
 - (results in reduction of contributing area)

CONSERVATION OF NATURAL AREAS

- Delineate on plans/ in the field
- Place in permanent Conservation Easement:
 - Stream/wetland buffers
 - Undisturbed vegetated or wooded area
- Size by deduction of area from WQv calculation



BUFFER OR FILTER STRIPS

- Natural areas used to treat and control runoff:
 - Forested conservation areas
 - Riparian/stream buffers
 - Filter strips of dense vegetation cover
- Vegetation mitigates the impacts of runoff by:
 - Slowing runoff velocity
 - Removing nutrients such as excess phosphorus and nitrogen by uptake into plant matter
 - Storing water in natural depressions
 - Promoting groundwater recharge
- Must be permanently protected (easements, covenants, etc.)



- Convey & treat runoff with:
 - Natural drainage paths
 - Properly designed & constructed channels
- On certain sites use in street right-of-way

OPEN VEGETATED SWALES



TREE PLANTING

➤ Benefits

- Reduce stormwater runoff through evapotranspiration
- Promote nutrient uptake
- Provide shading and thermal reductions
- Restore stream banks, riparian buffers
- Provide wildlife habitat

➤ Tree planting (general)

- Concentrated groupings of trees in landscaped areas

➤ Tree pits, also called tree boxes

- Individually planted trees in sidewalk cut-outs or curbed islands

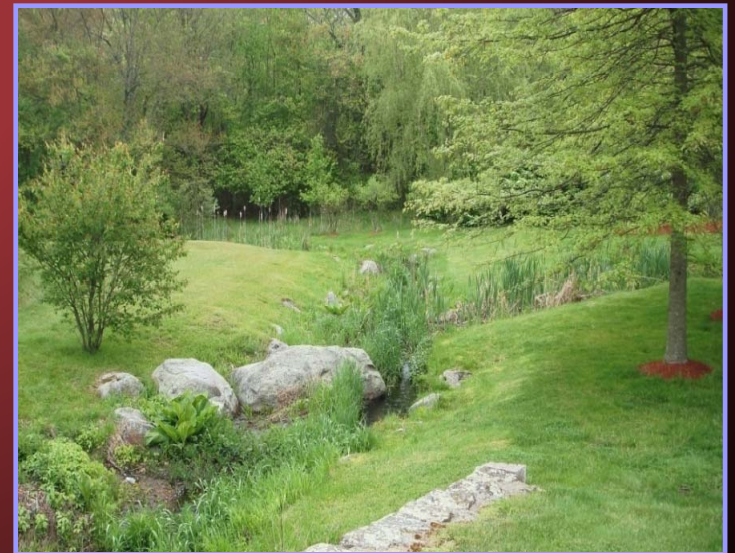


RUNOFF REDUCTION TECHNIQUE: Rooftop Runoff Disconnection



STREAM DAYLIGHTING

- Convert piped conveyance to open-channel stream
 - Stream must be stabilized
 - Must examine site conditions and channel characteristics
 - Benefits include:
 - Restoration of natural habitats
 - Increased infiltration
 - Reduction of pollutant loads
 - Prevention of flooding by increasing storage, reducing peak flows
 - Increase of property values
 - Aesthetic appeal in urban areas



GI PRACTICES

RUNOFF REDUCTION BY VOLUME

*(Manage the Impact –
Slow it down, Spread it out, Soak it in)*

- Rain garden
 - Green roof
 - Stormwater planter
 - Rain barrel/cisterns
 - Infiltration trench/bioretention
 - Porous pavement/permeable pavers
- (result in reduction of contributing volume)



RAIN GARDENS AND BIORETENTION

- Manage and treat small volumes of runoff using a conditioned soil bed and vegetation in a shallow depression
 - Rain gardens work through infiltration and plant uptake of water
 - Bioretention contains geotextile, an overflow bypass, specialized soil media, and (in poor soils) an underdrain
 - Sizing based on runoff volume
- Limitations
 - Steep slopes
 - Heavy tree cover or root systems
 - Compacted and clay soils



RAIN GARDENS AND BIORETENTION

➤ Benefits

- Pollutant treatment for rooftops and driveways
 - Solids, metals, nutrients, oil/grease
- Groundwater recharge
- Micro-scale habitat
- Aesthetic improvement to turf grass or hard urban surfaces
- Ease of maintenance
- Promote water resource education and stewardship
- Require a modest land area



GREEN ROOFS & GREEN WALLS



GREEN ROOFS

- Layers of vegetation and soil installed on top of a flat or sloped roof
 - Vegetation captures rainwater, evapotranspiration lowers runoff volume
 - Possible alternative when on-site space for practices is limited
 - Design options:
 - *Extensive* - thin soil layer and are lighter, less expensive and generally lower maintenance
 - *Intensive* - deeper soil layer with greater weight, higher cost, increased plant diversity and maintenance needs
 - Sizing based on
 - Treatment volume and pore storage space
 - Evapotranspiration rate



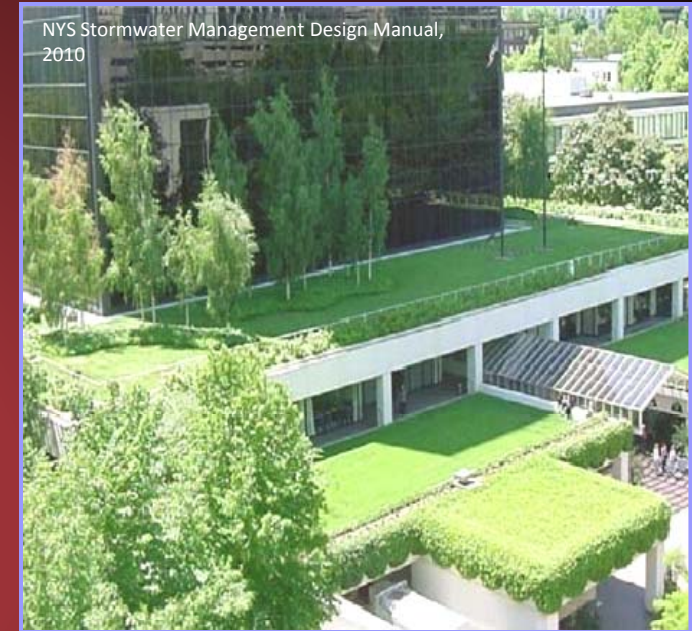
GREEN ROOFS

– Applications

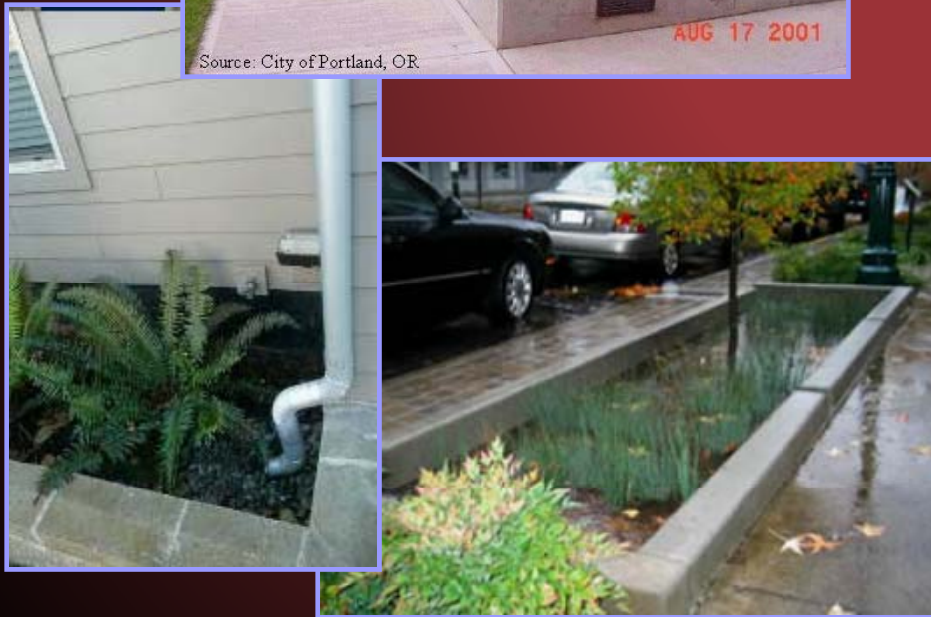
- Reduce annual runoff volumes
- Insulate from heat and cold, conserve energy
- Create aesthetically pleasing areas with habitat value

– Limitations

- Cost
- Damage to or failure of waterproofing
- Plant survival under extreme weather conditions
- Structural requirements
- Maintenance needs



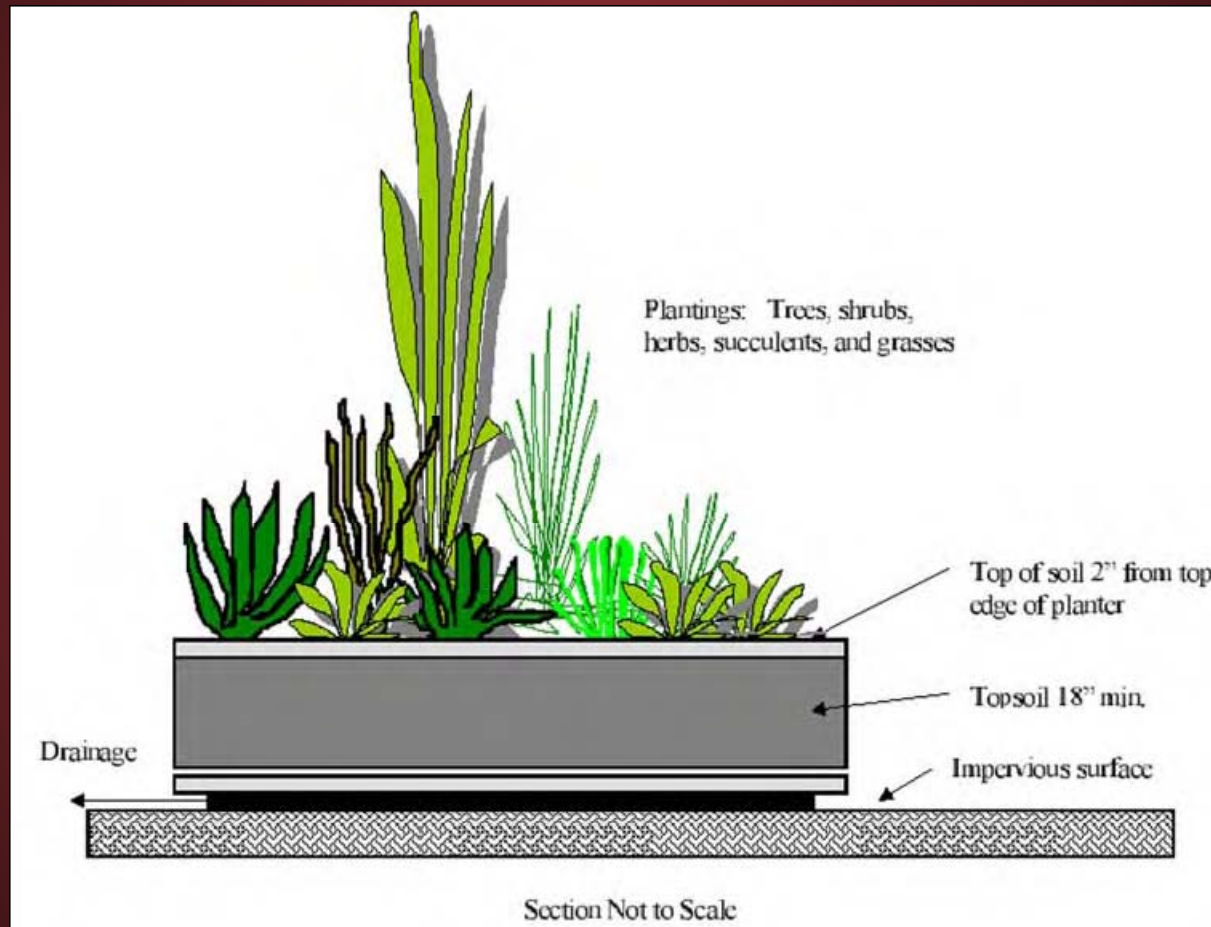
STORMWATER PLANTERS



➤ Three design types

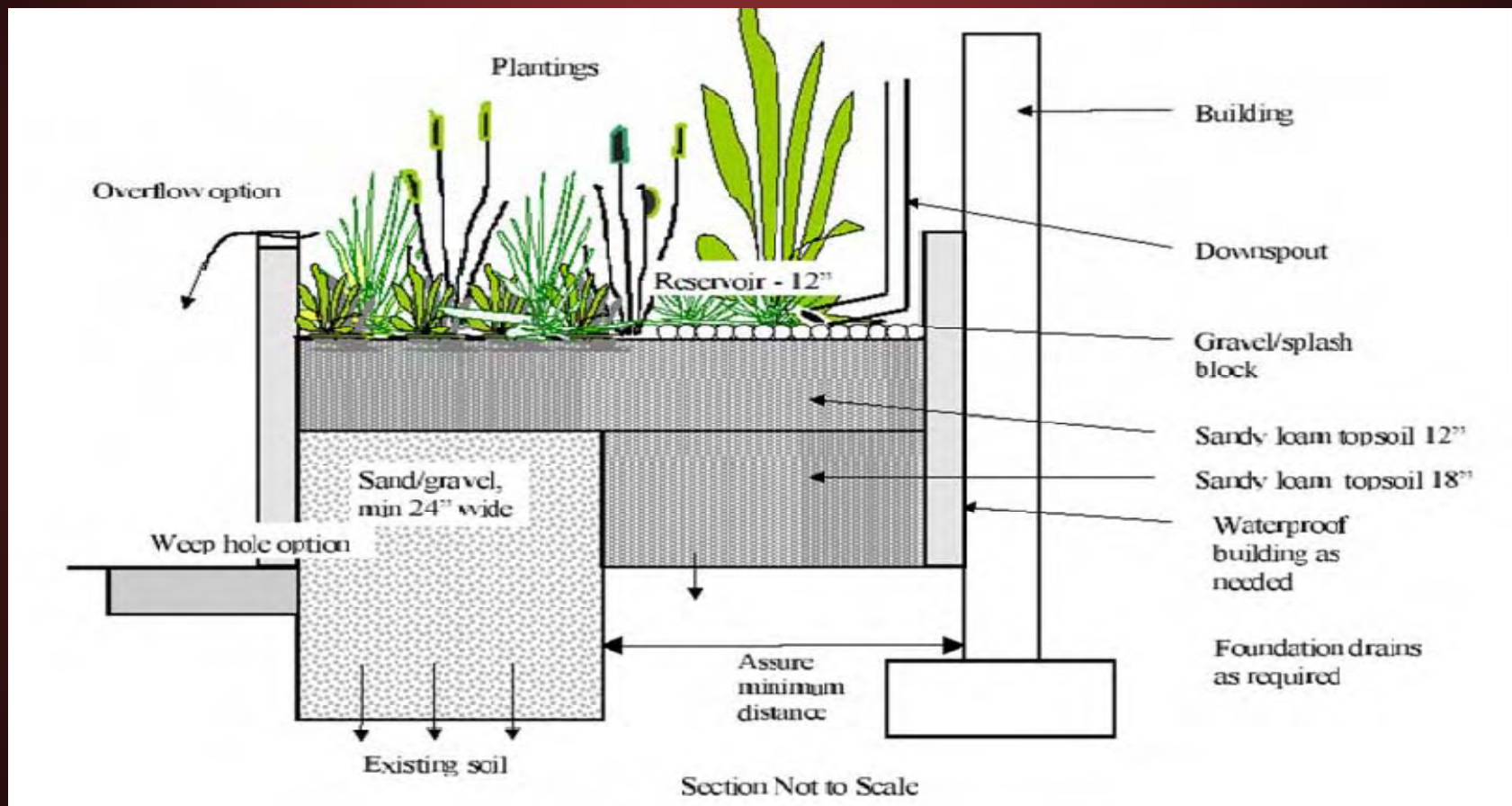
- *Infiltration planter* – pervious bottom allows stormwater to infiltrate into the underlying soil
- *Contained planter* – closed bottom above an impervious surface
- *Flow-through planter* – closed bottom, but contains an underdrain to carry runoff to a drainage system

STORMWATER PLANTERS



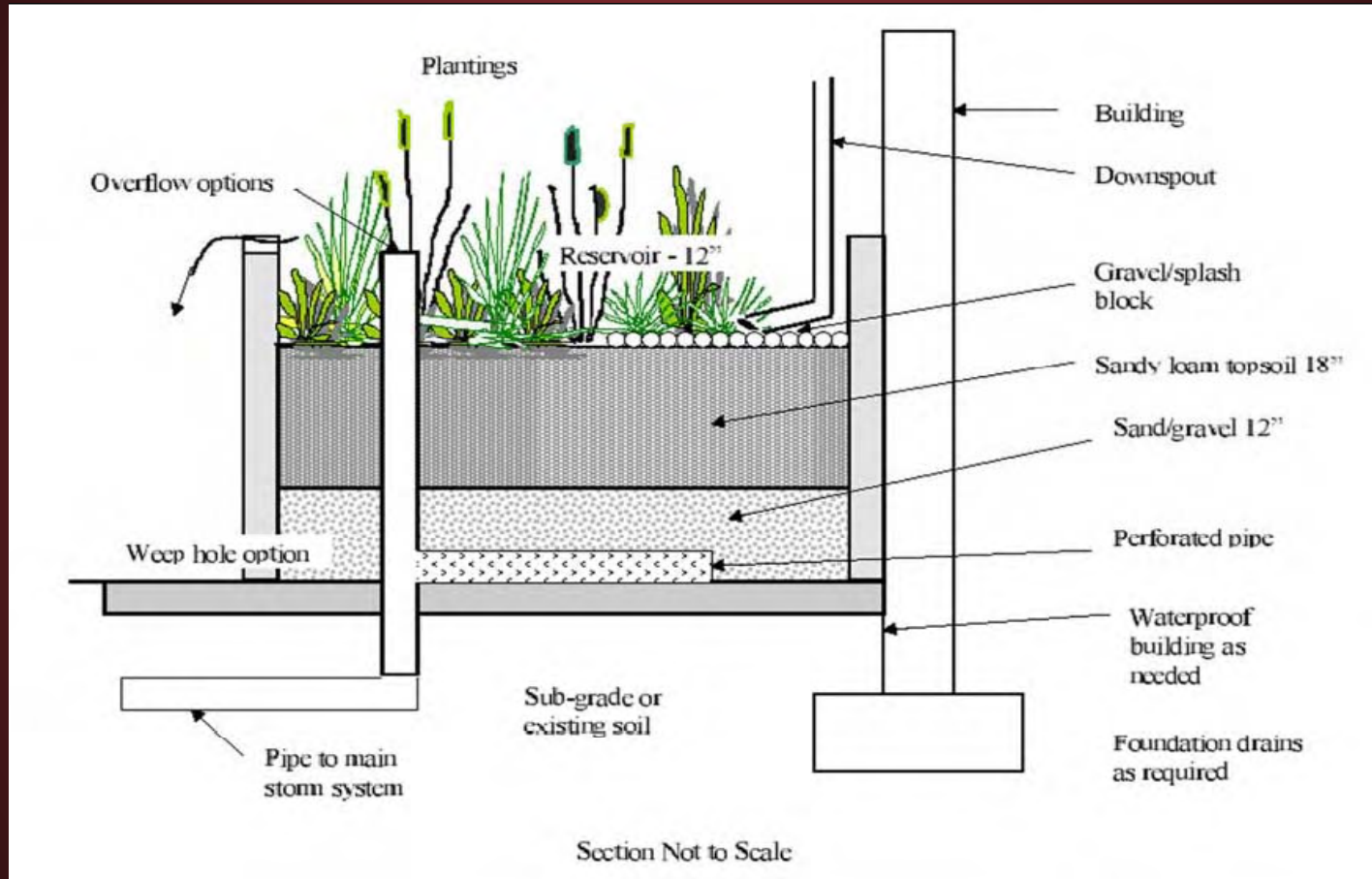
Contained Stormwater Planter

STORMWATER PLANTERS



Infiltration Stormwater Planter

STORMWATER PLANTERS



Flow-through Stormwater Planter

RAIN BARRELS AND CISTERNS

- Collect and recycle stormwater
 - Reduce runoff and peak flow
 - Reduce transport of pollutants from atmospheric deposition on roofs
 - Collected water used to:
 - Water lawns and landscaping
 - Wash cars
 - Top off swimming pools
 - Retrofits in redevelopment scenarios with:
 - High impervious cover
 - Compacted soils
 - High groundwater levels
 - Hot-spots that preclude infiltration



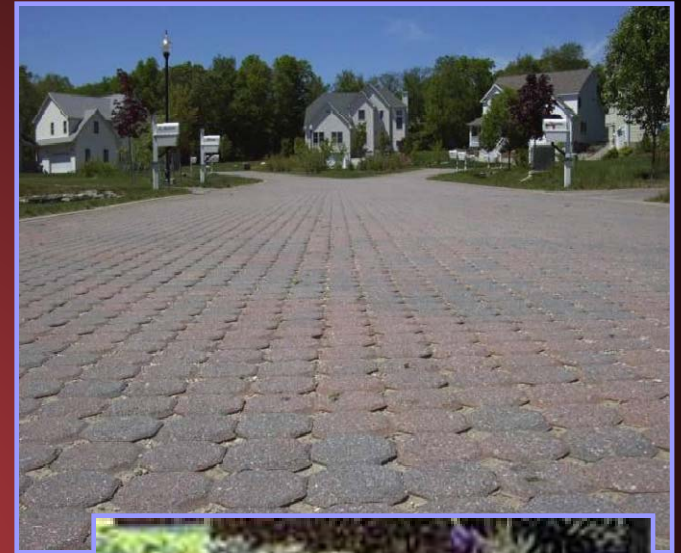


**Standard
Asphalt**

**Porous
Asphalt**

PERVIOUS PAVEMENT

- Conveys rain water through the surface into an underlying reservoir where it infiltrates, reducing runoff
 - Effective pollutant treatment for solids, metals, nutrients, and hydrocarbons
 - Potential alternative to conventional asphalt and concrete surfaces
 - May provide aesthetic improvement
 - Well-drained soils with moderate to high infiltration rate needed
 - Adequate depth to groundwater required



PERVIOUS PAVEMENT



– Porous pavement

- Permeable asphalt or concrete surface using larger aggregate, leaving void (pore) space
- Flexible pavement of recycled materials

– Permeable pavers

- Brick paver blocks
- Reinforced turf
- Interlocking concrete grid modules

GREEN INFRASTRUCTURE PRACTICES

Standard SMPs that provide Runoff Reduction

- Infiltration practices
 - 90% of WQv
- Bioretention
 - 80% of WQv (HSG A and B, no underdrain)
 - 40% of WQv (HSG C and D, with underdrain)
- Dry swale (open channel)
 - 40% of WQv (HSG A and B)
 - 20% of WQv (HSG C and D)

Step 3, cont'd.

➤ Projects that can not reduce 100% WQv must at least reduce WQv to be equal to or greater than “Minimum RRv”

- “Minimum RRv” = $(P)(*Rv)(Ai)/12$

- $*Rv = 0.05 + 0.009(I)$, $I = 100\%$

- $Ai = (S)(Aic)$

Ai = Area of impervious targeted for runoff reduction

Aic = Total area of new impervious

S = Hydrologic Soil Group Specific Reduction Factor

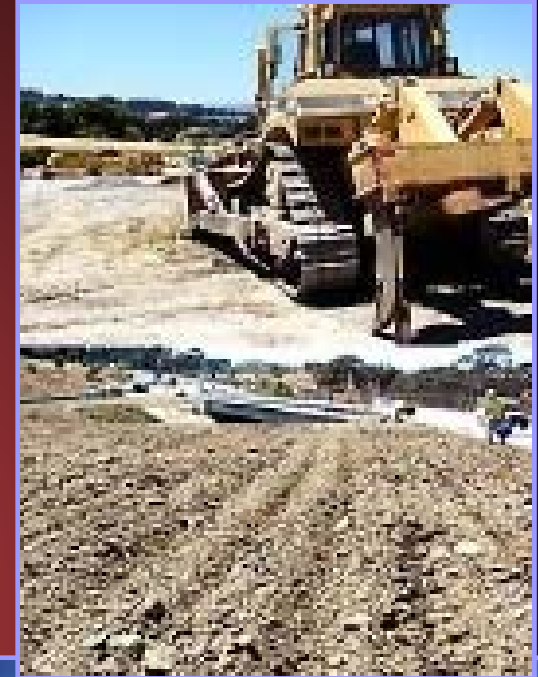
Step 3, cont'd.

- Design GI practices to treat the full WQv
 - If 100% reduction is not achievable, at minimum reduce to the following level, given objective and quantitative justification is provided:
 - **S = 55% on A soils**
 - **S = 40% on B soils**
 - **S = 30% on C soils**
 - **S = 20% on D soils**
- * Use a weighted average of mixed soil types
- Treat the remaining WQv prior to discharge (Step 4).

Step 3, cont'd.

➤ Soil Restoration

- Convert compacted, dense, poor soil to deep, well-drained soil rich in organic matter
- Promotes plant growth and absorbs rainwater
- Increased porosity reduces runoff, enhances groundwater recharge
- Soil is aerated through tilling and compost is incorporated
- Areas must be permanently vegetated



Step 4 – Apply Standard SMPs to Meet Total WQv

- Applies to sites that can not provide reduction of 100% of WQv
 - Use Standard Stormwater Management Practices from Chapter 6
 - Designed to address remaining WQv
= WQv (Step 2) – RRv provided (Step 3)
- *Note: RRv provided must be \geq “Minimum RRv”

Step 5 – Volume and Peak Rate Controls

- Design practices to address quantity control requirements (Chapter 4)
 - Channel Protection Volume (Cpv)
 - Overbank Flood Control (10 yr)
 - Extreme Flood Control (100 yr)

Exceptions to Meeting RRv Criteria

- Not required for “Redevelopment” projects that meet Chapter 9 criteria in Section 9.3.1
- Required for projects over karst geology, provided large infiltration basins are avoided
- Required for “hotspot” projects, provided no infiltration practices are used
- Not required for projects that have filed an application for site plan or subdivision approval and have a completed SWPPP prepared prior to March 1, 2011

QUIZ QUESTION

Which of the following is *NOT* a Green Infrastructure Practice that provides runoff reduction according to the NYSDEC Stormwater Design Standards?

- A. Rain Garden
- B. Micropool Extended Detention Pond
- C. Pervious Pavement
- D. Cistern

ANSWER

Which of the following is *NOT* a Green Infrastructure Practice that provides runoff reduction according to the NYSDEC Stormwater Design Standards?

- A. Rain Garden
- B. Micropool Extended Detention Pond
- C. Pervious Pavement
- D. Cistern

SWPPP Review Checklist

Identifies the required components of Basic and Full SWPPPs

STORMWATER POLLUTION PREVENTION PLAN REVIEW CHECKLIST
 New York State Department of Environmental Conservation
 SPDES General Permit for Stormwater Discharges from Construction Activity - Permit No. G7-02-01

Project Name:	<input type="checkbox"/> Basic SWPPP (E&SC Plan)	<input type="checkbox"/> Full SWPPP
Site Address:	Municipality:	Reviewer:
	County:	
Owner/Operator:	Phone:	Date:
Address:	Fax:	SPDES Permit Number:
		NYR10

Comments:

For completion of:

Hydrology and erosion control plan

SWPPP

SWPPP requirements met:

- Owner/Operator name, legal address, phone number
- Signed owner certification
- Copy of signed Notice of Intent (NOI)
- Contractor (and subcontractors if applicable) certification statement(s)
- Site address and legal description of site
- Vicinity Map, showing project boundary and receiving water(s)

Comments:

Existing and proposed mapping and plans (recommended scale of 1" = 50') which illustrate at a minimum:

SWPPP requirements met:

- Existing and proposed topography (minimum 2-foot contours recommended)
- Location of perennial and intermittent streams
- Mapping and description of predominant soils from USDA Soil Survey as well as location of any site-specific borehole investigations that may have been performed
- Boundaries of existing predominant vegetation and proposed limits of clearing
- Location and boundaries of resource protection areas such as wetlands, lakes, ponds and other setbacks (e.g. stream buffers, drinking water well setbacks, septic setbacks)
- Boundary and acreage of upstream watershed
- Location of existing and proposed roads, lot boundaries, buildings and other structures
- Location and size of staging areas, equipment storage areas, borrow pits and spoil areas
- Existing and proposed utilities (e.g. water, sewer, gas, electric) and easements
- Location of existing and proposed conveyance systems such as channels, swales, culverts and storm drains
- Flow paths for surface and subsurface stormwater management structures
- Location of floodplain/floodway limits
- Location and dimensions of proposed channel modifications, such as bridge or culvert crossings
- Location, size, maintenance access and limits of disturbance of proposed temporary and permanent stormwater management and erosion and sediment control practices, including timing and duration of temporary practices
- Plans stamped and signed by licensed professional

Comments:

SWPPP

Erosion and Sediment Control Plans and Vegetative Measures:

SWPPP requirements met:

- Material specifications, dimensions and installation details for erosion and sediment control practices, including the siting and sizing of any temporary sediment basins
- Description of temporary and permanent structural and vegetative measures for soil stabilization, runoff control and sediment control for each stage of the project from initial land clearing and grubbing to project close-out
- Site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice
- Maintenance schedule to ensure continuous and effective operation of the erosion and sediment control practices, and description of temporary practices to be converted to permanent control measures
- Description of structural practices to divert flows from exposed soils, store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable

Page 1 of 2

Page 2 of 2

Notice of Intent

- Must use new 12-page NOI
- Must be signed by SWPPP Preparer
- Must be signed by owner/operator

4286041005

NOTICE OF INTENT

New York State Department of Environmental Conservation

Division of Water

625 Broadway, 4th Floor NYR

Albany, New York 12233-3505 (for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-02-01
All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required. To properly complete this form, please refer to the Instruction Manual which can be accessed at www.dec.state.ny.us/website/dow/toolbox/instr_man.pdf

-IMPORTANT-

THIS FORM FOR HANDPRINT ONLY

RETURN THIS FORM TO THE ADDRESS ABOVE

PRINT **CAPITAL** LETTERS IN **BLACK** INK AND AVOID CONTACT WITH THE EDGE OF BOXES
FILL IN CIRCLES COMPLETELY AND **DO NOT** USE CHECKMARKS
OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------

Owner/Operator Contact Person First Name

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------

Owner/Operator Mailing Address

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------

City

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------

State

<input type="text"/>	<input type="text"/>
----------------------	----------------------

Zip

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	-	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	---	----------------------	----------------------	----------------------	----------------------

Phone (Owner/Operator)

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	-	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	---	----------------------	----------------------	----------------------	----------------------	----------------------

Fax (Owner/Operator)

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	-	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	---	----------------------	----------------------	----------------------	----------------------	----------------------

Email (Owner/Operator)

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------

Stormwater Management Practices are **not permitted** in New York State or Federal regulated wetlands and not within 100-foot adjacent areas to NYS wetlands without a wetland permit

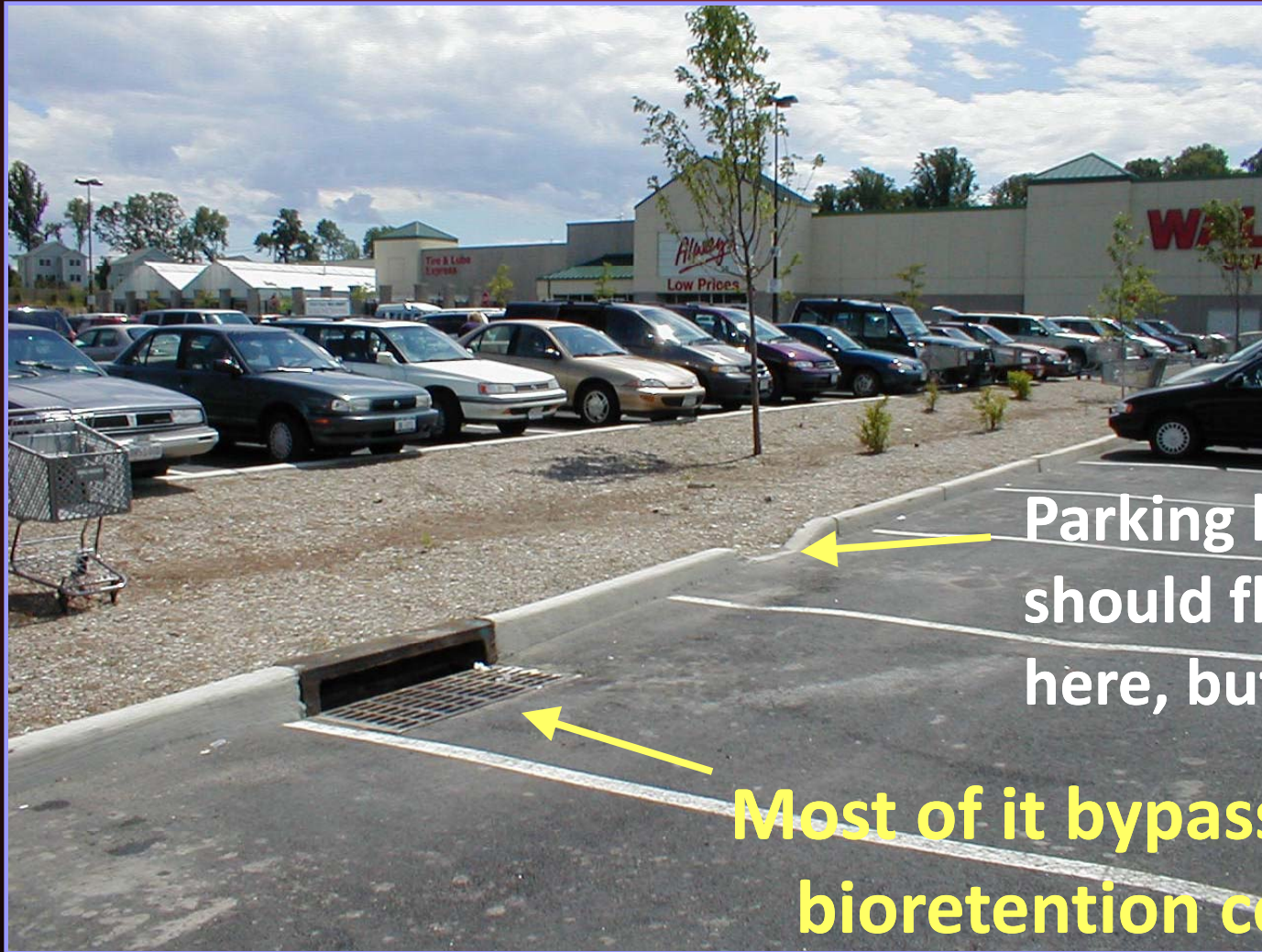


Revise Local Ordinances for Better Site Design and Runoff Reduction



- Require Pervious Surfaces and recessed grass islands
- Reduce Street Width requirements to reduce impervious cover
- Require roadside swales in place of gutters
- Reduce Parking Space widths
- Require Landscaping for runoff control

Watch out for poor execution of good ideas:



Parking lot runoff should flow through here, but...

Most of it bypasses the bioretention cell instead!

☑ Deviations from Standards

- Identification of any elements of the design that are not in conformance with the *New York State Stormwater Management Design Manual*
 - Justification for the deviation or alternative practice
 - Demonstration that the non-conforming design is equivalent to the technical standards
 - Use criteria from Chapters 5 and 6
- ★ Alternative SMPs are deviations from standards

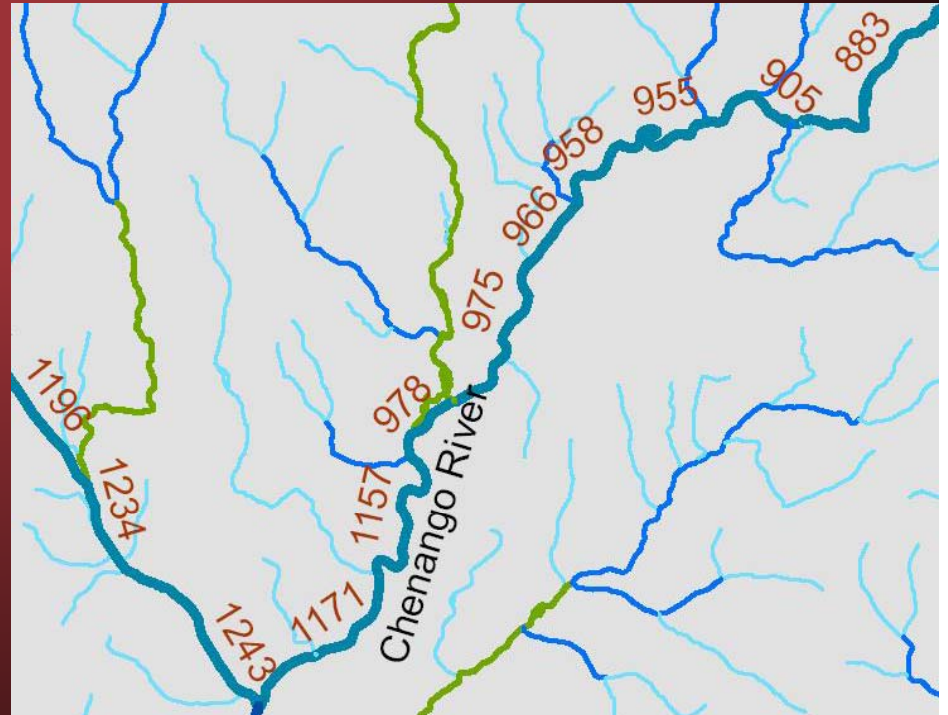
Who will own, operate and maintain stormwater management facilities?



- Drainage District established by municipality to fund stormwater facility maintenance
- Home Owners Association by legal agreement with municipality

☑ “Fifth-Order” Streams

- Strahler-Horton method is only a guideline – check with Regional DEC office for clarification
- Control of Channel Protection Volume is not automatically waived if Flood Control is waived
- Overbank and Extreme Flood Control may be waived if the site discharges *directly* (via a pipe) to a Fifth-Order waterway



☑ Redevelopment Projects (Chapter 9)

- Redevelopment projects provide an opportunity to reduce pollutant discharges, but site conditions may limit implementation of full post-construction controls.
- There must be a physical constraint that precludes of the standard methods of treatment listed in Chapters 5 and 6.



☑ Redevelopment Projects (Chapter 9)

- Only applies to acreage on the site where impervious surface already exists
- Does not apply to new development acreage on the site
- 25% reduction in Impervious – waive WQv
- No increase in Impervious and no change in hydrology that increases discharge rate – waive Quantity Controls

☑ Enhanced Phosphorus Removal Standards (Chapter 10)

- Onondaga Lake, East of Hudson Watershed, Greenwood Lake, Oscawana Lake
 - SWPPPs must include post construction SMPs designed in conformance with the EPRS (Chapter 10)
 - Emphasize source controls (Runoff Reduction)
 - Water Quality volume from 1 year-24 hour storm instead of 90% storm – resulting in ponds that will be much larger than before!

QUIZ QUESTION

Which of the following parties is *NOT* an option for maintenance of post-construction stormwater management practices?

- A. Property owner
- B. NYSDEC
- C. Municipality
- D. Homeowners Association

ANSWER

Which of the following parties is *NOT* an option for maintenance of post-construction stormwater management practices?

- A. Property owner
- B. NYSDEC
- C. Municipality
- D. Homeowners Association

THE CHALLENGES

➤ Planning Review Role and Implications

- Review Board responsible for *planning* aspects of SWPPPs
 - More significant role than in previous permit
- Conflicts with local code or previously standard methods
 - Developers will request practices previously not proposed
 - Trying to move project forward and make a profit
 - Must comply with Construction Stormwater Permit
 - Balancing act for municipalities
 - Must comply with MS4 Permit and their own codes
 - Concerns with costs of maintenance and administrative burden
 - Flexibility and compromise necessary between parties

THE CHALLENGES

➤ Maintenance and Education

- Need to determine the party responsible for maintenance
 - Individual property owner
 - Homeowners' Association
 - Municipality
- Enforcement provision needed (deed restriction, maintenance agreement with access by easement, drainage district)
- Responsible party must be educated on purpose and maintenance needs of the practice
 - Signage
 - Outreach materials
 - Education by word of mouth

Common “Buts”...

- But... I have clay soils and water won't infiltrate
- But... I live in a cold climate where:
 - Salt use will damage the vegetation
 - People will pile snow on vegetation and damage it
 - Porous pavement won't work because I'll have ice under the pavement
- But... rain gardens and bioretention will be mosquito breeding grounds
- But...

Easy Source Controls to reduce Stormwater Management Practice size

- Divert off-site run-on:
 - Total drainage area becomes smaller, therefore the WQ_v becomes smaller
- Disconnect rooftops from SMPs
- Establish buffer/filter areas (preserve existing forested vegetation)
- Cluster development to reduce road lengths
- Replace curb-and-gutter drainage and storm sewers with open swales (also reduces road width)

Putting it all together...

Recreating Natural Hydrology

- Protect natural features
- Let pervious be pervious
- Minimize impervious
- Direct water to pervious areas
- Promote vigorous plant growth
- Slow the water down
- Design for stormwater as an asset and amenity

THANK YOU !!

Ellen Hahn, CPESC, CPSWQ
exhahn@gw.dec.state.ny.us
(315) 426-7504

David Kubek, CPESC, CPSWQ
dkubek@cnyrpdb.org
(315) 422-8276

