GREEN INFRASTRUCUTURE PRACTICES TO CONSIDER FOR DEVELOPMENT PROPOSALS

Green Infrastructure practices to manage rainwater near its source to emulate the area's pre-development hydrology are required by NYS DEC for any development that disturbs one acre or more of land. However, Green Infrastructure practices can implemented on any development regardless of size.

Green Infrastructure (GI) practices are generally divided into two principals:

- Site Planning GI practices include measures for preservation of natural features.
- Runoff Reduction GI practices include measures that provide for stormwater runoff to be stored and treated on site as close to its source as possible.

The following is a check list of Green Infrastructure practices that can be used when reviewing development proposal site plans:

Note: Notations in parenthesis (5.X.X) are references to the section of the New York State Stormwater Management Design Manual that covers that particular topic in more detail.

SITE PLANNING PRACTICES

- **Preservation of Undisturbed Areas (5.1.1) and Conservation of Natural Areas (5.3.1)**
  Preservation of natural areas help to preserve a sites natural hydrology.
  Can reduce structural stormwater management storage needs.
  Preservation of natural areas can allow for the amount of water quality volume that is required to be treated by structural stormwater practices to be reduced.

- **Preservation of Buffers (5.1.2) and Sheetflow to riparian Buffers and Filter Strips (5.3.2)**
  Vegetated filter strips such as riparian buffers can be used as nonstructural stormwater infiltration zones before runoff enters a stream, wetland, or pond. The objective is for the vegetated buffer to intercept stormwater runoff before it becomes concentrated runoff, and allow natural infiltration and filtration by vegetation.
  The preservation of buffers allows for the amount of water quality volume that is required to be treated by structural stormwater practices to be reduced.

- **Reduction of Clearing and Grubbing (5.1.3)**
  Existing trees, well-drained soils, riparian buffers, and natural drainage ways may be used to emulate the predevelopment hydrology, potentially reducing structural stormwater management storage needs.

- **Locating Development in Less Sensitive Areas (5.1.4)**

  Development sites located to avoid sensitive resource areas such as floodplains, steep slopes, erodible soils, wetlands, and mature forests help to preserve the natural hydrology and drainage ways of a site.

- **Open Space Design (Compact Development) (5.1.5)**

  Concentrating development in a compact area in one portion or the site reduces impervious surfaces and grey infrastructure, and increases open space and preservation of natural areas.

- **Soil Restoration (5.1.6)**

  Apply soil restoration practices to soils that have been compacted due to construction activity and will be vegetated after construction is complete.
  Soil restoration of compacted soils allow for the recovery of the original properties and porosity of the soil allowing water to infiltrate into the ground as opposed to running off.

- **Roadway Reduction (5.2.1)**

  Roadway lengths and widths should be minimized on a development site where possible to reduce the overall imperviousness of the post developed site.
  Roadway reduction reduces the amount of impervious cover and associated runoff and pollutants generated, and the amount of stormwater that needs to be treated by standard stormwater practices.
  Roadway reduction can reduce the costs associated with road construction and maintenance.

- **Sidewalk Reduction (5.2.2)**

  Sidewalk lengths and widths should be minimized on a development site where possible to reduce the overall imperviousness of the post developed site.
  Sidewalk reduction reduces the amount of impervious cover and associated runoff and pollutants generated, and the amount of stormwater that needs to be treated by standard stormwater practices.
  Sidewalk reduction should **not** compromise the potential to promote walkable communities or the requirements of the Americans with Disabilities Act.

- **Driveway Reduction (5.2.3)**

  Driveway lengths and widths should be minimized on a development site where possible to reduce the overall imperviousness of the post developed site.
  Driveway reduction reduces the amount of impervious cover and associated runoff and pollutants generated, and the amount of stormwater that needs to be treated by standard stormwater practices.
  Shared driveways and the reduction of front building setbacks can help to reduce driveway lengths and widths.

- **Cul-de-sac Reduction (5.2.4)**

  The number of cul-de-sacs and the radius size of cul-de-sacs should be minimized on a development site where possible to reduce the overall imperviousness of the post developed site.

  The cul-de-sac radius required for emergency vehicles and school buses should **not** be compromised. *However, many cul-de-sac radius requirements in building codes are out dated; newer emergency vehicles require smaller radii than what was required when the building codes were written.*

- **Building Footprint Reduction (5.2.5)**

  Building footprints should be minimized on a development site where possible to reduce the overall imperviousness of the post developed site.

  Building footprint reduction reduces the amount of impervious cover and associated runoff and pollutants generated, and the amount of stormwater that needs to be treated by standard stormwater practices.

  Alternate or taller building designs can reduce the building footprint while maintaining the square footage.

  Consolidation of buildings and buildings functions can reduce the overall development footprint.

- **Parking Area Reduction (5.2.6)**

  Reduce the overall imperviousness of a development by minimizing the amount of parking required, and using porous pavement for parking (either on the entire parking lot or overflow parking).

  Parking area reduction reduces the amount of impervious cover and associated runoff and pollutants generated, and the amount of stormwater that needs to be treated by standard stormwater practices.

  Parking area reduction can reduce the costs associated with road construction and maintenance.

RUNOFF REDUCTION PRACTICES

- **Vegetated Swales (5.3.3)**

  A vegetated swale that conveys stormwater runoff allows for infiltration and filtering by vegetation of the runoff. The use of vegetated swales can reduce the amount of the required water quality volume that needs to be treated by conventional stormwater treatment practices from between 10% to 20%.

  The amount that a vegetated swale can reduce the required water quality volume that needs to be treated by conventional practices depends on the hydrologic group of the existing soil.

- **Tree Planting and Tree Pits(5.3.4)**

  Conserving existing trees or planting new trees can reduce stormwater runoff, promote evapotranspiration, increase nutrient uptake, as well as provide shade and thermal reduction. Tree planting allows for the amount of water quality volume that is required to be treated by conventional stormwater practices to be reduced.

- **Disconnection of Rooftop Runoff (5.3.5)**

  Directing roof top runoff to vegetated filtering or infiltration areas reduces runoff.

  When rooftop runoff is adequately directed to properly sized vegetated filters or infiltration areas then the impervious area of the roof top can be considered to be pervious when calculating the required water quality volume that needs to be treated. Thus, the amount of water quality volume that is required to be treated is reduced.

- **Stream Daylighting (5.3.6)**

  Daylighting a stream that was previously culverted or piped restores natural habitats, better attenuates runoff, promotes infiltration, and reduces pollutant loads.

  The impervious area where the stream had been piped and will be day lighted is considered pervious when calculating the required water quality volume that needs to be treated. Thus, the amount of water quality volume that is required to be treated is reduced.

- **Rain Garden (5.3.7)**

  A rain garden is similar to the conventional stormwater practice of bioretention, but is intended to treat small volumes of stormwater runoff. The volume of stormwater runoff treated by a rain garden can be directly credited towards the overall required water quality volume that needs to be treated.

- **Green Roofs (5.3.8)**

  Green roofs consist of a layer of vegetation and soil installed on top of a conventional flat or sloped roof. The rooftop vegetation captures rainwater allowing evapotranspiration and evaporation processes to reduce the amount of runoff entering downstream systems.

  A green roof is considered pervious area and therefore results in reduced amount of water quality volume that is required to be treated by conventional practices.

- **Stormwater Planters (5.3.9)**

  Stormwater planters are small landscaped stormwater treatment devices that can be placed above or below ground. Similar to rain gardens and green roofs stormwater planters use soil infiltration and biogeochemical processes to improve water quality.

  The volume of stormwater runoff treated by a stormwater planter can be directly credited towards the overall required water quality volume that needs to be treated.

- **Rain Barrels and Cisterns (5.3.10)**

  Rain barrels and cisterns capture and store stormwater runoff to be used later for lawn and landscaping irrigation.

  A runoff reduction credit can be applied to the overall required water quality volume that needs to be treated.

- **Porous Pavement (5.3.11)**

  Porous or permeable pavement is an alternative paving option to conventional asphalt or concrete that allows rainfall and runoff to infiltrate through the pavement either into the underlying soil or into an underlying reservoir.

  The volume of stormwater runoff treated by porous pavement systems that have an underlying reservoir can be directly credited towards the overall required water quality volume that needs to be treated. Porous pavement systems that do not have an underlying reservoir can be considered pervious area and therefore results in reduced amount of water quality volume that is required to be treated by conventional practices.

  Porous pavement systems should not be used at hot spot locations (gas stations, etc.).

  Porous pavement systems should not be used with seasonally high groundwater elevations.