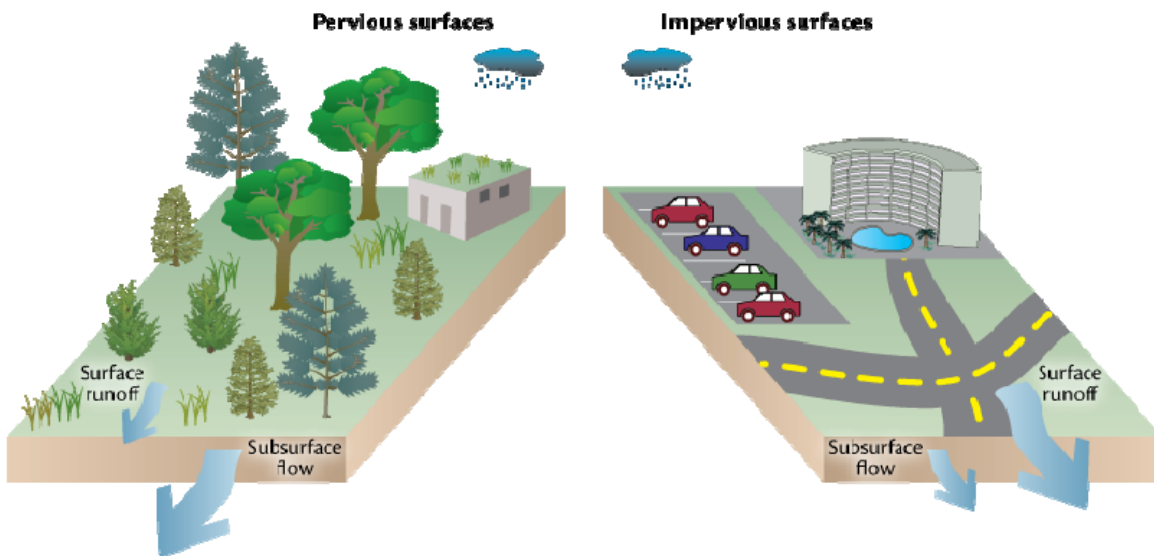


MAXIMUM IMPERVOUS SURFACE ZONING ORDINANCE

I. BACKGROUND AND PURPOSE

This chapter provides planning boards with basic background information on protecting the Merrimack River from stormwater runoff through regulation of the amount of impervious surface allowable within one-quarter mile of the Merrimack River shoreline.

Impervious surface has been linked to water quality and problems with associated with water quality. As the effective amount of impervious surface increases within a watershed, changes in a stream's ability to withstand increased pollutant loads, peak flood flows, and channel stability begin to decrease. Impervious surface can affect water quality by first increasing the amount of untreated water delivered to a waterbody during and after a storm event. Precipitation that hits the natural ground surface is allowed to slowly infiltrate downward through the soil column and into the groundwater. Precipitation that encounters an impervious surface travels on top of the surface, does not infiltrate, and instead is able to pick up pollutants and momentum before reaching a surface water. Often, stormwater is collected in storm drainage systems directly from impervious surfaces and piped or channeled straight to natural waterways. Stormwater that arrives through directed systems has the potential to be both highly contaminated and arrive with higher channel-destabilizing rates than natural runoff.



Source: Maryland Coastal Bays Program

II. APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

The Maximum Impervious Surface Overlay District provided here is appropriate for any community in New Hampshire where increasing amounts of impervious surface in a watershed is beginning to threaten surface water quality. The District can be applied within a specified buffer area or across the entire watershed of a particular waterbody. Since the condition of shoreland areas, or those areas that are immediately adjacent to surface waterbodies, can often be the last defense against the destructive effects of stormwater, it is suggested that these areas be given an immediate level of protection against continued impervious surface development.

To maximize the effectiveness of managing impervious surface, it must be part of an overall stormwater management program that encourages innovative techniques to store, treat, and contain stormwater onsite. There are many other issues to consider in addition to how impervious surface affects the flow and pollutant load of stormwater runoff. Adopting an impervious surface regulation without addressing how stormwater is managed from a broader perspective will help, but will not be able to entirely remediate surface water quality problems. Components of a comprehensive approach to stormwater management would include:

- Public Education: A successful stormwater management program needs to inform persons in the community about stormwater issues and actions they need to take toward being responsible watershed residents. Key topics would include landscaping and lawn-care practices, pet and animal waste management, proper disposal of household hazardous wastes and alternatives to toxic substances, water conservation practices, residential car washing, and trash and debris management.
- Public Involvement: Effective public outreach is needed to effectively identify, engage, and involve stakeholders throughout a watershed to restore and maintain healthy environmental conditions. Programs such as storm drain marking, adopt-a-stream programs, and volunteer water quality monitoring help in fulfilling stormwater goals as well as allowing community members to feel connected to their watershed and water quality goals.
- Illicit Discharge Detection and Elimination (IDDE): Communities need to actively develop and implement an IDDE System to eliminate illicit discharges into the storm drain system or onto a shoreline. Illicit discharges are generally any discharge into a storm drain system this is not composed entirely of stormwater. Illicit discharges are a problem because, unlike wastewater which flows to a wastewater treatment plant, stormwater generally flows to waterways without any additional treatment. Illicit discharges often include pathogens, nutrients, surfactants, and various toxic pollutants. IDDE programs need to develop comprehensive storm sewer maps, a plan to detect and address illicit discharges, an education program on hazards associated with illicit discharges, an ordinance prohibiting illicit discharges and connections to the storm drain system.
- Construction Site Stormwater Control: Uncontrolled stormwater runoff from construction sites can have a significant impact on rivers, lakes and estuaries. Sediment in waterbodies from construction sites can reduce the amount of sunlight reaching aquatic plants, clog fish gills, smother aquatic habitat and spawning areas, and impede navigation. Programs that effectively reduce pollutants in stormwater from construction sites include development of an ordinance requiring erosion and sediment control compliance, ability for permitting authority to review construction site plans, including any sediment control measures, and the for municipal officials to inspect and enforce stormwater violations on construction sites at all times.
- Post-construction Stormwater Control: Communities need to implement practices that will treat, store, and infiltrate runoff onsite before it can affect water bodies downstream. Innovative site designs that reduce imperviousness and encourage low impact development practices are excellent ways to achieve the goals of reducing flows and improving water quality. A successful post-construction stormwater management program would include a community ordinance which addresses how post-construction runoff shall be handled as well as a program ensuring long-term operation and maintenance of Best Management Practices.

All of these activities together with restrictions on allowable impervious surface within sensitive watershed areas can work together to preserve and protect surface water quality.

III. LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

A. Enabling Statutes

A municipality's power to "regulate and restrict" land use to protect surface water quality is laid out in RSA 674:16, Grant of Power. RSA 674:16 provides the foundation of a municipality's right to zone "for the purpose of promoting the health, safety, or the general welfare of the community..." RSA 674:16 also provides that the power to adopt a zoning ordinance "...expressly includes the power to adopt innovative land use controls which may include the methods contained in RSA 674:21." Among the methods listed in 674:21 are environmental characteristics zoning and performance standards.

B. Local Considerations

Every community has different development patterns, pollution loads and sources, and ability to manage activities affecting adjacent surface waters. Some communities have large areas of undeveloped forest or agricultural land. Others contain densely developed downtowns with very high percentages of impervious surface. Some communities may wish to adopt impervious surface regulations based on land use type (higher allowable percentages of impervious surface for commercial and industrial parcels and lower allowable percentages of impervious surface for residential uses), or may wish to adopt a sliding scale of allowable impervious surfaced based on proximity to a threatened waterbody.

Land uses within the Lower Merrimack River Corridor, the one-quarter mile area on both sides of the Merrimack River shorelines within the communities of Merrimack, Litchfield, Nashua, and Hudson, are summarized in the following table:

Land Uses within one-quarter mile of the Merrimack River	Agricultural	Commercial	Industrial	Municipal/ Institutional	Residential	Right-of-Way	Vacant	Total
# Parcels	31	146	90	45	1,940	10	337	2,599
# Acres	553	215	774	493	1,363	60	1,076	4,535
Median Parcel Size	16	0.6	2.7	1.7	0.33	1.29	0.31	0.35

IV. IMPERVIOUS SURFACE OVERLAY DISTRICT MODEL ORDINANCE

I. TITLE AND AUTHORITY

A. Title

The title of this District shall be the Town/City of _____ Maximum Impervious Surface Overlay District.

OPTION	This zoning element can be adopted either as an overlay district in which the underlying district determines lot sizes, density, frontage requirement, setbacks, and uses allowed by special exception, or as a separate zoning district. In the case of a separate zoning district, additional information would be needed specifying those requirements.
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B. Authority

This ordinance is adopted under the authority granted pursuant to RSA 674:16, Grant of Power, RSA 674:21, Innovative Land Use Controls, and 674. 56, Flood Hazards.

II. PURPOSE

The purpose of the Maximum Impervious Surface Overlay is to protect surface water quality and the health and safety of residents by promoting the most appropriate use of land adjacent to surface water areas.

III. FINDINGS

The Lower Merrimack River Local Advisory Committee (LMRLAC) provides guidance to Merrimack River corridor communities (Merrimack, Litchfield, Hudson, and Nashua) as they make decisions having the potential to affect the watershed, river corridor, and river itself. LMRLAC included regulation of allowable impervious surface in the *Lower Merrimack River Corridor Management Plan* (NRPC 2008) as their top-ranked corridor management recommended action. This was done in part because surface water quality has been shown to decline as impervious surfaces increase.

Impervious cover changes the distribution of stormwater by diverting what may have infiltrated through soils directly into surface waters. This results in an increase in stormwater volume and velocity, as well as an increased potential for erosion and flooding. Impervious cover prevents infiltration while magnifying the volume and velocity of stormwater runoff over land. The result is decreased groundwater recharge, diminished stream flow during dry periods, increased surface runoff and increased potential for severe flooding problems. Impervious cover also collects contaminants common to developed areas such as oils, sediments, nutrients, and trash that fast-moving stormwater transports to receiving surface waters, resulting in degraded water quality (UNHSC, *Protecting Water Resources and Managing Stormwater: A Birds's Eye View for New Hampshire Communities*, 2009).

The water quality effects of impervious cover can be seen even at low amounts of impervious cover within a watershed. At 5 percent impervious cover, a downward trend in water quality begins. At 14 percent, it fails to meet common water quality standards (Deacon et al., 2005). Other studies have shown similar results where water quality degrades at levels of about 10 percent impervious cover, and becomes significantly impaired when greater than 25 percent (Center for Watershed Protection, 2003). While the exact percentage of impervious cover associated with a certain level of water quality degradation will depend on local conditions associated with a particular waterbody, the basic relationship between increasing amounts of impervious surface and water quality degradation remains undisputed (UNHSC, 2009).

IV. APPLICABILITY

All proposed development in the Maximum Impervious Surface Overlay District shall require a permit.

The Building Inspector shall review all building permit applications for new construction, additions to existing structures, and substantial improvements to determine whether the proposed site is within the Maximum Impervious Surface Overlay District. If the site is determined to be within the Maximum Impervious Surface Overlay District, the Building Inspector shall review the application to ensure that the

proposal is in compliance with all provisions of the District including all applicable standards contained in Section VIII - *Development Standards*, for the District.

OPTION	This ordinance should be administered by the appropriate official in the community who administers the local permit requirements and has the function of initially reviewing proposed development, whether that is a building inspector, code enforcement officer, zoning administrator, town planner, Board of Selectmen, or other official. The title of that administrative official or body should be substituted wherever the words "Building Inspector" appear in this model ordinance.
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V. Boundaries

The provisions of this district shall apply to all lands within the Merrimack River Watershed.

OPTION	<p>This model ordinance was originally designed to support a recommendation contained within the Lower Merrimack River Corridor Management Plan which applied only to lands within one-quarter mile of the Merrimack River. The one-quarter mile area on both sides of the Merrimack River is primarily a political designation and reflects a jurisdictional area for which the Lower Merrimack River Local Advisory Committee oversees.</p> <p>We recommend that the ordinance be applied throughout the Merrimack River Watershed since it is the cumulative development of the entire watershed area which can produce overall declines in water quality. From a functional standpoint, providing natural buffer areas and limiting impervious surfaces in the upper reaches of a watershed provides better protection and increased water quality benefits since these areas are generally less developed, more ecologically sensitive, and generally comprise a proportionally larger area of the total watershed.</p> <p>If municipal leaders feel that this approach is politically infeasible, communities may wish to apply the ordinance standards to identified land areas around specific waterbodies. Logical choices might be those waterbodies that are already degraded and suffer from water quality problems that can be directly attributed to surface runoff issues from impervious surfaces (such as chloride levels due to parking and roadway winter salt maintenance). The ordinance could then be applied to properties within a determined linear distance (one-quarter or one-half mile) of a specific lake, pond, or stream in order to monitor water quality benefits over time before applying the ordinance to the entire watershed. If this option is chosen, the Boundaries section of this ordinance would read:</p> <p style="text-align: center;">The provisions of this district shall apply to all lands within _____ ^{xx distance} of the <u>waterbody(s) of interest</u> .</p>
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VI. DEFINITIONS

The following definitions shall apply only to this Maximum Impervious Surface Ordinance, and shall not be affected by the provisions of any other ordinance of the (Town/City) of _____.

1. "Addition" is an expansion of a structure outside of the footprint of the original building.

2. "Adjusted Site Area" is the portion of a property available for development. Adjusted Site Area excludes land within existing vehicular access easements, including roadway right-of-ways, land between the ordinary high water mark of rivers or streams, land within lakes, ponds, wetlands or formally protected buffer zones, and all lands classified as steep slopes.
3. "Curve Number (CN)" is a numerical representation used to describe the stormwater runoff potential for a given drainage area based on land use, soil group, and soil moisture, derived as specified by the US Department of Agriculture, Natural Resource Conservation Service (USDA / NRCS).
4. "Development" means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavating or drilling operation or storage of equipment or materials. Developments are alterations to the landscape that create, expand, or change the location of impervious surfaces or alters the natural drainage of a site.
5. "Disconnected Impervious Cover" is impervious cover that does not contribute directly to stormwater runoff from a site, but directs stormwater runoff to on-site pervious cover to infiltrate into the soil or be filtered by overland flow so that the net rate and volume of stormwater runoff from the disconnected impervious cover is not greater than the rate and volume from undisturbed cover of equal area.
6. "Effective Impervious Cover" is impervious cover that is not disconnected impervious cover.
7. "Grading" is the cutting and/or filling of the land surface to a desired slope or elevation.
8. "Groundwater" is underground water usually found in aquifers. Groundwater usually originates from surface infiltration.
9. "Illicit discharge" is the discharge of non-stormwater materials to the storm drainage system. Examples are discharges from internal floor drains, appliances, industrial processes, sinks, and toilets that are connected to the nearby storm drainage system. These discharges should be going to the sanitary sewer system, a holding tank, an on-site process water treatment system, or a septic system.
10. "Impervious Surface" means a structure or surface with a low capacity for infiltration, including but not limited to buildings and roofed areas, structures, parking areas, loading areas, driveways, roads, sidewalks, and any areas of concrete, asphalt, or significantly compacted material which prevents water from absorption. Impervious surfaces have a Curve Number of 98 or greater.
11. "Maximum Site Development" means the maximum level of development that can be accommodated on a site. Maximum Site Development takes into consideration the relationship between the Total Site Area and the Adjusted Site Area.
12. "Pervious Cover" is a land surface with a high capacity for infiltration.
13. "Retention" is the process of collecting and holding surface and storm water runoff with no surface outflow.
14. "Runoff" is water originating from rainfall and other precipitation that ultimately flows into drainage facilities, rivers, streams, springs, seeps, ponds, lakes, and wetlands as well as shallow groundwater.
15. "Sheet flow" is the portion of precipitation that moves initially as overland flow in very shallow depths before eventually reaching a stream channel.

16. "Storm drain system" is a network of underground pipes and open channels designed for flood control which discharges straight to a natural stream, river, pond, or other waterbody.
17. "Stormwater" is runoff water resulting from precipitation.
18. "Stormwater pollution" is water from precipitation, irrigation, garden hoses or other activities that picks up pollutants (cigarette butts, trash, automotive fluids, used oil, paint, fertilizers and pesticides, lawn and garden clippings, pet waste, etc.) from streets, parking lots, driveways and yards and carries them through the storm drain system to a natural waterbody.
19. "Stormwater Runoff" is water flow on the surface of the ground or in storm sewers resulting from precipitation.
20. "Structure" means a walled and roofed building as well as a manufactured home.
21. "Surface Water" is water that remains on the surface of the ground, including rivers, lakes, reservoirs, streams, wetlands, impoundments, seas, estuaries, etc.
22. "Violation" means the failure of parcel to be fully compliant with the community's impervious surface management regulations.
23. "Watershed" is a geographic area in which water, sediments, and dissolved materials drain to a common outlet, typically a point on a larger stream, a lake, an underlying aquifer, an estuary, or an ocean. A watershed is also sometimes referred to as the "drainage basin" of the receiving waterbody.

VII. NONCONFORMING USES

Parcels with a greater percentage of impervious surface than the allowed maximum as of the effective date of this ordinance may continue, even though it does not conform to requirements of these regulations. Such non-conformities may not be extended, enlarged, or re-established after being discontinued for more than one year.

Nor may the impervious surfaces within a non-conforming parcel be modified to create another non-conforming use and/or structure unless it is determined by the Board of Adjustment that the proposed use will not increase the degree of non-conformance with the standards contained in these Regulations.

Reconstruction of an existing structure will be allowed if within the same building footprint, of similar or smaller dimensions.

VIII. DEVELOPMENT STANDARDS

A. General Standards within the Maximum Impervious Surface Overlay District

NOTE	To ensure the effectiveness of many of these provisions, an active program of inspection and enforcement must follow adoption.
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1. **Maximum Site Development:** The Maximum Site Development of any lot within the Maximum Impervious Surface Overlay District shall not exceed 15 percent of the Adjusted Site Area.

- a. **Adjusted Site Area:** Adjusted Site Area is the Gross Site Area of a parcel minus the following:
 - i. All land within existing vehicular access easements, including roadway right-of-ways.
 - ii. All land between the ordinary high water mark of rivers or streams.
 - iii. All land within lakes, ponds, and wetlands.
 - iv. All land classified as steep slopes.

NOTE	Communities may have different definitions of steep slopes. For clarity, in Section VIII.A.1.a.iv communities may wish to put in a numerical value (i.e. 15 percent slopes) clarifying how steep slopes are defined in your community.
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b. **Site Development.** Site Development is considered to be land surface that is covered by buildings, structures, impervious surfaces, porches, impermeable decks, terraces, patios, driveways, sidewalks, and parking areas. Unpaved driving surfaces which have been compacted to the point of impermeability may be considered as part of the calculated site development.

OPTION	<p>Communities may wish to include a threshold allowable impervious surface amount (ex. 3,000 square feet) for smaller parcels. The median residential parcel size within the corridor is 0.33 acres. Using this parcel size as an example the allowable 15 percent maximum impervious surface allowance would be 2,156 square feet. (Municipal officials will have to determine whether there should be a threshold allowable square footage on small properties to allow for adequate building area, driveway, and parking space in order to decrease the potential number of variance requests that might otherwise ensue.)</p> <p>Under this option, the ordinance at Section VIII.A.1 would then read: The Maximum Site Development of any lot within the Maximum Impervious Surface Overlay District shall not exceed 15 percent of the Adjusted Site Area, or XX square feet, whichever is greater.</p>
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2. **Driveway Area Exempted if Better Site Design Achieved.** If it can be demonstrated, to the satisfaction of the Building Inspector, that a better site design and structure location can be achieved by exempting a portion of the area of the driveway from the maximum site development amount, then the portion of the area of the driveway that provides for the better site design and structure location shall be removed from the maximum site development calculation.

3. **Use of Low Impact Development Techniques and Onsite Stormwater Management Controls:** If it can be demonstrated, to the satisfaction of the Building Inspector, that stormwater management controls have been used onsite to capture, store, treat, and/or infiltrate stormwater runoff from moving offsite, the allowable impervious surface amounts can be inflated relative to the amount of calculated effective impervious surface achieved onsite.

NOTE	As noted in the definitions, Effective Impervious Cover is different from Impervious Cover. For example, to comply with this section, a site that creates 50 percent impervious cover must provide ample opportunities to capture and infiltrate stormwater to reduce the amount of stormwater leaving the site to be equivalent to having just 15 percent impervious cover (i.e., the site has 15 percent effective impervious cover).
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a. **Innovative Stormwater Management Controls:** Innovative Stormwater Management Controls include, but are not limited to, the following:

- i. Bioretention Areas (including Rain Gardens)
- ii. Permeable Pavements
- iii. Rain Barrels
- iv. Green Roofs

b. Performance Standards Required: All development activity must comply with the following provisions to reduce and properly manage stormwater post-construction:

- i. BMP techniques shall be used to meet the conditions below for control of peak flow and total volume of runoff, water quality protection, and maintenance of on-site groundwater recharge.
 - a. Stormwater management practices shall be selected to accommodate the unique hydrologic and geologic conditions of the site.
 - b. The use of nontraditional and/or nonstructural stormwater management measures, including site design approaches to reduce runoff rates, volumes, and pollutant loads, are preferred and shall be implemented to the maximum extent practical. Such techniques include, but are not limited to, minimization and/or disconnection of impervious surfaces; development design that reduces the rate and volume of runoff; restoration or enhancement of natural areas such as riparian areas, wetlands, and forests; and use of practices that intercept, treat, and infiltrate runoff from developed areas distributed throughout the site (e.g. bioretention, infiltration dividers or islands, or planters and raingardens). Applicants shall demonstrate why the use of nontraditional and/or nonstructural approaches are not possible before proposing to use traditional, structural stormwater management measures (e.g., stormwater ponds, vegetated swales).
 - c. The applicant shall demonstrate how the proposed control(s) will comply with the requirements of this ordinance, including the control of peak flow and total volume of runoff, protection of water quality, and recharge of stormwater to groundwater. The applicant must provide design calculations and other back-up materials necessary.
 - d. At the discretion of the planning board, stormwater management systems shall incorporate designs that allow for shutdown and containment in the event of an emergency spill or other unexpected contamination event.
 - e. Stormwater management systems shall not discharge to surface waters, ground surface, subsurface, or groundwater within 100 feet of a surface water within a water supply intake protection area.
 - f. Stormwater management systems shall not discharge within the setback area for a water supply well as specified in the following table:

Well Type	Well Production Volume (gallons per day)	Setback from Well (feet)
Private Water Supply Well	Any Volume	75
Non-Community Public	0 to 750	75

Water Supply Well	751 to 1,440	100
	1,441 to 4,320	125
	4,321 to 14,400	150
Community Public Water Supply Well	0 to 14,400	150
Non-Community and Community Public Water Supply Well	14,401 to 28,800	175
	28,801 to 57,600	200
	57,601 to 86,400	250
	86,401 to 115,200	300
	115,201 to 144,000	350
	Greater than 144,000	400

g. BMPs shall be designed to convey a minimum design storm event, as described in the table below, without overtopping or causing damage to the stormwater management facility.

Treatment Practice	Design Storm Event
Stormwater Pond	50-year, 24-hour storm
Stormwater Wetland	50-year, 24-hour storm
Infiltration Practices	10-year, 24-hour storm
Filtering Practices	10-year, 24-hour storm
Flow through Treatment Swales	10-year, 24-hour storm

ii. Protection of natural hydrologic features and functions.

a. Site disturbance shall be minimized. Vegetation outside the project disturbance area shall be maintained. The project disturbance area shall be depicted on site plans submitted as part of the site plan review process. The project disturbance area shall include only the area necessary to reasonably accommodate construction activities. The applicant may be required to install construction fencing around the perimeter of the proposed project disturbance area prior to commencing land disturbance activities.

b. Soil compaction on site shall be minimized by using the smallest (lightest) equipment possible and minimizing travel over areas that will be revegetated (e.g., lawn areas) or used to infiltrate stormwater (e.g., bioretention areas). In no case shall excavation equipment be placed in the base of an infiltration area during construction.

c. Development shall follow the natural contours of the landscape to the maximum extent possible. A grading plan shall be submitted as part of the site plan review process showing both existing and finished grade for the proposed development.

d. Cut and fill shall be minimized. The maximum height of any fill or depth of any cut area, as measured from the natural grade, shall not be greater than 10 feet.

e. Any contiguous area of disturbance, not associated with the installation of a roadway, shall be limited to 20,000 square feet for residential development and to 100,000 square feet for other types of development. Contiguous areas of disturbance shall be separated by an area maintained at natural grade and retaining existing, mature vegetated cover that is at least 20 feet wide at its narrowest point.

f. No ground disturbed as a result of site construction and development shall be left as exposed bare soil at project completion. All areas exposed by construction, with the exception of finished building, structure, and pavement footprints, shall be decompacted (aerated) and covered with a minimum thickness of six inches of non-compacted topsoil, and shall be subsequently planted with a combination of living vegetation such as grass, groundcovers, trees, and shrubs, and other landscaping materials (mulch, loose rock, gravel, stone).

g. Priority shall be given to maintaining existing surface waters and systems, including, but not limited to, perennial and intermittent streams, wetlands, vernal pools, and natural swales.

i) Existing site hydrology shall not be modified so as to disrupt on-site and adjacent surface waters. The applicant must provide evidence that this standard can be achieved and maintained over time.

ii) Existing surface waters, including lakes, ponds, rivers, perennial and intermittent streams, wetlands, vernal pools, and natural swales, shall be protected by a 50 foot no disturbance, vegetated buffer.

NOTE	The 50 foot buffer requirement under 7.b-. is meant as a bare-minimum standard for communities that do not have more specific buffer requirements. While a 50 foot buffer will provide some water quality benefits, it will not be adequate in all situations (e.g., particularly steep slopes) or sufficient to meet all the natural resource protection goals of a community. Communities should determine whether a broader buffer requirement is appropriate for their community to provide additional water quality and other benefits, such as wildlife habitat and corridor protection and human recreation opportunities. Other chapters in this series, particularly those pertaining specifically to the protection of surface water resources and habitat, provide additional information on appropriate buffer widths and protections to achieve various natural resource protection goals.
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iii) BMPs shall not be located within the 50 foot no disturbance, vegetated buffer or within 50 feet of steep banks (greater than 15 percent slope).

iv) Where roadway or driveway crossings of surface waters cannot be eliminated, disturbance to the surface water shall be minimized, hydrologic flows shall be maintained, there shall be no direct discharge of runoff from the roadway to the surface water, and the area shall be revegetated post-construction.

v) Stream and wetland crossings shall be eliminated whenever possible. When necessary, stream and wetland crossings shall comply with state recommended design standards to minimize impacts to flow and animal passage. (See NH Fish and Game Department, 2008.)

iii. Post-development peak flow rates and total runoff volumes.

a. The applicant shall provide pre- and post-development peak flow rates. Any site that was wooded in the last five years must be considered undisturbed woods for the purposes of calculating pre-development peak flow rates.

b. The two-year, 24-hour post-development peak flow rate shall be (a) less than or equal to 50 percent of two-year, 24-hour storm pre-development peak flow rate or (b) less than or equal to the one-year, 24-hour storm pre-development peak flow rate.

c. The 10-year, 24-hour post-development peak flow rate shall not exceed the 10-year, 24-hour pre-development peak flow rate for all flows off-site.

d. The 50-year, 24-hour post-development peak flow rate shall not exceed the 50-year, 24-hour pre-development peak flow rate for all flows off-site.

e. Measurement of peak discharge rates shall be calculated using point of discharge or the down-gradient property boundary. The topography of the site may require evaluation at more than one location if flow leaves the property in more than one direction. Calculations shall include runoff from adjacent up-gradient properties.

f. An applicant may demonstrate that a feature beyond the property boundary is more appropriate as a design point.

g. The applicant shall provide pre- and post-development total runoff volumes. Any site that was wooded in the last five years shall be considered undisturbed woods for the purposes of calculating pre-development total runoff volumes.

h. The post-development total runoff volume shall be equal to 90 to 110 percent of the pre-development total runoff volume (based on a two-year, 10-year, 25-year, and 50-year, 24-hour storms). Calculations shall include runoff from adjacent up-gradient properties.

iv. Water Quality

a. If more than 35 percent of the total area of the site will be disturbed or the site will have greater than 15 percent effective impervious cover, the applicant shall demonstrate that their stormwater management system will:

- i) Remove 80 percent of the average annual load of total suspended solids (TSS), floatables, greases, and oils after the site is developed.
- ii) Remove 40 percent of phosphorus.

b. Compliance with the recharge requirements under Section F, consistent with the pre-treatment and design requirements in Sections F.2 and F.3, shall be considered adequate to meet the treatment standards specified in VI.E.1.

c. Applicants not able to employ Section F must provide suitable documentation, including a pollutant loading analysis from an approved model, that the treatment standards specified in VI.E.1 will be met.

v. Recharge to Groundwater: Except where prohibited, stormwater management designs shall demonstrate that the annual average pre-development groundwater recharge volume (GRV) for the major hydrologic soil groups found on-site are maintained.

a. For all areas covered by impervious cover, the total volume of recharge that must be maintained shall be calculated as follows:

i) $REQUIRED\ GRV = (Total\ Impervious\ Cover) \times (Groundwater\ Recharge\ Depth)$

Where Total Impervious Cover is the area of proposed impervious cover that will exist on the site after development.

And where Groundwater Recharge Depth is expressed as follows:

USDA/NRCS Hydrologic Soil Group (HSG)	Groundwater Recharge Depth (inches)
A	0.40
B	0.25
C	0.10
D	not required

Example: Applicant proposes 30,000 square foot parking lot over C soils.
 $REQUIRED\ GRV = 30,000 \times 0.10$
 $REQUIRED\ GRV = 250\ ft^3$

ii) Where more than one hydrologic soil group is present, a weighted soil recharge factor shall be computed.

b. Pre-Treatment Requirements

- i)* All runoff must be pretreated prior to its entrance into the groundwater recharge device to remove materials that would clog the soils receiving the recharge water.
- ii)* Pretreatment devices shall be provided for each BMP, shall be designed to accommodate a minimum of one-year's worth of sediment, shall be designed to capture anticipated pollutants, and be designed and located to be easily accessible to facilitate inspection and maintenance.

NOTE:	The use of below-ground pre-treatment devices should be discouraged because of the added difficulty in assessing their function and performing regular inspections and maintenance.
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c. Sizing and design of infiltration (recharge) BMPs

- i)* All units shall be designed to drain within 72 hours from the end of the storm.
- ii)* The floor of the recharge device shall be at least three feet above the seasonal high water table and bedrock.
- iii)* Soils under BMPs shall be scarified or tilled to improve infiltration.
- iv)* Infiltration BMPs shall not be located in areas with materials or soils containing regulated or hazardous substances or in areas known to DES to have contaminants in groundwater above ambient groundwater quality standards or in soil above site-specific soil standards.

d. Infiltration may be prohibited or subject to additional pre-treatment requirements under the following circumstances:

- i)* The facility is located in a well-head protection area or water supply intake protection area; or
- ii)* The facility is located in an area where groundwater has been reclassified to GAA, GA1 or GA2 pursuant to RSA 485-C and Env-Dw 901; or
- iii)* Stormwater is generated from a "high-load area," as described under Section vi.

vi. Land Uses with Higher Potential Pollutant Loads

a. The following uses or activities are considered "high-load areas," with the potential to contribute higher pollutant loads to stormwater, and must comply with the requirements set forth in subsections 2, 3, and 4 below:

- i)* Areas where regulated substances are exposed to rainfall or runoff; or

ii) Areas that typically generate higher concentrations of hydrocarbons, metals, or suspended solids than are found in typical stormwater runoff, including but not limited to the following:

a) Industrial facilities subject to the NPDES Multi-Sector General Permit (MSGP); not including areas where industrial activities do not occur, such as at office buildings and their associated parking facilities or in drainage areas at the facility where a certification of no exposure will always be possible [see 40CFR122.26(g)].

b) Petroleum storage facilities.

c) Petroleum dispensing facilities.

d) Vehicle fueling facilities.

e) Vehicle service, maintenance and equipment cleaning facilities.

f) Fleet storage areas.

g) Public works storage areas.

h) Road salt storage and loading facilities.

i) Commercial nurseries.

j) Non-residential facilities having uncoated metal roofs with a slope flatter than 20 percent.

k) Facilities with outdoor storage, loading, or unloading of hazardous substances, regardless of the primary use of the facility.

l) Facilities subject to chemical inventory under Section 312 of the Superfund Amendments and Reauthorization Act of 1986 (SARA).

m) Commercial parking areas with over 1,000 trips per day.

iii) If a high-load area demonstrates, through its source control plan, the use of best management practices that result in no exposure of regulated substances to precipitation or runoff or release of regulated substances, it shall no longer be considered a high-load area.

b. In addition to implementation of BMPs for designing site-specific stormwater management controls, uses included under subsection G.1 shall provide a stormwater pollution prevention plan (SWPPP, see margin note below), describing methods for source reduction and methods for pretreatment.

NOTE:	Example Stormwater Pollution Prevention Plans (SWPPP) are available at http://cfpub.epa.gov/npdes/stormwater/swppp-msgp.cfm .
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c. Infiltration of stormwater from high-load areas, except commercial parking areas, is prohibited. Infiltration, with appropriate pre-treatment (e.g., oil/water separation) and subject to the conditions of the SWPPP, is allowed in commercial parking areas and others areas of a site that do not involve potential “high-load” uses or activities (e.g., where a certification of “no exposure” under the MSGP will always be possible).

d. For high-load areas, except commercial parking areas, filtering and infiltration practices, including but not limited to, sand filters, detention basins, wet ponds, gravel wetlands, constructed wetlands, swales or ditches, may be used only if sealed or lined.

vii. Parking

a. Snow may not be plowed to, dumped in, or otherwise stored within 15 feet of a wetland or waterbody, except for snow that naturally falls into this area. Snow storage areas shall be shown on the site plan to comply with these requirements.

b. At the discretion of the planning board, parking spaces may be allowed, or required, to be constructed of a pervious surface (i.e. grass, pervious asphalt, pervious pavers).

c. Infrequently used emergency access points or routes shall be constructed with pervious surfaces (i.e. grass, pervious asphalt, pervious pavers).

viii. Redevelopment or Reuse

a. Redevelopment or reuse of previously developed sites must meet the stormwater management standards set forth herein to the maximum extent possible as determined by the planning board. To make this determination the planning board shall consider the benefits of redevelopment as compared to development of raw land with respect to stormwater.

b. Redevelopment or reuse activities shall not infiltrate stormwater through materials or soils containing regulated or hazardous substances.

c. Redevelopment or reuse of a site shall not involve uses or activities considered “high-load areas” unless the requirements under Section G. are met.

ix. Easements

a. Where a site is traversed by or requires construction of a watercourse or drainageway, an easement of adequate width may be required for such purpose.

b. There shall be at least a ten foot wide maintenance easement path on each side of any stormwater management system element. For systems using underground pipes, the maintenance easement may need to be wider, depending on the depth of the pipe.

x. Performance Bond

- a. To ensure that proposed stormwater management controls are installed as approved, a performance bond shall be provided as a condition of approval in an amount determined by the planning board.
- b. To ensure that stormwater management controls function properly, a performance bond shall be required, as a condition of approval, which may be held after final certificate of occupancy is issued.

xi. Operation and Maintenance Plan

- a. All stormwater management systems shall have an operations and maintenance (O&M) plan to ensure that systems function as designed. This plan shall be reviewed and approved as part of the review of the proposed permanent (post-construction) stormwater management system and incorporated in the Permanent Stormwater Management Plan, if applicable. Execution of the O&M plan shall be considered a condition of approval of a subdivision or site plan. If the stormwater management system is not dedicated to the city/town pursuant to a perpetual offer of dedication, the planning board may require an applicant to establish a homeowners association or similar entity to maintain the stormwater management system. For uses and activities under Section G, the O&M plan shall include implementation of the Stormwater Pollution Prevention Plan (SWPPP).
- b. The stormwater management system owner is generally considered to be the landowner of the property, unless other legally binding agreements are established.
- c. The O&M plan shall, at a minimum, identify the following:
 - i) Stormwater management system owner(s), (For subdivisions, the owner listed on the O&M plan shall be the owner of record, and responsibilities of the O&M plan shall be conveyed to the party ultimately responsible for the road maintenance, i.e. the Town should the road be accepted by the Town, or a homeowners association or other entity as determined/required under Section VI.L.1 above.)
 - ii) The party or parties responsible for operation and maintenance and, if applicable, implementation of the Stormwater Pollution Prevention Plan (SWPPP).
 - iii) A schedule for inspection and maintenance.
 - iv) A checklist to be used during each inspection.
 - v) The description of routine and non-routine maintenance tasks to be undertaken.
 - vi) A plan showing the location of all stormwater management facilities covered by the O&M plan.

vii) A certification signed by the owner(s) attesting to their commitment to comply with the O&M plan.

d. Recording:

i) The owner shall provide covenants for filing with the registry of deeds in a form satisfactory to the planning board, which provide that the obligations of the maintenance plan run with the land.

ii) The owner shall file with the registry of deeds such legal instruments as are necessary to allow the city/town or its designee to inspect or maintain the stormwater management systems for compliance with the O&M plan.

d. Modifications:

i) The owner shall keep the O&M plan current, including making modifications to the O&M plan as necessary to ensure that BMPs continue to operate as designed and approved.

ii) Proposed modifications of O&M plans including, but not limited to, changes in inspection frequency, maintenance schedule, or maintenance activity along with appropriate documentation, shall be submitted to the planning board for review and approval within thirty days of change.

iii) The owner must notify the planning board within 30 days of a change in owner or party responsible for implementing the plan.

iv) The planning board may, in its discretion, require increased or approve decreased frequency of inspection or maintenance or a change in maintenance activity. For a reduced frequency of inspection or maintenance, the owner shall demonstrate that such changes will not compromise the long-term function of the stormwater management system.

v) The planning board shall notify the owner of acceptance of the modified plan or request additional information within 60 days of receipt of proposed modifications. No notification from the planning board at the end of 60 days shall constitute acceptance of the plan modification. The currently approved plan shall remain in effect until notification of approval has been issued, or the 60 day period has lapsed.

xii. Record Keeping

a. Parties responsible for the operation and maintenance of a stormwater management system shall keep records of the installation, maintenance and repairs to the system, and shall retain records for at least five years.

b. Parties responsible for the operation and maintenance of a stormwater management system shall provide records of all maintenance and repairs to the [_____] *i.e.* Code Enforcement Officer, Board of Selectmen], during inspections and/or upon request.

xiii. Enforcement: When the responsible party fails to implement the O&M plan, including, where applicable, the SWPPP, as determined by the Code Enforcement Officer or Board of Selectmen, the municipality is authorized to assume responsibility for their implementation and to secure reimbursement for associated expenses from the responsible party, including, if necessary, placing a lien on the subject property.

IX. VARIANCES AND APPEALS

A. Any order, requirement, decision or determination of the Building Inspector made under this ordinance may be appealed to the Zoning Board of Adjustment as set forth in RSA 676:5. (Note: In communities with no comprehensive zoning, a special Board of Adjustment appointed by the Board of Selectmen.)

X. REFERENCES

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<http://pubs.usgs.gov/sir/2005/5103>.

Nashua Regional Planning Commission (NRPC). *Lower Merrimack River Corridor Management Plan*. 2008.

University of New Hampshire Stormwater Center (UNHSC). *Protecting Water Resources and Managing Stormwater: A Bird's Eye View for New Hampshire Communities*. 2009.