



## **TOWN OF TOPSFIELD Planning Board**

### **Low Impact Development Guidelines**

The Town of Topsfield began the study of Low Impact Development approaches and their application to development in Topsfield in 2005 as part of a Smart Growth Technical Assistance Grant from the Commonwealth of Massachusetts. Consultants from the Metropolitan Area Planning Commission (MAPC) worked with the Stormwater Management Committee of the Town to develop a Stormwater and Erosion Control By-law and Rules and Regulations for the By-law. This By-law was adopted at the 2005 Annual Town Meeting. The Conservation Commission and the Planning Board adopted Rules and Regulations for the by-law in May of 2006. In addition, the Stormwater Management Committee and MAPC studied the implications of Low Impact Development from the environmental, technical, regulatory and fiscal perspectives. The Stormwater Management Committee and its affiliates included representatives from the Conservation Commission, Planning Board, Board of Health, Highway Department and Water Department, and all agencies of the Town involved in permitting and/or approving projects involving stormwater management. What follows are the results of the Planning Board's efforts to capture what it has learned about Low Impact Development and establish principles to guide development in the future.

### **Why Consider Low Impact Development**

Stormwater Management is a major issue confronting communities and developers. More rigorous state standards and the EPA's Phase II Stormwater Management rules require that the quality and volume of stormwater run-off be tightly controlled. Conventional stormwater management techniques may not always achieve the desired effects. A second major issue for Topsfield is the quantity and quality of water resources in the Ipswich River Watershed Area. It is essential that future development include water conservation strategies, including maximizing ground-water recharge. Low Impact Development is based on a set of strategies designed to protect natural features, minimize runoff and impervious surfaces, maximize filtration and recharge, create open space and wildlife habitat areas, and educate the public. These strategies can achieve compliance with stormwater standards and help preserve groundwater quality. At the same time, they coincide with Topsfield's goals for preserving open space and the rural character of the town. As a result, the Planning Board will work with developers and homeowners to utilize appropriate low impact development techniques in the management of stormwater on their properties. Input from other permitting authorities in the Town is also likely to be required.

## **The Challenge of Low Impact Development**

Clearly, Low Impact Development practices are environmentally beneficial. The challenge is in the technical details and the regulatory framework within which permitting authorities operate. A further consideration of significant concern is the long-term fiscal impact on the community. Conventional infrastructure development techniques – roads, pipes, culverts, storm drains, and detention ponds, among others - produce predictable maintenance costs typically born by the community. Low Impact Development techniques disperse a wide variety of technologies across both private and public property. They require monitoring, regular maintenance and, often, specialized equipment. Long-term management of low impact developments may entail public/private partnerships and legal protections for all parties involved. The information below provides guidance to both permitting authorities and developers as to the technical, regulatory and fiscal issues that must be addressed when dealing with low impact development projects.

## **Site Suitability**

Low Impact Development is site specific. The first rule of Low Impact Development is to work with the landscape of a site to identify natural features and environmentally sensitive areas. Slopes and flow paths should be maintained with minimal grading and tree clearance. While many sites are appropriate for low impact development, not all sites lend themselves to the typical low impact development approaches that utilize swales and a variety of recharge methods. Steeply sloping sites or those with poor soil permeability or high water tables, for instance, may require conventional stormwater management systems if they are to be developed at all.

Topsfield is noted for its hills and glacial soils. As a result, it should be expected that development in Topsfield will require a combination of approaches to stormwater management including both conventional and low impact techniques. Developers should meet in informational sessions with the Conservation Commission, Board of Health and the Planning Board to determine the suitability of their sites for low impact development. A joint meeting of these groups or their agents is recommended. These boards will consider the size, topography, soil quality, wetlands and resource areas of the site and will provide direction to the developer's engineer. For example, swales should be two to six feet in width at the bottom and should be between 0.5% and 4.0% in slope. Areas requiring larger or steeper swales to manage stormwater should be treated conventionally.

## **Regulations**

An early decision of the Stormwater Management Committee and the Planning Board involved the interface between Low Impact Development approaches and existing regulations. In that not all sites in Topsfield are appropriate for Low Impact Development because of the soils, slopes, and other characteristics, it was determined that the Town should keep intact its standard regulations but develop a series of acceptable alternatives to allow for and encourage Low Impact Development approaches on acceptable sites.

MAPC reviewed the Town's By-laws and various boards' rules and regulations to determine how they might conflict with Low Impact Development approaches. It is expected that most projects will be developed under Topsfield Zoning By-Law, Article IV, Section 4.09 - Open Space Development Plan that allows for flexibility in lot size and frontage, clusters development, and requires an open space set-aside. The Subdivision Control Rules and Regulations that govern the Planning Board's review of Preliminary and Definitive Plans, both standard and Open Space, are based on conventional stormwater management practices. Many of the features of Low Impact Development, especially newer technologies such as stormceptors and infiltrators are not even mentioned. In order to facilitate Low Impact Development projects, a number of requirements of the existing Subdivision Control Rules and Regulations would need to be waived by the Planning Board using its waiver powers under the Subdivision Control Rules and Regulations. The table below outlines those sections of the regulations and provides alternatives consistent with a Low Impact Development approach. This list is provided to guide the applicant in preparing the application for a Definitive Plan and the Planning Board in reviewing the resulting request for waivers. Other waivers to be identified in the course of the review of the Definitive Plan may also be required.

<b>Section</b>	<b>Requirement</b>	<b>LID Projects</b>
4.4 Suitability of the Land	Board of Health, Wetlands Protection and Soil Surveys.	Informational sessions with Conservation Commission, Board of Health and Planning Board to determine suitability of the site for Low Impact Development. Approval of these boards is required before proceeding with a Low Impact Development project.
5.1.2 Streets, Cross Sections	Cross sections shall be in accordance with the standards as shown on plates 1 and 2.	The applicant may propose low impact roadways with open section drainage systems, such as the designs shown on Plates LID 1 and LID 2. The Planning Board may permit such alternative designs subject to the determination that the proposed design will provide safe vehicular travel, emergency response access, stormwater management, roadway durability, and pedestrian safety.
5.1.3 Alignment, Grade, Dead End, and Intersections (Table	These shall be in accordance with the standards shown in	Applicants may propose alternative designs and

1)	Table 1.	narrower widths/smaller radii for roadways and cul-de-sacs, provided they demonstrate that the alternative designs will provide safe vehicular travel and adequate emergency response access.
5.1.4.d Site and Earthwork	The entire area within the right-of-way lines shall be cleared and grubbed of all stumps, brush, roots, boulders, and like materials. All rock or masonry with a maximum dimensions over three inches and within six inches of the top of subgrade shall be removed. Trees intended to be preserved shall be protected by suitable boxes, fenders, or wells as appropriate.	Clearing within the right of way shall be limited to that which is necessary for the construction of the roadway, drainage systems, sidewalks, and utilities, and to ensure adequate site lines. The developer should seek to retain existing vegetation, including brush and trees, to the extent possible, in order to reduce stormwater runoff. The construction area shall be cleared and grubbed of all stumps, brush, roots, boulders, and like materials. Grubbing and removal of roots and boulders is not necessary for those areas cleared only to ensure adequate site lines.
5.1.6.b Driveways	Driveway aprons shall be...graded to provide positive drainage towards the streets by the developer and/or owner from the edge of the public roadway to the property line."	Driveway aprons shall be...graded to provide positive drainage into roadside swales, lawn areas, grass strips, or onto other pervious surfaces. Developers and/or owners are encouraged to use permeable paving and/or 'two-track' designs for residential driveways, provided the design can provide adequate access for residents and emergency response vehicles
5.2 Shoulders	Shoulders shall not be allowed in place of sidewalks, curbs, and grass strips shown	This design requirement may be waived as it is not applicable to Low Impact

	on Plates 1 and 2, unless permission is specifically granted by the Board.	Local Street Designs as shown in Plates LID 1 and LID 2.
5.3 Curbing	Curbing “shall be installed along both edges of all roadways in Type II subdivisions, except at driveways.”	Alternatively, the applicant may propose an open section roadway such as that shown on Plates LID 1 and LID 2. The Planning Board may approve alternative roadway edges subject to the determination that the proposed design provides for adequate safety, stormwater management, and roadway edge durability.
5.4.1 Sidewalks	Bituminous concrete sidewalks shall conform to the standards..... as indicated on Plates 1 and 2.	The applicant may also propose the use of permeable paving such as pervious concrete, porous asphalt, or stone, brick, or concrete pavers, subject to the determination that such permeable paving provides adequate access and durability.
5.4.2 Sidewalks	Sidewalks shall be constructed on both sides of the roadway....	The Planning Board may waive the sidewalk requirement or require that they be constructed on one or both sides of the roadway in accordance with the designs shown on Plates LID 1 and LID 2.
5.5.1 Grass Strips	Grass strips shall be provided as indicated on Plates 1 and 2...where sidewalks are required.	Requirements for grass strips, with the exception of 5.5.3 (Tree Planting), may not apply to a Low Impact Local Street as shown on Plates LID 1 and LID 2.
5.5.3 Grass Strips (Tree Planting)	Shade trees...shall be planted along the side lines of the streets.....	In Low Impact Development projects, the location, species and number of trees to be planted shall be determined by the Tree Warden.
5.12.1.b Utilities	All utility lines shall be installed in the location	Alternative locations for underground utilities

	indicated...as shown on Plates 1 and 2.	alongside Low Impact Local Streets may be approved by the Planning Board subject to the determination that the proposed locations will provide for adequate access, safety, and other concerns.
5.12.3a Drainage		Please refer to the Stormwater Management and Erosion Control Bylaw.
5.12.3.b Drainage	Engineer shall design the drainage system in accordance with the zoning regulations...	The applicant shall model the stormwater discharge from the site according to the regulations outlined in Section 7.0 of the Topsfield Stormwater Management and Erosion Control Regulations.
5.12.3.c Drainage	Drainage system within the subdivision shall be adequate...etc.	The applicant shall model the stormwater discharge from the site according to the regulations outlined in Section 7.0 of the Topsfield Stormwater Management and Erosion Control Regulations.
5.12.3.d Drainage	Drainage system shall not wrongfully overburden continuous existing drainage systems...etc.	The applicant shall model the stormwater discharge from the site according to the regulations outlined in Section 7.0 of the Topsfield Stormwater Management and Erosion Control Regulations.
5.12.3.f Drainage	artificial recharge operations should be employed, e.g., holding basins, modified streambed, etc.	Artificial recharge operations may include bio-retention areas, infiltration trenches, dry wells, and constructed wetlands, with appropriate pretreatment where necessary to prevent clogging or groundwater contamination.
5.12.3.f Drainage	Catch basins shall be located on both sides of the roadway on continuous grades at intervals of not more than 300 feet...	Catch basins are not required for Low Impact Local Roads drained by open channel systems.
5.12.3.g Drainage	The applicant shall submit estimates of peak flow	The applicant shall model the stormwater discharge from the

		site according to the regulations outlined in Section 7.0 of the Topsfield Stormwater Management and Erosion Control Regulations.
5.13.1 Easements	Utility easements..... shall be provided where necessary and shall be at least thirty (30) feet wide unless, in the opinion of the Board, a different width is warranted.	The Planning Board may adjust the width of the utility easement upon the advice of the Water and Highway Superintendents.
5.13.2 Easements	The board shall require that there be provided a stormwater easement or drainage right of way of adequate width (minimum 30') to conform substantially to the lines of such watercourse.....	The Planning Board may require that there be provided a stormwater easement or drainage right of way of adequate width to conform substantially to the lines of such watercourse.....
5.20 Tree Planting	Shade trees of species approved by the Tree Warden shall be planted on each side of each street.....	In Low Impact Development projects, the location, species and number of trees to be planted shall be determined by the Tree Warden.
Article 6 Administration		The applicant shall provide a detailed operations, inspection and maintenance plan for all stormwater management features of the development.

Devices, installations and technologies not currently included in the Subdivision Control Rules and Regulations may be permitted by the Planning Board upon recommendation of the Highway Superintendent and/or the Board's consulting engineer(s). In many cases such technologies are already proven in accordance with Best Management Practices and will encounter no difficulties. The permeability of the soils, slope of the area and the seasonable high water table level in the areas proposed for infiltration devices must meet the standards of Best Management Practices and the Stormwater Management and Erosion Control By-law.

A detailed operations, inspection and maintenance plan shall be submitted with the application for a Definitive Plan. This plan should address these issues relative to all vegetated swales, grass filter strips, permeable paving, bio-retention areas, stormceptors, infiltrators, infiltration trenches, dry wells and any other stormwater management strategies that are proposed for the development.

### **Conservation Commission and Board of Health**

Both the Conservation Commission and the Board of Health are permitting authorities whose rules and regulations govern stormwater management. The applicant should discuss with those boards their requirements.

### **Long-Term Maintenance**

Low Impact Development projects tend to disperse a wide variety of stormwater management features throughout a development on privately owned land. Vegetated swales, grass filter strips, permeable paving, bio-retention areas, stormceptors, infiltrators, infiltration trenches and dry wells all require regular inspection and maintenance. Some require very costly specialized equipment for this regular maintenance. Low Impact Development projects will normally require the creation of a Homeowners Association that will take responsibility for elements of the operation, inspection and maintenance plan cited above under Article 6 of the Subdivision Control Rules and Regulations. It is anticipated that projects will differ as to the division of maintenance responsibilities between the Town of Topsfield and the Homeowners Association. As a general rule, the Town will assume responsibility for work within the public right-of-way unless it does not have the appropriate equipment or expertise. Maintenance easements on private lots within the development may be required for areas abutting the right-of-way. In addition, easements or deed restrictions might be required for private lots on which stormwater management features, including bio-retention areas or “rain-gardens” are located, in order to provide access by the Homeowners’ Association and its employees or service providers.