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Memorandum

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| To: | Barkhamsted Low Impact Development Committee |
| From: | Martin J. Connor, AICP |
| Date: | November 17, 2010, as amended 12.04.26 |
| Re: | Barkhamsted Low Impact Development Recommendations for Subdivision Regulations |

I have reviewed the “*Town of Barkhamsted Subdivision Regulations*” with a goal of incorporating best management practices relating to Low Impact Development into the Regulations. The proposed recommendations below incorporate recommendations that the Low Impact Committee made at the November 17, 2010 meeting.

Article I - Section 170.2 Definitions and word usage

Existing Language:

This section contains the definitions.

Recommendations:

Add the following definitions to incorporate Low Impact Development terms:

BEST MANAGEMENT PRACTICES: Techniques that are effective practical ways of preventing or reducing pollution and providing environmental stewardship. Refer to 2004 Connecticut Stormwater Quality Manual, as amended.

HYDROGRAPH: A graph showing the variation in discharge or depth of a stream of water over time.

INFILTRATION: The process of precipitation percolating into the subsoil.

LOW IMPACT DEVELOPMENT (LID): A site design strategy intended to maintain or replicate predevelopment hydrology through the use of small-scale controls integrated throughout the site to manage runoff as close to its source as possible.

NONPOINT SOURCE POLLUTION: Pollution caused by diffuse sources that are not regulated as point sources and are normally associated with precipitation and runoff from the land that carries pollutants.

PERMEABLE PAVING: Materials that are alternatives to conventional pavement surfaces and that are designed to increase infiltration and reduce stormwater runoff and pollutant loads. These materials have variable porosity dependent on the product, its installation and the site conditions.

PROFESSIONAL ENGINEER: A person licensed by the State of Connecticut to practice as a professional engineer in civil engineering.

RAIN GARDENS/BIOFILTRATION: A low impact development practice to manage and treat stormwater runoff by using a specially designed planting soil bed and planting materials to filter and infiltrate runoff gathered in a shallow depression.

STORMWATER: Water consisting of precipitation runoff or snowmelt.

STORMWATER MANAGEMENT PLAN: Plan describing the potential water quality and quantity impacts associated with a development project both during and after construction. It also identifies selected source controls and treatment practices to address those potential impacts, the engineering design of the treatment practices, and maintenance requirements for proper performance of the selected practices.

STORMWATER RUNOFF: Above ground water flow resulting from precipitation or snowmelt.

STORMWATER TREATMENT: Devices constructed for primary treatment, pretreatment or supplemental treatment of stormwater.

STORMWATER TREATMENT TRAIN: Stormwater treatment practices, as well as site planning techniques and source controls, combined in series to enhance pollutant removal or achieve multiple stormwater management objectives.

WATER QUALITY SWALES : Vegetated open channels designed to treat and attenuate the water quality volume and convey excess stormwater runoff.

WATER QUALITY VOLUME: The volume of runoff generated by one inch of rainfall on a site.

Reasons:

1. The Low Impact Development Techniques should have consistent definitions to allow applicants to understand the Town's expectations and the Town to review a subdivision objectively.
2. The same definitions will be proposed to be added to the Zoning Regulations. These proposed definitions in the Subdivision Regulations will become consistent with the Zoning Regulations, if they are both adopted.

Article III - Section 170.21 B (2A) Formal subdivision and application requirements

Recommendations:

A biological assessment of the natural resources located on the subject property with special reference to wetlands, vernal pools and biodiversity prepared by a qualified expert shall be submitted unless the Commission waives the requirement because the proposed activity will have minimal impact to the environment. Commission will refer to map entitled "Vernal Pools and Vernal Pool Critical Terrestrial Habitat Zones Barkhamsted Biodiversity Study" dated 2010 and included in "Town of Barkhamsted: Amphibian and Reptile Biodiversity Study", by Eric R. Davison, BS and Michael W. Klemens, PhD, Cary Institute of Ecosystem Studies. A report on

the project from the Inland Wetlands Commission shall be considered in determining whether to require a biological assessment on the subject project.

Reasons:

1. Subdivision plans should include a biological assessment of the subject property.

Article III - Section 170.21 B (5) Formal subdivision and application requirements

Existing Language:

- (5) Construction plan and profiles. Plans, profile drawings and typical cross sections shall be submitted where a subdivision application involves site improvements, including streets, catch basins, manholes, **ditches**, watercourses, headwalls, sidewalks, curbs, bridges, culverts and other structures and improvements required by these regulations. The construction plans and profiles shall conform to the requirements of 170-23 and 170-26 of these regulations.

Recommendations:

Substitute the word “ditches” with “swales.”

Proposed Language:

- (5) Construction plan and profiles. Plans, profile drawings and typical cross sections shall be submitted where a subdivision application involves site improvements, including streets, catch basins, manholes, **swales**, watercourses, headwalls, sidewalks, curbs, bridges, culverts and other structures and improvements required by these regulations. The construction plans and profiles shall conform to the requirements of 170-23 and 170-26 of these regulations.

Article IV - Section 170.25 B (12) Site Development Plan

Existing Language:

- (12) Existing and proposed storm drains, catch basins, manholes, **ditches**, watercourses, headwalls, sidewalks, gutters, curbs and other structures.

Recommendations:

Substitute the word “ditches” with “swales.”

Proposed Language:

- (12) Existing and proposed storm drains, catch basins, manholes, **swales**, watercourses, headwalls, sidewalks, gutters, curbs and other structures.

Article IV- Section 170.26 B (3) Construction plans

Existing Language:

- (3) The depth, invert, slope and size of all pipes, **ditches**, culverts, catch basins, headwalls and watercourses and ditch and watercourse cross sections.

Recommendations:

Substitute the word “ditches” with “swales.”

Proposed Language:

- (3) The depth, invert, slope and size of all pipes, **swales**, culverts, catch basins, headwalls and watercourses and ditch and watercourse cross sections.

Reasons:

The word “swale” connotes a low impact technique whereas a ditch implies otherwise.

Article V- Section 170.32 Driveways and access ways

Existing Language:

- A. Driveways shall be so located, designed and constructed as to prevent erosion and prevent excessive road drainage onto driveways or excessive driveway drainage unto the roadways.

Proposed Language:

- A. Driveways shall be so located, designed and constructed as to prevent erosion and prevent excessive road drainage onto driveways or excessive driveway drainage **onto** the roadways. **Low Impact Development techniques are the preferred method of addressing drainage from driveway construction.**

Reasons:

1. LID techniques in should be the preferred method for handling stormwater run-off from driveways.

Article VII – Section 170-47 General stormwater management objectives

Existing Language:

The stormwater management program shall be planned to address the following objectives:

- A. To achieve a zero (0) increase in peak rate of runoff leaving the property, except where it is shown that such an objective will result in an adverse impact.
- B. To minimize the impact on downstream properties.
- C. To prevent channel erosion and unstable conditions.
- D. To maintain water quality.
- E. To maintain environmental quality.

Proposed Language:

The stormwater management program shall be planned to address the following objectives:

- A. To achieve a zero (0) increase in peak rate of runoff leaving the property, except where it is shown that such an objective will result in an adverse impact.
- B. To minimize the impact on downstream properties.
- C. To prevent channel erosion and unstable conditions.
- D. To maintain water quality.
- E. To maintain environmental quality.
- F. **Utilize Low Impact Development techniques whenever feasible. The stormwater management plan shall include design considerations for best management practices (BMP's) during the construction phase.**

Reason:

Emphasize LID techniques as an important objective in the stormwater management plan.

Article VII – Section 170-48 Conditions requiring stormwater management plan:

Existing Language:

A. Land use development plans shall have a stormwater management system when the proposed development:

- (1) Disturbs an area of five (5) acres or more.
- (2) Is a subdivision with proposed new roads or a subdivision of five (5) or more lots on an existing road.
- (3) Is a nonresidential use with a total impervious surface of fifteen thousand (15,000) square feet or more.

Proposed Language:

A. Stormwater management plans shall be developed for all new subdivisions, including phased subdivisions that meet the following criteria:

- Any development, **either commercial or residential**, resulting in the disturbance of greater than or equal to one acre of land;
- Residential development consisting of 5 or more dwelling units;
- Residential development consisting of fewer than 5 dwelling units involving the construction of a new road or reconstruction of an existing road.
- Residential development consisting of fewer than 5 dwelling units where imperviousness of the site after construction exceeds 30 percent.
- Stormwater discharge to wetlands/watercourses or in areas designated by the Town of Barkhamsted as Aquifer Protection Areas.
- Land uses or facilities with potential for higher pollutant loadings such as industrial facilities subject to DEEP Industrial Stormwater General Permit or U.S. EPA National Pollution Discharge Elimination System (NPDES) Stormwater Permit Program, vehicle salvage yards and recycling facilities, vehicle fueling facilities, vehicle service, maintenance and equipment cleaning facilities, fleet storage areas (cars, busses, trucks, public works), commercial parking lots with high intensity uses (shopping center, fast food restaurants, convenience stores, supermarkets), public works storage areas, road salt storage facilities, commercial nurseries, flat metal rooftops of industrial facilities, facilities with outdoor storage and loading/unloading of hazardous substances or materials, regardless of the primary land use of the facility or development.
- Industrial and commercial developments which result in 10,000 sq ft or greater of impervious surface.
- New highway, and street construction
- Modifications to existing storm drainage systems.

Reason:

1. The stormwater management plan requirement will be consistent with Article I – Section 193-11 of the Zoning Regulations which states when stormwater management plans are required.

Article VII – Section 170-49A On-site stormwater management

Existing Language:

- A. The stormwater management plans for project sites shall be prepared by an Connecticut licensed engineer so as to minimize any adverse increase to the peak flow rate in the downstream impact areas. This may be accomplished by use of infiltration systems, accelerating runoff to separate hydrograph peaks, short-term detention basins, longer term retention basins, delaying surface runoff with overland flow or swales, reducing impervious areas and other methods.

Proposed Language:

- A. The stormwater management plans for project sites shall be prepared by an Engineer, licensed in the State of Connecticut, so as to minimize any adverse increase to the peak flow rate in the downstream impact areas. This may be accomplished by use of infiltration systems, accelerating runoff to separate **hydrograph** peaks, short-term detention basins, longer term retention basins, delaying surface runoff with overland flow or swales, reducing impervious areas and other **low impact development** methods.

Reasons:

1. The word “hydrograph” is misspelled. (Note: a definition for hydrograph has been added to the definitions section.)
2. Low impact development techniques should be emphasized in the stormwater management plan.

Article VII – Section 170-50 Contents of plans

Proposed Language:

Add new #12 and #13 to Contents of a Stormwater Management Plans as follows:

12. Location and description of all proposed stormwater controls and Best Management Practices (BMPs) for both construction activities and post construction long-term stormwater control. (i.e. TST, TSB, etc.)
13. Proposed maintenance and operational manual and/or maintenance schedule for any trash hoods, catch basins, or other Best Management Practice (BMP) devices used to treat or store runoff. Plans shall encourage sheet flow or infiltration and treatment of stormwater. Stormwater facilities/structures shall be designed with adequate access for maintenance.

Reasons:

1. The contents of the plan need to show the location and describe BMPs both during and after construction.
2. A maintenance schedule and operational instructions should be described for the BMP devices proposed.

Article VII – Section 170-51E.

Proposed Language:

The analysis shall utilize the TR55 Method to determine all times of concentration

Reason:

Per recommendation of Consulting Town Engineer, Tom Grimaldi, P.E.

Article VII – Section 170.52 F Detention facilities

Existing Language:

The DEP Guidelines for Erosion and Sediment Control shall be used as a guide to construction details and materials.

Proposed Language:

The DEP Guidelines for Erosion and Sediment Control **and the 2004 Connecticut Stormwater Quality Manual, as amended,** shall be used as a guide to the construction details and materials.

Reasons:

The 2004 Connecticut Stormwater Manual, as amended, should also be used as a guidance document.

Article VII – Section 170.53 A. Infiltration systems

Existing Language:

- A. All drainage systems shall be designed to encourage infiltration of runoff into the soil where suitable conditions exist. Infiltration systems should be used where sand and gravel soils are present. The following infiltration devices shall be considered: infiltration basins and trenches, dry wells, dry well catch basins, porous pipe, porous paving, overland flow and open channels.

Proposed Language:

- A. Drainage systems shall be designed using **low impact development techniques** to encourage infiltration of runoff into the soil where suitable conditions exist. **Stormwater management practices may include one or more of the following: bio retention,**

oil/particle separators, catch basins, permeable paving materials, catch basin inserts, porous pavement, cisterns, deep sump catch basins, rain barrels, dry detention ponds, rain gardens, filter strips, stormwater ponds, grass drainage swales, underground detention, hydrodynamic separators, underground infiltration, infiltration practices and vegetated buffers. Use of these techniques should be informed by the biological conditions of the site.

Reasons:

Additional low impact development techniques were added to this section of the Subdivision Regulations for consideration in the preparation of the stormwater infiltration systems.