



environment

TOOLKIT FOR

Environment



Catalyst for Regional Progress

PVPC

PIONEER VALLEY
SUSTAINABILITY TOOLKIT

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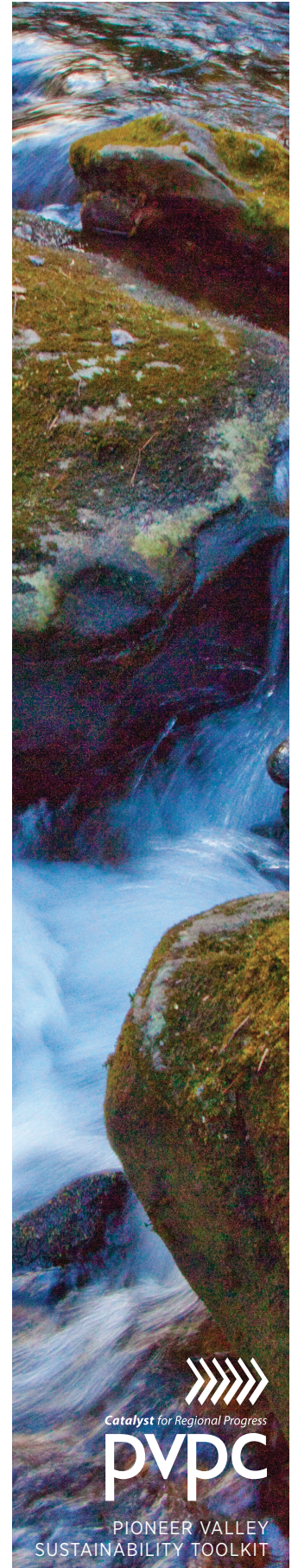
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ENVIRONMENT BYLAWS



Agricultural Best Management Practices (BMPs)

THE FOLLOWING RESOURCES ARE AVAILABLE TO HELP IMPLEMENT AGRICULTURAL BMPs:

Massachusetts Agricultural Environmental Enhancement Program (AEEP)—offers reimbursement funds up to \$25,000 for farmers that install BMPs that mitigate or prevent impacts on natural resources including water quality.

www.mass.gov/agr/programs/aEEP/index.htm

Section 319 Nonpoint Source Competitive Grants Program - for projects that address the prevention, control, and abatement of nonpoint source (NPS) pollution, such as agricultural runoff. A 40% match of the total project cost is required.

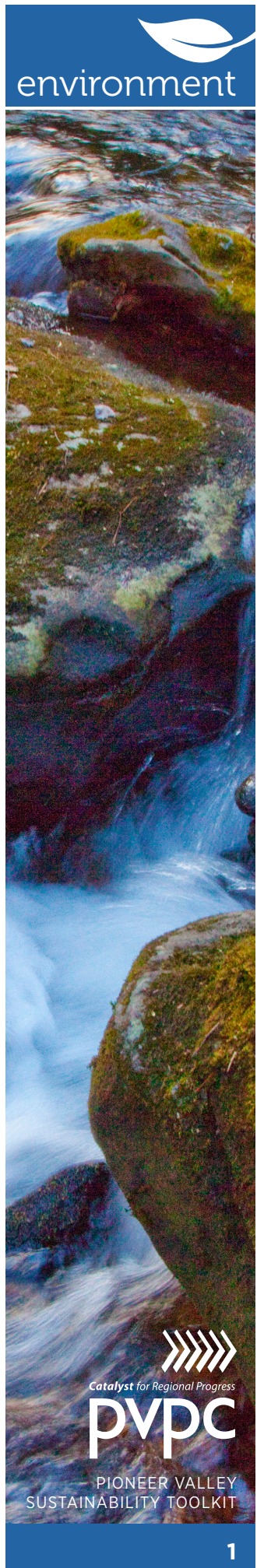
<http://www.mass.gov/dep/water/grants.htm#sums>

Massachusetts Environmental Quality Incentives Program (EQUIP) —offers technical expertise for planning and designing conservation practices that protect water along with cost share and incentive payments up to \$450,000 per farm to producers that adopt water management practices.

www.ma.nrcs.usda.gov/programs/eqip.html



Farm in Buckland, MA Source: FRCOG





What are the objectives of Agricultural BMPs?

To provide guidelines for agricultural operators that address environmental concerns, such as preventing contamination of water supplies, as well as improving the productivity of the land.

Why do we need Agricultural BMPs?

Because too much of an agricultural input in the wrong place can cause water quality degradation or other environmental problems. Management practices and systems have been developed that can sustain yields and protect the natural resources that support them.

How do Agricultural BMPs work?

Agricultural BMPs are guidelines that farmers can choose to follow in order to help prevent or mitigate the impact of agricultural practices on natural resources. Adapting land management practices and utilizing the latest appropriate technologies can result in higher levels of economic efficiency and cropland productivity. Common Agricultural BMPs relate to conservation tillage, crop nutrient management, weed and pest management, and conservation buffers. These BMPs are easily adaptable to virtually any farming situation and can be fine-tuned to meet unique needs. The net results tend to be better soil, cleaner water and greater on-farm productivity.

Types of Agricultural BMPs:

Conservation Tillage—A system of crop production with little, if any, tillage. Leaving crop residue undisturbed for as long as possible increases organic matter, improves soil quality, increases soil productivity, and can reduce soil erosion by as much as 90 percent. The conservation tillage system reduces labor, equipment costs, and fuel use.

Crop Nutrient Management—A practice which matches nutrient availability with the plant needs by fine-tuning application rates, timing, and placement to match plant growth. Efficient crop nutrient management addresses all nutrients including manure, fertilizer, and natural mineralization. These processes reduce the risk of nutrients such as nitrogen and phosphorous making their way to streams, groundwater, and surface water. This can result in improved fish habitat, greater recreational opportunities, and reduced water treatment costs. This type of BMP can also increase profit per acre by increasing the efficiency of crop inputs and the resulting yields.

Weed and Pest Management—A comprehensive approach to on-farm management of harmful weeds and pests including resistant plants, cultural controls, soil amendments, beneficial insects, natural enemies, barriers, physical treatments, behavioral disputants, biological and conventional pesticides. Weed and pest management can help match the best method of control with the optimum time to maximize benefits of the control.

By using mechanical cultivation, pesticides, fertilizers and tillage only when necessary, growers can decrease costs and reduce the amount of sediment and polluted runoff entering lakes, streams, and rivers.

Conservation Buffers—Small areas or strips of vegetated land or wetlands designed to slow water runoff, provide shelter and stabilize riparian areas. When located in environmentally sensitive areas, buffers can filter surface and ground water before it enters streams and lakes, reduce wind erosion, reduce downstream flooding, and stabilize stream banks. Buffers can also reduce crop losses from flooding, protect soil in vulnerable areas, and provide tax incentives.

SOURCES:

Barrios, Anna. "Agriculture and Water Quality." CAE Working Paper Series. WP)))-2. June 2000. American Farmland Trust's Center for Agriculture in the Environment, DeKalb, Illinois.

U.S. Department of Agriculture and Natural Resources Conservation Service. NRCS/RCA Issue Brief 9. Water Quality. March 1996.

LINKS:

For more detailed information and listings of BMPs, see the following websites.

AMERICAN FARMLAND TRUST (AFT)

<http://www.farmland.org/>

MASSACHUSETTS DEPARTMENT OF AGRICULTURE (MDAR)

<http://www.mass.gov/agr/index.htm>

MASSACHUSETTS DEPARTMENT OF FOOD AND AGRICULTURE (MFDA)

<http://www.massdfa.org/>

NATURAL RESOURCES CONSERVATION SERVICE (NRCS)

<http://www.nrcs.usda.gov/>

FOR MORE INFORMATION, PLEASE CONTACT

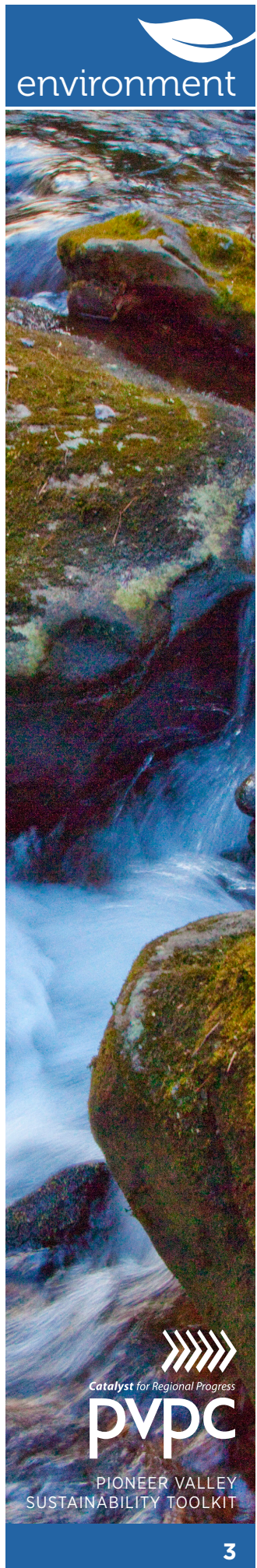
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Conservation Subdivision Design

THE IMPACT OF CONVENTIONAL RESIDENTIAL SUBDIVISION DEVELOPMENT

Typically, when land is developed for a conventional residential subdivision, the parcel is divided up in a “cookie cutter” fashion of individual house lots of a specified size laid out along a road or roads. In many rural communities, like those along the Connecticut River, towns require large lot sizes for each house, generally 1 acre or more. As the picture indicates, this traditional approach for a residential subdivision is land-consumptive and detracts from the rural landscape.



Center for Rural Massachusetts, University of Massachusetts

Large-lot residential development typically results in a condition known as sprawl, with houses scattered over a large area. Sprawl consumes open space; disrupts the natural terrain, hydrologic systems and wildlife habitat; and it increases the amount of impervious surfaces in the form of wide private roadways that may threaten water quality and create erosion.

CONSERVATION SUBDIVISION DESIGN

A community can encourage developers and property owners to develop their land in a more environmentally and aesthetically conscious manner through a Conservation Subdivision Design (CSD) bylaw (also known as Open Space Residential Design or Cluster Development). This technique is an innovative subdivision design process that provides the developer with the flexibility to use various lot sizes, setbacks, and frontage within



the development to preserve open space and critical natural resources. CSD standards and regulations will result in a subdivision that:

- » Preserves open space, protects natural resources and water quality, and conserves the scenic views and rural character of a community;
- » Allows for greater flexibility and creativity in the design of residential developments; and
- » Encourages a less sprawling and more efficient form of development that consumes less open land and conforms to existing topography and natural features.

A CSD project begins with determining how many lots could be developed under conventional zoning and subdivision regulations: this is called the base yield of the property. From that point, the plan development process follows four basic steps: **identify conservation areas; locate house sites; align roads, trails, and other infrastructure; and draw in lot lines.** A CSD bylaw can provide sufficient flexibility to achieve the development goals of a community and a property owner. By working in partnership, the community and the developer can determine where the building footprint will be least disruptive to the landscape and which areas and features should be preserved – wetlands, floodplains, stream buffers, wildlife habitat, farm land, forested land, and viewsheds. Some towns also allow a density bonus to encourage this type of development over a traditional subdivision.



Center for Rural Massachusetts, University of Massachusetts

Usually, ownership and management of the preserved open space is conveyed to a Homeowners Association, the Town, or a non-profit land trust or conservation organization to ensure that emergency access to and the use of and management of the private lands are maintained in perpetuity. Another innovative approach, which can work well for property owners who are actively farming their land, is to have ownership and management of the preserved open space remain with the private landowner.

A vertical banner image showing a close-up of a stream flowing over mossy rocks. The water is clear and blue, creating a sense of movement and freshness. The rocks are dark and covered in green moss.

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Conservation Subdivision Development can:

- » Preserve open space and natural resources.
- » Reduce impervious surfaces.
- » Reduce non-point pollution.
- » Preserve community character.
- » Provide a mix of housing types.

Adding Low Impact Development Techniques Further Improves the Subdivision

Coupling Low Impact Development (LID)¹ techniques with Conservation Subdivision Development further helps a developer to protect the natural and water resources on the property. These techniques include: limiting impervious surfaces by reducing private roadway and common driveway widths; using pervious pavers on driveways and walkways, and using rain gardens and roadside swales for stormwater management.

Incorporating LID strategies further protects water supplies and important habitat by reducing the amount of non-point pollution from runoff, preventing erosion and allowing for groundwater recharge.

Regional, State and Federal Resources

Massachusetts

PIONEER VALLEY PLANNING COMMISSION

www.pvpc.org/

FRANKLIN REGIONAL COUNCIL OF GOVERNMENTS

www.frcog.org/

CENTER FOR RURAL MASSACHUSETTS

www.umass.edu/ruralmass/

THE TRUSTEES OF RESERVATIONS: HIGHLAND COMMUNITIES INITIATIVE

www.thetrustees.org/



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New Hampshire

SOUTHWEST REGIONAL PLANNING COMMISSION

UPPER VALLEY LAKE SUNAPEE REGIONAL PLANNING COMMISSION

NORTH COUNTRY COUNCIL

Vermont

WINDHAM REGIONAL PLANNING COMMISSION

SOUTHERN WINDSOR COUNTY REGIONAL PLANNING COMMISSION

TWO RIVERS OTTAUQUECHEE REGIONAL COMMISSION

NORTHEAST REGION DEVELOPMENT ASSOCIATION

US EPA: Smart Growth - www.epa.gov/dced/

Information on Low Impact Development can be found at the following website:

<http://www.mass.gov/eea/state-parks-beaches/land-use-and-management/land-conservation/planning-land-use/low-impact-development.html>

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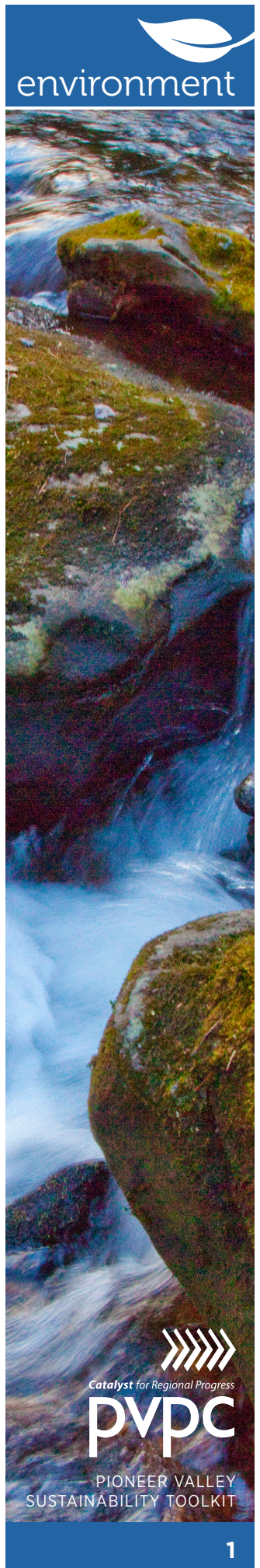
Put Your Sidewalk and Driveway on a Low-Salt Diet

WHAT'S THE PROBLEM WITH GOOD OLD, NATURAL SALT?

Unfortunately salt (sodium chloride), even small amounts, leaches into surrounding soil changing its composition and making it hard for plants to survive. High concentrations of salt can damage and kill trees and other plants. Brown trees and shrubs along roadsides are evidence of this. Dried salt can also blow over the land seeping into groundwater and washing into lakes and streams destroying habitat for plants and animals. Salt is highly corrosive to paved surfaces, buildings, and cars.



And if that weren't enough, our pets suffer from the use of salt. When your pet's paws are exposed to salt, they lick it off and may end up ingesting toxic amounts of salt. Other de-icers may also be a problem for pets, so read the labels!



WHAT'S A SAFER ALTERNATIVE TO SALT?

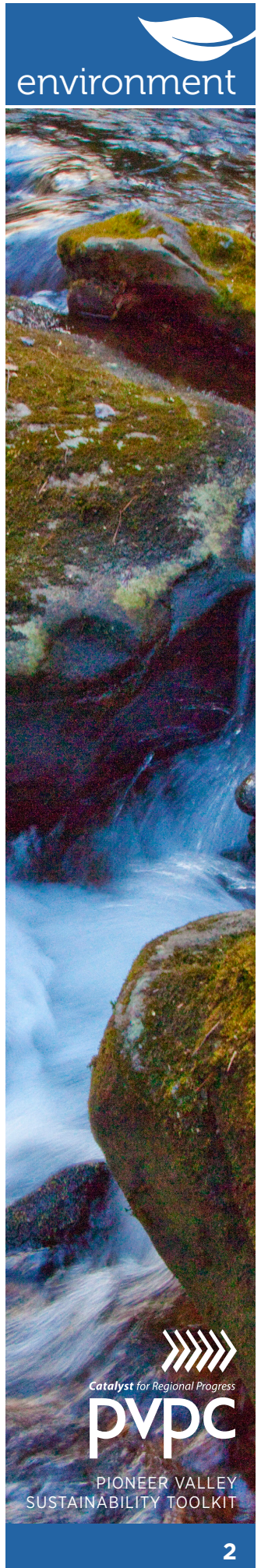
What's a safer alternative? A de-icer is not a substitute for shoveling. Sorry! De-icers are actually more efficient if there is less snow in the way, and it is possible that obsessive shoveling could prevent the need for de-icers. But, this usually is not going to happen so we need to protect ourselves from slipping on walkways and the driveway.

Sand can be used for traction (not melting ice), but it needs to be swept up in the spring. Otherwise, it can clog storm drains in more urban areas and cause flooding. When sand reaches rivers and lakes, sand buries aquatic floor life and fills in natural habitats. Kitty litter and wood ash are not especially effective as, like sand, they do not melt ice and they tend to get messy when it warms up.

Unfortunately, there is no competitively priced safe alternative to salt. However, when purchased in small quantities, such as for a home, the price is much lower than the environmental impacts of salt. Calcium magnesium acetate (CMA) appears to be the best option. If you have large areas requiring de-icing, you might consider mixing salt with CMA or sand.

What can I do?

- » Clear snow early and often and before you use any de-icing product. **NEVER** put de-icer on top of snow.
- » Adopt the "Just Enough" principle putting down just enough de-icer to clear areas.
- » Apply de-icers evenly using a broadcast spreader rather than by hand.
- » Sweep up un-dissolved de-icer after a storm to re-use later.
- » Consider switching to a non-chloride de-icer.



What are the options?

De-Icer	Works to:	Cost relative to salt:	Advantages:	Disadvantages:
Sodium Chloride (rock salt)	15° F		Relatively low cost	Contains cyanide; chloride impact
Calcium Chloride	-25° F	3X more than salt	Can use lower amounts; no cyanide	Chloride impact
Potassium Acetate	-75° F	8X more than salt	Safer than salt for steel structures; performs very well; noncorrosive; biodegradable	Could cause slickness on pavement; lowers oxygen levels in water
Calcium Magnesium Acetate	25° F	20X more than salt	Less toxic; biodegradable	Subject to dilution and refreezing
Sand	No melting effect	Less than salt	Relatively low cost	Accumulates in streets and streams

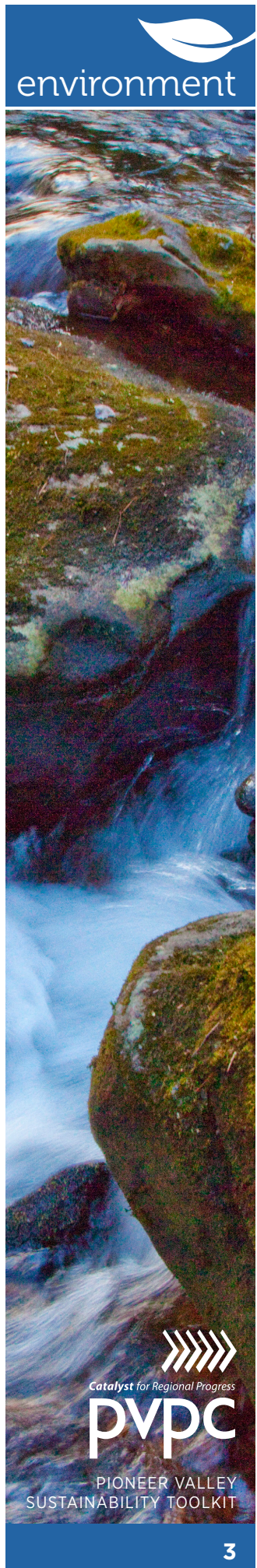
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Household Hazardous Waste Collections

WHAT ARE THE WATER PROTECTION OBJECTIVES OF HHW COLLECTIONS?

To encourage local governments to provide household hazardous waste collections for their citizens. Providing collections for proper management of common household hazardous waste can keep it out of our water supplies. To educate local officials about the options for collections.

WHY DO WE NEED HHW COLLECTIONS FOR WATER QUALITY?

Leftover household products that contain corrosive, toxic, ignitable, or reactive ingredients are considered to be “household hazardous waste” or “HHW.” Products, such as oil-based paints, cleaners, oils, rechargeable batteries, and pesticides that contain potentially hazardous ingredients require special care when disposed of. Americans generate 1.6 million tons of HHW per year.

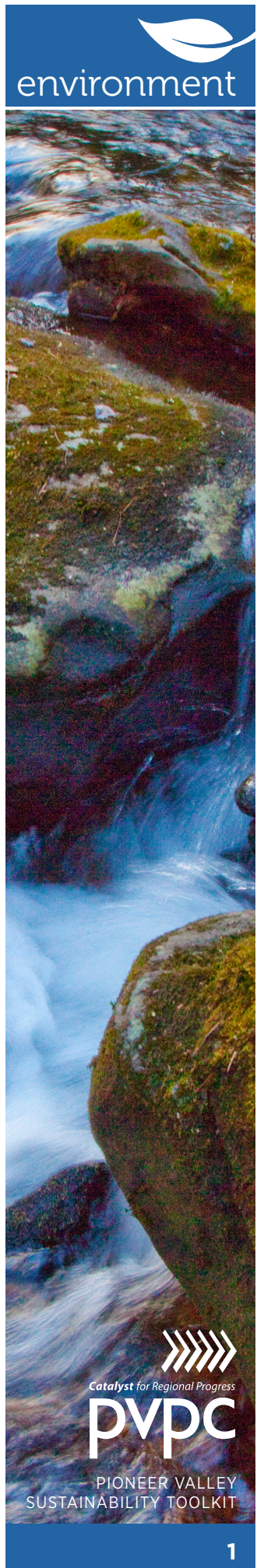
The average home can accumulate 100 pounds of HHW in the basement, garage, and storage cupboards. Improper disposal of household hazardous wastes can include pouring them down the drain, on the ground, into storm sewers, or in some cases putting them out with the trash. The dangers of such disposal methods might not be immediately obvious, but improper disposal of these wastes can pollute the environment and pose a threat to human health.

All Purpose Cleaner Recipes

Mix 2 tablespoons vinegar, 1 teaspoon Borax or washing soda, and 2 cups hot water in a spray bottle and shake. Add ¼ cup liquid soap. Mix gently.

Baking soda can be used for scouring powder.

Vinegar removes soap scum, grease and mineral deposits and acts as a deodorizer. Use white distilled vinegar. Mix with water to wash non-wax floors.



HOW DO HHW COLLECTIONS PROTECT WATER QUALITY?

HHW collections protect water quality by providing options to their citizens for proper management. Most HHW is highly regulated and must be managed by licensed personnel or contractors. However, local governments can provide daily collection of some HHW. “Universal Waste” is a type of HHW which the federal government allows to be collected and stored at municipal facilities because the waste type is so common. This includes rechargeable and other hazardous content batteries, fluorescent light bulbs and tubes, mercury-containing items such as thermostats and thermometers, and some pesticides. States may modify the definition and add other materials to be included in the definition of universal waste. For example, New Hampshire added electronics to their definition.

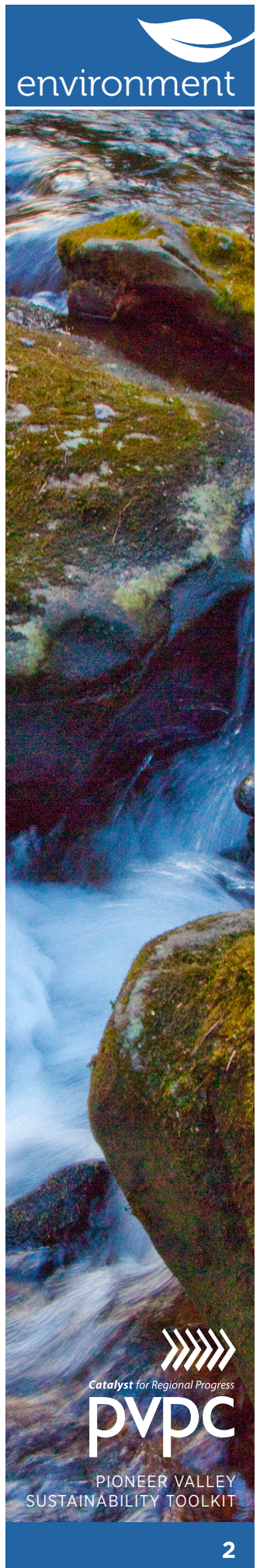
HOW AND WHERE ARE HHW COLLECTIONS USED TO PROTECT WATER QUALITY?

There are several options for managing HHW. The first as with all waste is to discourage purchasing it to begin with. Educate people about non-toxic alternatives, especially for cleaners. And if hazardous products are purchased, they should be used up rather than becoming waste. Educate your community about hazardous materials collection events and drop off locations. Many retail stores and municipal facilities provide daily collection of some materials such as used oil, car batteries, rechargeable batteries and cell phones, fluorescent bulbs, and electronics. Often this service is provided for free or a minimal fee.

THE FOLLOWING ARE EXAMPLES OF DIFFERENT TYPES OF HHW COLLECTION OPTIONS:

Swap Shops — Can be used to trade useable materials instead of discarding as waste, such as common garden pesticides and oil-based paint. One disadvantage is these shops can become overrun with materials, increasing the risk of a spill, or mixing inappropriate materials and creating a greater hazard by doing so.

Multiple or Single Day Collections — Typically, a public works garage or other municipal facility with shelter, toilets, safety equipment, and pavement is identified. A licensed contractor is hired who sets up the collection area. This can be open to residents and/or commercial small quantity generators. Often the participating towns will pay the cost for their residents using the collections. Institutions and businesses can pre-register and pay in advance or at the collection. Non-participating town residents may be allowed to attend the collection if they pay for their waste at the collection. All New Hampshire towns are serviced by this method.





Permanent Facilities — Often sited with existing transfer stations, these structures must be built to standards to provide safe storage for materials and be accessible and safe for users. They must be able to contain spills, be well ventilated and have some fireproofing. Appropriate containers must be available to store the various materials on site. The Hartford, Vermont facility meets the requirements for a permanent facility, but functions as a fixed site for multiple day collections instead.

Curbside Collection — These collections are typically arranged with individual households prior to the collection, or they are scheduled by the community a few times a year. Participating households and businesses are required to properly label and store their waste. The container of waste is then placed in a specified location, not on the street, to prevent spills or vandalism. This is generally the most expensive form of collection.

Mobile Unit Pick-Up — These collections are similar to the Multiple or Single Day Collections but require a specially built or modified vehicle designed to collect as well as transport the materials to its final management destination. The mobile units follow a route within the service area, stay for a specified period, and then move the whole operation to the next site.

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Local Conservation Fund

WHAT ARE THE OBJECTIVES OF A LOCAL CONSERVATION FUND?

To provide a local funding source for acquiring and protecting important lands, open spaces and water supply protection areas through the purchase of land in fee simple, conservation restrictions or easements.

WHY DO WE NEED A LOCAL CONSERVATION FUND?

A local Conservation Fund provides communities with the funding needed to permanently protect important watershed and aquifer recharge lands. Local zoning and other regulations provide a level of protection, but the best way to permanently protect these lands is through the purchase of fee simple interests, conservation restrictions or easements. Often, if state and federal grants are available, they take long periods of time to secure. Communities need a local funding source to be able to move quickly to protect threatened lands.

Did you know a Local Conservation Fund can:

- » • accept private gifts, such as bequests in wills, which require only the Selectboard or Mayor's approval;
- » • include funds earmarked by Town Meeting or City Council for a specific project;
- » fulfill a psychological function by reminding communities to make annual contributions to conservation projects.

HOW DOES A LOCAL CONSERVATION FUND WORK?

A Conservation Fund is a dedicated account established by a municipality to ensure that the Conservation Commission will have cash that can be spent for any purpose stated in MGL Chapter 40, section 8C (The Conservation Commission Act) without further authorization. These purposes include protection of watershed resources. A Conservation Fund can be created by a vote of Town Meeting or City Council. Funds can be used for purchase of land, capital improvements to such land, and expenses directly related to land purchases, such as title searches and legal expenses. Money must be



specifically appropriated or transferred to the Conservation Fund by a majority vote of Town Meeting or City Council. Money voted to the Fund remains there until expended or until transferred out by a Town Meeting or City Council vote. No further authorization is needed to spend money from the Fund, even for the purchase of land.

HOW DOES A LOCAL CONSERVATION FUND PROTECT WATER SUPPLIES?

A local Conservation Fund could be used to purchase lands or easements or conservation restrictions in water supply areas, including Zone 1 or Zone 2 Aquifer Recharge Areas, and watershed areas for surface water reservoirs.

HOW AND WHERE IS A LOCAL CONSERVATION FUND WORKING?

CASE STUDY: TOWN OF HADLEY

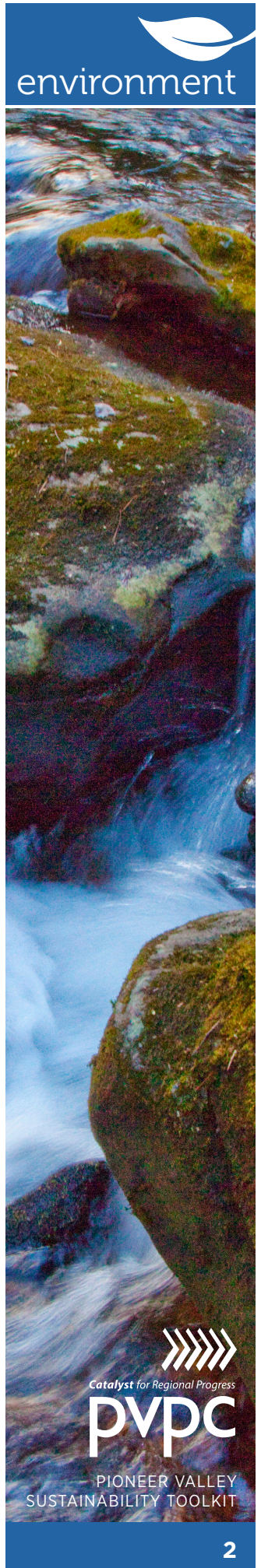
Hadley, Massachusetts has had a Local Conservation Fund established for a number of years. This fund receives an annual Town Meeting appropriation, and has also received contributions from the town's Transfer of Development Rights bylaw, and mitigation funds from development project along the Route 9 Corridor. Hadley has used \$338,000 from its Local Conservation Fund to match \$3,483,000 in state Agricultural Preservation Restriction funds, in order to preserve 239 acres of land in nine parcels for farmland preservation purposes. The net result is that Hadley has been able to use its Local Conservation Fund to leverage approximately ten times that amount of funds in state funding. This means Hadley has been able to protect a sizable amount of land with only modest local funding.

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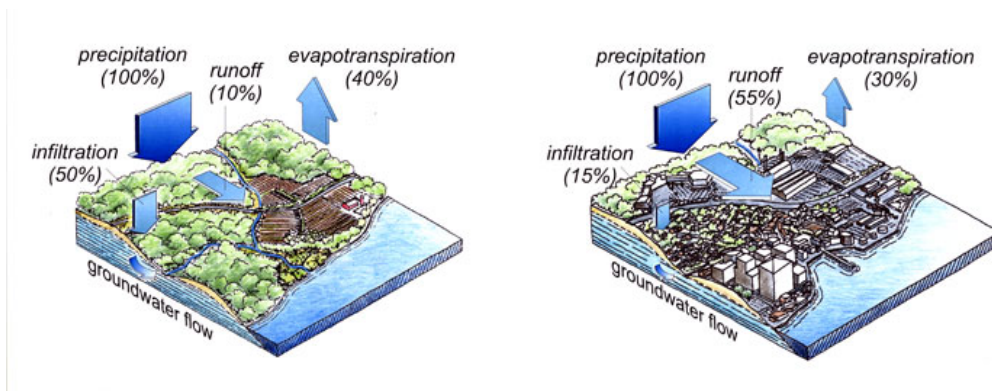
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Low Impact Development (LID)

WHAT ARE THE OBJECTIVES OF LOW IMPACT DEVELOPMENT?

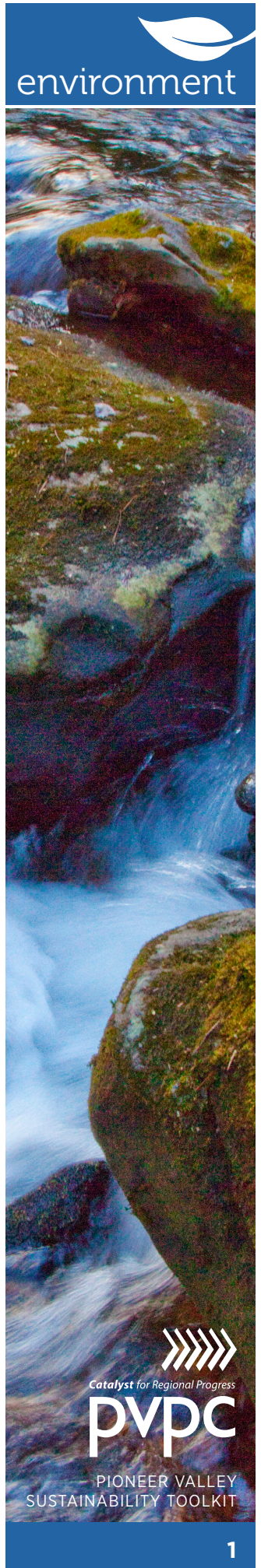
To create a more sustainable land development pattern that results from a site planning process that first identifies critical natural resources, then determines appropriate building envelopes. To incorporate a range of best management practices (BMPs) that preserves the natural hydrology of the land.



Groundwater Base Flow, Rural and Urban Environments Source: MA Smart Growth Toolkit

WHY DO WE NEED LOW IMPACT DEVELOPMENT?

Development patterns based on conventional zoning codes in Massachusetts often result in „sprawl“ with its associated large impervious areas, loss of natural areas, and alteration of hydrologic systems. Too often, the development process begins with the clearing and leveling of an entire parcel. Conventional developments that follow commonly contain wide roads and large parking lots. These large impervious areas prevent water from infiltrating into the ground (which normally replenishes groundwater supplies and supports nearby wetlands and streams with baseflow) and convey polluted runoff into waterbodies. In order to deal with water that runs off of these sites, structural stormwater controls such as catch basins, pipes, and detention ponds are used. Conventional landscaping of these developments brings additional concerns including the introduction of non-native plants, use of herbicides, pesticides and fertilizers, and excessive water consumption.



HOW DOES LOW IMPACT DEVELOPMENT WORK?

The LID approach provides opportunities to build the homes and businesses that are needed, while conserving natural areas and drainage patterns. LID is accomplished as a two-step process: 1) thoughtful site planning, and 2) incorporation of best management practices (BMPs). Thoughtful site planning begins with an approach that identifies critical site features such as wetlands, poor soils, or drinking water protection areas that should be set aside as protected open space. Natural features, such as vegetated buffers and view sheds, will also play an integral role in any LID planning exercise. After the critical open space areas are identified and set aside, sustainable development areas are then identified as „building envelopes.“ Within the delineated building envelopes, a broad range of design techniques or BMPs, such as shared driveways, permeable pavers, and bioretention are used to reduce the level of impervious cover and improve the quantity and quality of stormwater drainage. Other LID design techniques include green roofs, rain barrels, rain gardens, grassed swales, stormwater infiltration systems, and alternative landscaping. Through these techniques, natural drainage pathways are conserved, open space is preserved, and the overall impact from development is significantly reduced.

HOW DOES LID PROTECT WATER SUPPLIES?

LID encourages recharge of groundwater and protection of water resources from polluted runoff. LID can be an important component in an overall water supply protection strategy. Elements for LID can be incorporated into Stormwater bylaws and ordinances, Water Supply Protection Overlay zones, and Green Performance Standards.

Did you know that Low Impact Development also provides:

- » • Preservation of open space, trees and natural drainage patterns;
- » • Aquifer protection;
- » • Environmental improvement (in retrofit situations);
- » • Reduction of impervious cover;
- » • Stormwater pollution mitigation; and,
- » • Aesthetic appeal.



HOW AND WHERE IS LOW IMPACT DEVELOPMENT WORKING IN MASSACHUSETTS?

CASE STUDY: TOWN OF PELHAM, MA

With a Smart Growth Technical Assistance Grant from EOE, PVPC worked with the Pelham Growth Study Committee to draft a Low Impact Development (LID) zoning bylaw utilizing the LID Bylaw from EOE's Smart Growth Tool Kit as a model template. Given the largely rural and residential nature of Pelham, the committee felt that the State's model was more complicated than they would be able to administer and was more appropriate for new commercial and industrial developments, the likes of which were not happening in Pelham. Therefore, PVPC significantly streamlined the model, making the bylaw applicable to two types of land uses: 1) all non-residential land disturbances requiring a Special Permit and/or Site Plan Approval, and 2) all residential uses, including single-family detached dwellings, creating land disturbances that require a Special Permit, Site Plan Approval, or Building Permit. The Committee opted to call the new zoning bylaw a Stormwater Management bylaw rather than an LID bylaw due to the fact that they believe stormwater management is a term more easily understood by the general public rather than low impact development.

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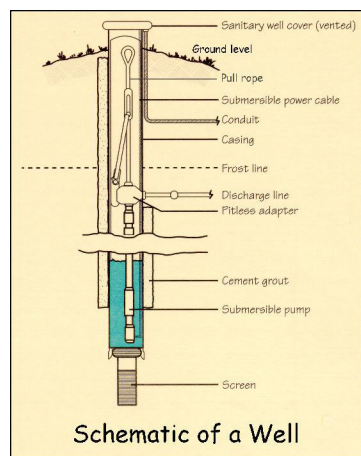
Private Wells

THE ISSUE – CONTAMINATION OF DRINKING WATER

A huge number of people rely on private wells for drinking water. In Massachusetts alone over 400,000 people have private water systems for their homes and businesses. These private wells draw water from groundwater and aquifers that are susceptible to contamination from a variety of activities and sources.

Some naturally occurring contaminants include bacteria; radioactive elements such as radium, uranium and radon; and chemicals and minerals like arsenic, lead, copper, chloride, sodium, and fluoride. Other pollutants are caused by human activity. Industrial, commercial and agricultural activities can introduce hazardous substances like volatile organic compounds (VOCs), fuels, solvents, bacteria and pesticides into the groundwater through improper storage and disposal and accidental spills. Even typical residential activities such as the use of fertilizers and pesticides, fueling of lawn equipment, and improper disposal of household chemicals in an on-site septic system can contaminate groundwater.

A range of adverse outcomes can result from exposure to pollutants in drinking water, principal among them are polluted groundwater and aquifer supplies that compromise public health; others are unacceptable taste and odor and aesthetic concerns.



Schematic courtesy of University of Maryland Extension



STRATEGIES AND REGULATIONS FOR PROTECTING DRINKING WATER

Most states do not have any statutes that specifically regulate the quality of water for private wells, so the protection of drinking water is left to local government, specifically the Boards of Health, and the individuals or businesses with the wells.

Requiring regular monitoring of drinking water from private wells can help to mitigate the adverse outcomes of contamination for residents and identify threats to public health and public water supplies in your town.

PRIVATE WELL REGULATIONS

Regulations requiring regular water quality testing help to protect water supplies in private wells by identifying hazardous levels of drinking water contaminants that pose a health risk. Also, they identify some secondary contaminants that may present aesthetic problems affecting water quality.

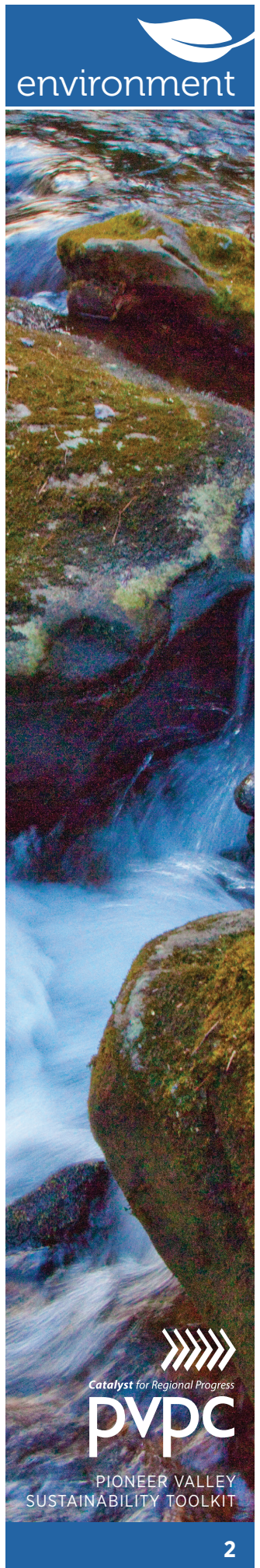
Local governments in Massachusetts are responsible for regulating private wells. Local Boards of Health (BOH) may adopt bylaws requiring testing of private wells to ensure the protection of drinking water. Testing of private wells may be required when a new well is installed, when a house is sold, or at regular intervals as recommended the State. Additionally, the BOH may require set backs for wells from possible pollutions sources such as roads, septic systems, barn yards, and industrial sites. Banks usually require testing of wells on private property before providing mortgages.

Generally, states have guidelines that take into account the cost of monitoring to the homeowner, make recommendations for sampling frequency, and offer Recommended Concentration Limits for pollutants that have been identified by EPA and/or State. In Vermont and New Hampshire, state agencies recommend testing at a sampling frequency of three to five years. Massachusetts recommends initial monitoring and then testing again in 10 years if no problems are detected (See Private Well Guidelines. www.mass.gov/dep/water/laws/policies.htm#pwg). The exceptions to this recommended testing schedule are monitoring for nitrate/nitrite and bacteria levels, which all states recommend be done on an annual basis.

PRIVATE WELL TESTING

A listing of laboratories that are certified for specific analyses of well water can be obtained on State websites: <http://edep.dep.mass.gov/labcert/lacert.aspx>,

It should be noted that laboratories that are certified for one type of analysis may not be certified for other types. A basic scan typically tests for coliform bacteria, fecal coliform, nitrate, nitrite, pH, alkalinity, arsenic, iron, lead, manganese, copper, sulfate, chloride, sodium, fluoride, hardness, turbidity, conductivity, T. dissolved solids and chlorine. More advanced analyses can test for volatile organic compounds (VOCs) and/or radioactive elements (such as radium, uranium and radon).





Private well regulations require testing that can:

- » Identify hazardous levels of bacteria and inorganic compounds in drinking water from wells;
- » Detect dangerous levels of radon in drinking water;
- » Determine if VOCs resulting from spills of petroleum products are present in the water.

Owners of wells in industrial or densely developed residential areas are encouraged to conduct more frequent testing. Local Boards of Health in Massachusetts may adopt regulations that require more frequent monitoring of private wells.

CASE STUDY: PRIVATE WELL REGULATIONS

Town of Leverett, MA

The Town of Leverett adopted private well regulations in 1989 to “insure an adequate supply of safe water to houses with no access to public water supplies and to insure the safe destruction of abandoned private wells.” For homes that are served by private wells, owners must apply for a water supply certification certificate from the Leverett Board of Health. Application must be submitted within 30 days of the completion of the well’s construction and must include:

- » A completed and approved Application for Well Construction/Destruction Permit;
- » A copy of the Water Well Completion Report, provided by the well driller;
- » A water quality analysis performed by a state certified laboratory; and
- » A certificate of yield from the well driller that water quantity standards have been met.

No new well can be operated or building permit issued unless a water supply certificate has been issued by the Leverett Board of Health.

FOR MORE INFORMATION, PLEASE CONTACT

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Reduced Parking Footprint

WHAT IS REDUCED PARKING FOOTPRINT?

“Reduced Parking Footprint” aims to reduce the total area of paved surfaces and allow rainwater and snowmelt to travel more naturally across the landscape to surface waters as well as filter down naturally to groundwater aquifers. Reducing the parking footprint reduces the amount of impervious surfaces in watersheds. Watersheds with 10 to 20% impervious cover are more likely to have degraded water quality in rivers, streams and groundwater.ⁱ Reduced parking footprint is a valuable tool when used in conjunction with other measures to protect drinking water and provide cost savings in the long-run.ⁱⁱ

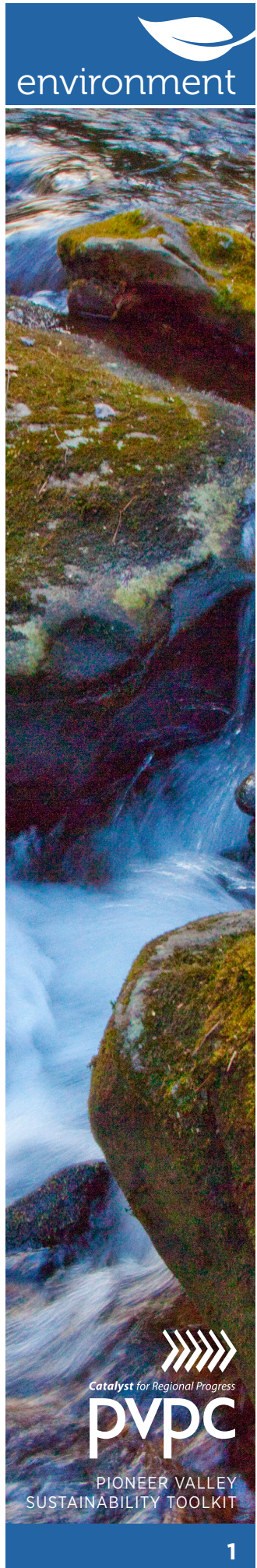
HOW DO YOU REDUCE PARKING FOOTPRINTS?

Reduced parking footprint, in practice, may take many forms that are not new, but may require modifications to municipal by-laws and zoning. The intent is to limit the amount of land area dedicated to surface parking. Some options to reduce the parking footprint include:

- » Relax minimum parking standards or assign maximum parking standards;
- » Establish shared parking provisions for mixed-use development where adjacent uses that have peak parking demands at different times of day;
- » Encourage shared-footprint or multi-level parking design during site plan review.

Another strategy is termed “unbundled parking.” This option separates parking costs from leases or the purchase price of a condominium. Landlords then have the following options:

- » Parking can be bought or rented separately;
- » Discounted rental rates for residents who do not use their parking spaces;
- » Rental agreements with line items in the lease where parking cost may be negotiated or shared with another tenant;
- » A market for parking spaces would enable building owners or managers inventory and market vacant parking spaces to other users in the surrounding area.



Under most circumstances these efforts to reduce development parking footprints are commercially viable where land prices are at a premium rate and/or the development density and presence of other transportation modes like walking, biking, and transit, do not affect customer choice.

Successful Project Examples:

Seattle, WA: Residential units were offered without parking at a lower price.

St. Louis, Missouri: Buyers could opt-out of purchasing a parking spot. The site was adjacent to mass transit (bus, light rail), which made the opt-out program possible

Regulations and Incentives

To relax minimum parking standards for qualifying developments, towns can either pass ordinances or analyze parking through the site plan review process. Towns can also produce regulations either through zoning laws or site plan review for minimum, maximum and shared parking. Reduced parking footprint practices may be regulated in certain areas of concern (e.g.: public water supply districts, urban centers, transit hubs, etc.).

Contact Information and Links

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY:
<http://www.epa.gov/>

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION:
www.mass.gov/dep

MASSACHUSETTS EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS:
www.mass.gov/envir

VERMONT AGENCY OF NATURAL RESOURCES:
www.anr.state.vt.us

NH DEPARTMENT OF ENVIRONMENTAL SERVICES:
<http://des.nh.gov/>

THE CENTER FOR WATERSHED PROTECTION:
<http://www.cwp.org/>

THE STORMWATER MANAGER'S RESOURCE CENTER:
<http://www.stormwatercenter.net/>

URBAN LAND INSTITUTE:
<http://www.uli.org/>



FOR MORE INFORMATION, PLEASE CONTACT

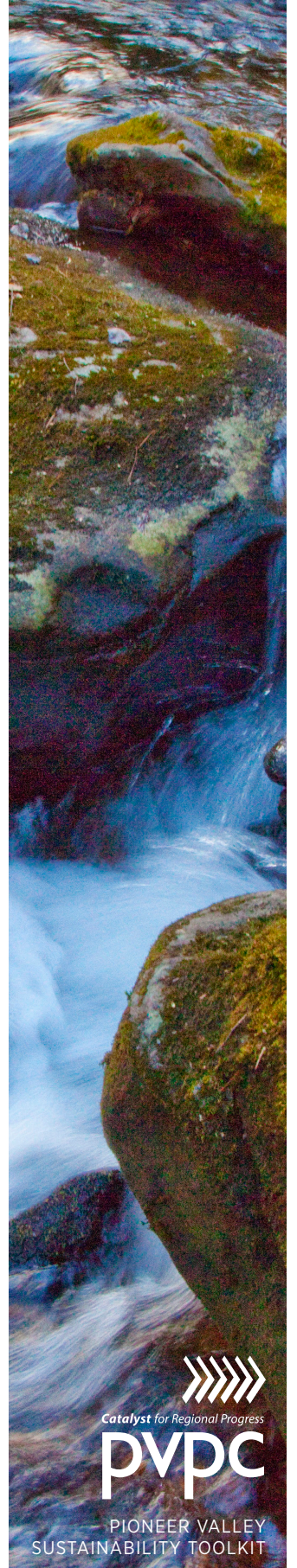
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Catalyst for Regional Progress

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PIONEER VALLEY
SUSTAINABILITY TOOLKIT

Best Management Practices for Road Crews

WHY DO WE NEED BMPS FOR ROAD CREWS?

Protecting the quality and quantity of clean drinking water is important to all communities. Routine road maintenance practices including managing stormwater, snow, and ice have a significant impact on local surface water and groundwater quality. Many communities throughout New England institute Best Management Practices (BMPs) for road crews to minimize roadwork impacts on nearby surface water and natural resources, increase efficiency and reduce operating costs.

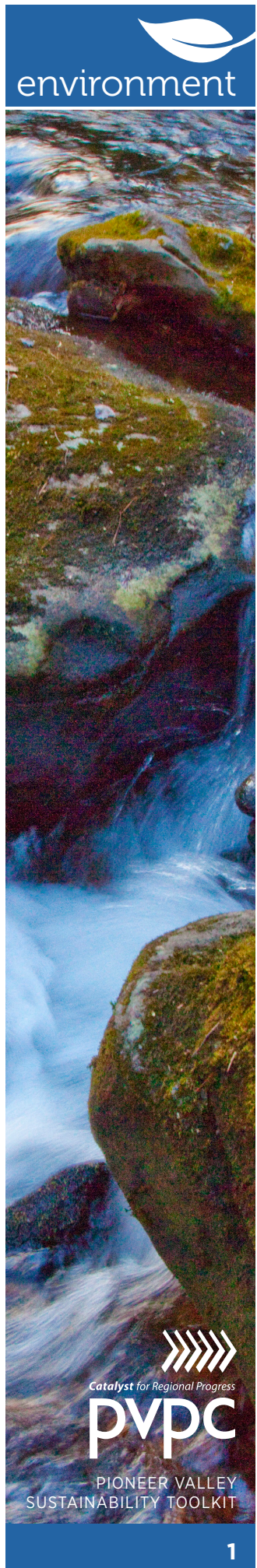
HOW DO BEST MANAGEMENT PRACTICES FOR ROAD CREWS WORK?

In order to protect water quality through Best Management Practices, towns must first identify water resources and their watersheds including all past, present and future possible sources of drinking water from surface and groundwater supplies. Once watersheds have been delineated and mapped, place signage along roadways to indicate boundaries of the public water supply watershed. Within these boundaries, there may be special provisions for road maintenance practices such as reduced anti-icing.

Garages and maintenance yards should also follow best management practices for storage and disposal of materials. Salt piles and sand piles should be housed in sheds to reduce loss to rain, and prevent salt and sand runoff to rivers, streams and lakes. Stormwater in maintenance yards should be adequately mitigated and treated on-site wherever possible through low-impact designs, retention ponds and natural infiltration (except in the case where chemicals may be present). Maintenance products such as engine oil, gasoline, diesel, hydraulic fluid should be stored and disposed of in accordance with state laws.

Tree removal or trimming along roadways should be performed when necessary, but should follow protocols to reduce soil erosion and reduce damage to riparian buffers along rivers, lakes and streams.

Policies and guidelines for road crew best management practices should be adopted by local Highway Departments, and training provide to employees in the use of BMPs.



Municipalities should re-visit best management practices on a one to five year time frame to ensure that up-to-date methods are being implemented.

Employees should be trained in best management practices including:

- » Proper installation and maintenance of erosion and sediment control practices.
- » Familiarity with National Pollution Discharge Elimination System (NPDES) requirements, particularly with regard to Total Maximum Daily Loads for salt.
- » Develop equipment operator skills to minimize environmental impacts when working in environmentally sensitive areas.
- » Culvert sizing and natural-streambed design for fish populations and other aquatic species.
- » Techniques in snow and ice removal with sand, salt, and other applications. Such techniques may include reduced salt application areas, use of calibrated salt spreaders, and proper storage and handling of road treatment chemicals.
- » Methods to minimize salt or chemical migration from roadways to drinking water supplies.
- » Use of innovative techniques to increase operational efficiency.

HOW DO BEST MANAGEMENT PRACTICES PROTECT WATER SUPPLIES?

Towns can adopt regulations and bylaws for road salt, sand, and road-salt alternatives application for town employees, plowing contractors, parking-lot owners and residential use on driveways and walkways. Best management practices for road crews are critical to balancing safety needs with water quality protection.



HOW AND WHERE ARE BEST MANAGEMENT PRACTICES FOR ROAD CREWS WORKING?

In New Hampshire, The Town of Enfield has implemented best management practices to protect water supplies. Larger cities in New England are using technology to reduce salt dispersal.

The Vermont Better Roads Program is assisting towns with grants to inventory road erosion and develop capital improvement plans to improve them. In addition, grants are also available to correct existing erosion problems in Vermont. For more information go to

www.vt.nrcs.usda.gov/rc&d/bbcoverpage.html

In Massachusetts, the Baystate Roads Program offers statewide training on winter salt and sand practices, as well as a range of best management practices for road crews. A schedule of training opportunities can be found at

<http://baystateroads.eot.state.ma.us/Resources>

AASHTO CENTER FOR ENVIRONMENTAL EXCELLENCE:

<http://www.environment.transportation.org/>

US EPA:

www.epa.gov

FEDERAL HIGHWAY ADMINISTRATION:

www.fhwa.dot.gov



Road Salt Reduction

WHAT ARE THE OBJECTIVES OF A ROAD SALT REDUCTION PROGRAM?

Road crews across America use approximately 8 to 12 million tons of salt to treat roads annually. Northern New England relies heavily on salt applications during the winter months. The use of salt on roads leads to the potential for artificially high salinity levels in local surface water and groundwater resources and can be harmful to human and environmental health. Communities throughout New England seek to eliminate the use of road salt adjacent to community drinking water protection areas.

HOW DOES A ROAD SALT REDUCTION PROGRAM WORK?

Towns must first identify water resources including past, present and future groundwater and surface drinking water supplies, and delineate and map the associated watersheds. Prioritize roads, parking lots and driveways within these watersheds for reduced-salt application or salt alternative policies. Towns taking this approach should recognize that low or no-salt applications may not be practical due to safety, cost and availability of salt alternatives, and environmental impact of salt alternatives. Reduced road-salt areas are often noted with signage to alter motorists to potential changes in road conditions due to these practices.



The following are practical approaches for municipalities and private citizens to individually reduce the use of salt:

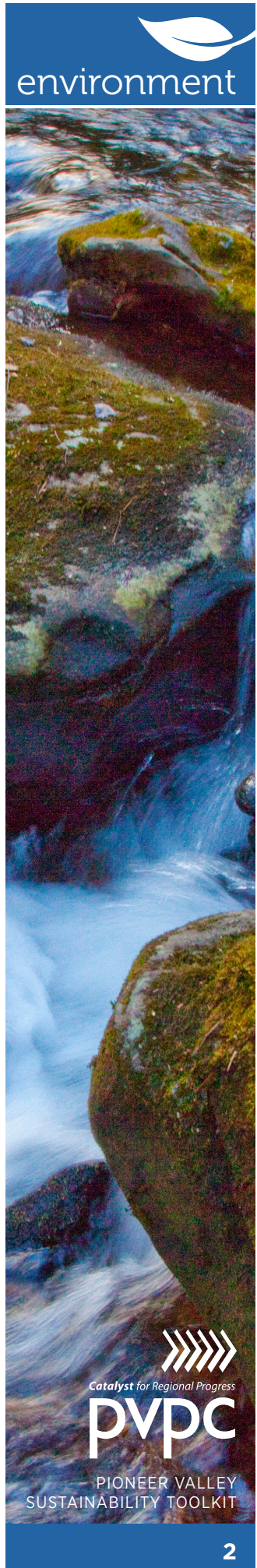
- » Salt application quantities should be determined by the temperature of the road surface.
- » Road salt should be properly handled and stored to reduce potential contamination and eliminate loss to runoff.
- » Evaluate salt alternatives and seek to use alternative road treatment chemicals in the most sensitive water resource areas. Many of the alternative chemical treatments require special consideration of how to handle and apply the chemicals effectively, whether there needs to be substantial equipment fit-up, and cost per ton.
- » Broader use of snow tires may have a positive impact on safety when salt reduction policies are in place. The use of snow tires is mandated in Quebec from December 15 to March 15.

WHERE AND HOW IS ROAD SALT REDUCTION WORKING?

A road salt reduction pilot program exists on the Interstate 89 bridge across the Connecticut River between New Hampshire and Vermont. This program utilizes continuous roadway monitoring software to measure conditions on the bridge deck. When sensors indicate unsafe conditions the system automatically applies chemical treatments on the bridge deck; limiting environmental impacts to the Connecticut River below.

Did you know that Towns can...

- » Implement regulations and bylaws for road salt application for town roads, private plowing contractors, parking-lot owners and residential driveways and walkways.
- » Pre-treat roads with salt brine to prevent ice buildup and reduce the amount of salt needed during a storm.
- » Equip plow trucks with slat calibration devices so that less salt can be applied in designated reduced salt zones.
- » Keep accurate records of salt application amounts per storm.
- » Prohibit dumping or plowing snow into rivers, streams, lakes or frozen water bodies or their buffer areas.
- » Recover sand and prevent it from running off to rivers, streams and lakes.



CONTACT INFORMATION AND LINKS

BAYSTATE ROADS PROGRAM
<http://baystateroads.eot.state.ma.us/>

FOR MORE INFORMATION, PLEASE CONTACT

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Stormwater Management

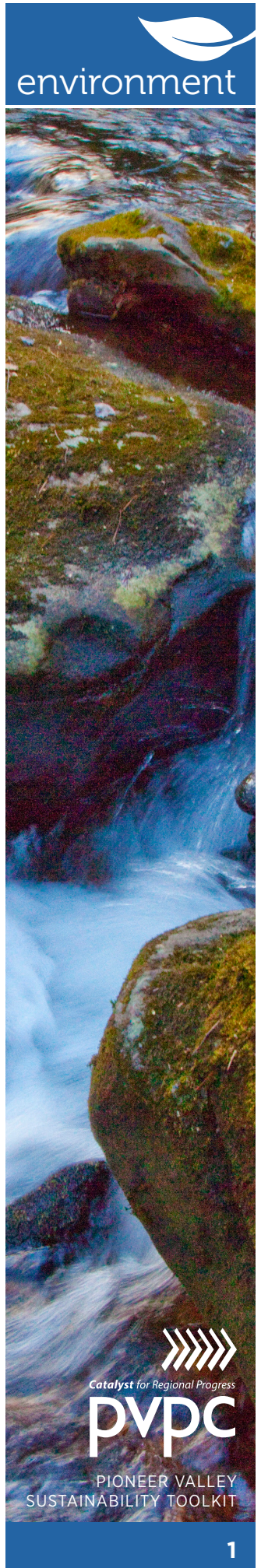
THE CHALLENGE OF STORMWATER

Stormwater runoff is a real problem for cities and towns in the Connecticut River Valley. Stormwater can contain oil, grease, metals, chemicals and sediment that pollute our rivers, lakes, ponds, and aquifers. Without proper management and control, stormwater can cause serious erosion and flooding, destroy aquatic life, deplete groundwater, close waterways to recreation, and result in toxic algae blooms.

The construction of new subdivisions and commercial development can increase stormwater runoff from impervious surfaces such as buildings, parking lots, and roadways. In contrast, undeveloped land and Low Impact Development (LID) stormwater management techniques such as rain gardens, grassed swales and pervious pavers can filter polluted runoff, provide flood control, and slow the flow of water. Redevelopment of downtown areas, which generally have a high concentration of impervious surfaces, and Brownfield properties can present an opportunity for incorporating better stormwater management strategies such as LID techniques.



Rain Garden at Riverfront Park in Orange, MA.



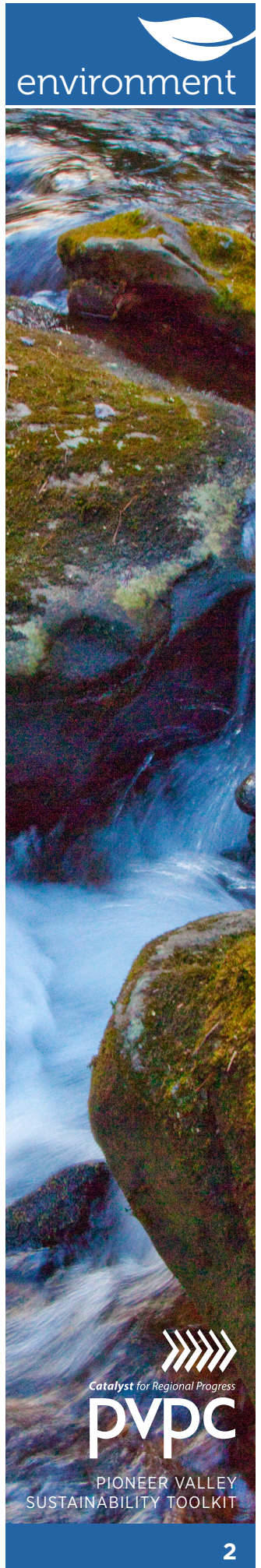
MANAGEMENT STRATEGIES AND STANDARDS

Local governments are responsible for managing stormwater to insure that new development does not diminish the safety and health of or the quality of the environment in their communities. There are a number of strategies and standards your community should consider to improve stormwater management and encourage development that protects your drinking water, wetlands, rivers, ponds and aquifers and safeguards structures and property. Towns can take a comprehensive approach by adopting a Stormwater Management Bylaw or Ordinance; most will need to manage the problem incrementally by:

- » Encouraging the use of Low Impact Development (LID) techniques by developers.
- » Adopting LID Standards in your zoning.
- » Requiring LID techniques to be used in aquifer recharge areas or other environmentally sensitive areas by adding language to an existing overlay district or creating a new overlay district.
- » Requiring Site Plan Review of all development proposals to encourage environmentally sensitive site design and the use of LID techniques.
- » Enacting source controls, pollution prevention standards and/or erosion and sediment regulations.



Pervious pavers used for the walkways at Riverfront Park in Orange, MA.



HELP IS ON THE WAY

Stormwater management is complicated and not easily implemented at the local level where it is most needed and important. However, if your town wants assistance help is available from your Regional Planning Commission or Agency, which will work directly with you to develop strategies to manage stormwater that fit the needs of your community. Also, the State has guidance documents, circuit rider programs, and an internet site that can help you understand stormwater management.

There are 9 Regional Planning Commissions in the Tri-State Watershed that are available to help watershed towns:

Massachusetts – Pioneer Valley Planning Commission and Franklin Regional Council of Governments;

New Hampshire – Southwest Regional Planning Commission, Upper Valley Lake Sunapee Regional Planning Commission, and North Country Council;

Vermont – Windham Regional Planning Commission, Southern Windsor County Regional Planning Commission, Two Rivers Ottauquechee Regional Commission, and Northeast Region Development Association.

The most common site design techniques used to minimize the creation of new runoff, enhance groundwater recharge, and remove suspended solids and other pollutants.

- » Minimize impervious surfaces
- » Fit the development to the terrain
- » Preserve and capitalize on natural drainage systems
- » Use LID stormwater management techniques

STATE RESOURCES

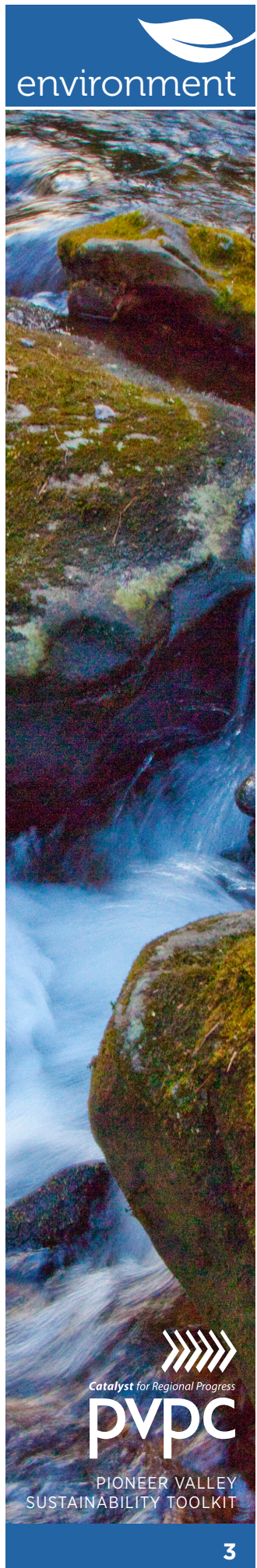
Each state has different resources that can help you understand stormwater management including publications, workshops, websites and circuit riders. For the big picture, explore the EPA web site at

www.epa.gov/nps/

Massachusetts

2008 MASSACHUSETTS REVISED STORMWATER MANAGEMENT STANDARDS AND STORMWATER HANDBOOK

<http://projects.geosyntec.com/NPSManual/>



MASSACHUSETTS NONPOINT POLLUTION SOURCE MANAGEMENT MANUAL
<http://www.mass.gov/dep/water/wastewater/stormwat.htm>

LOW IMPACT DEVELOPMENT TECHNIQUES
http://www.mass.gov/envir/smart_growth_toolkit/pages/SG-slides-lid.html

New Hampshire

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES WATER DIVISION
<http://des.nh.gov/organization/divisions/water/stormwater/>

NEW HAMPSHIRE STORMWATER MANUAL
<http://des.nh.gov/organization/divisions/water/stormwater/manual.htm>

UNIVERSITY OF NEW HAMPSHIRE STORMWATER CENTER
<http://www.unh.edu/erg/cstev/>

Vermont

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION STORMWATER
MANAGEMENT SECTION
<http://www.anr.state.vt.us/dec/waterq/stormwater.htm>

VERMONT EROSION PREVENTION AND SEDIMENT CONTROL FIELD GUIDE
http://www.vtwaterquality.org/stormwater/docs/construction/sw_vermont_field_guide.pdf

VERMONT BETTER BACKROADS
<http://www.vt.nrcs.usda.gov/rc&d/bbcoverpage.html>

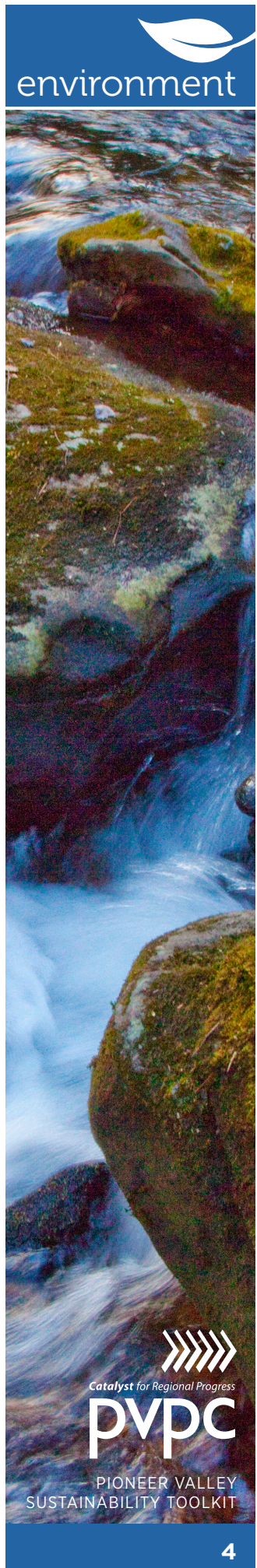
VT LID BROCHURE AND TOWN GUIDE
<http://swcrpc.org/wp/programs/watershed-and-basin-planning/Federal>

FOR MORE INFORMATION, PLEASE CONTACT

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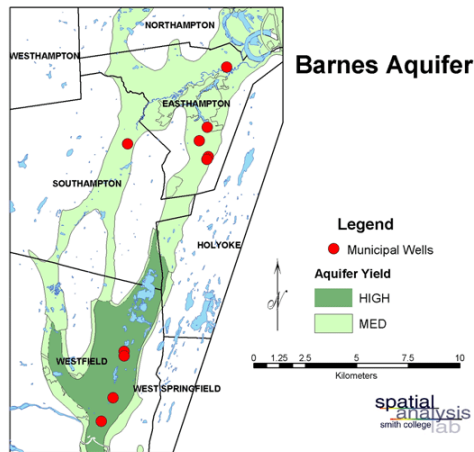
Memorandums of Understanding

WHY ARE MEMORANDUMS OF UNDERSTANDING (MOU) IMPORTANT?

MOUs encourage and support solutions to issues and problems that extend beyond individual municipal borders. In the 21st Century, many growth problems cannot be solved at the local level, and the traditional New England community-based form of government can seem like a disadvantage. However, regional solutions such as intergovernmental compacts and regional funding initiatives can help to address these regional growth concerns.

WHAT IS AN MOU AND HOW DOES IT FUNCTION?

MOUs, also called cooperative agreements or intergovernmental compacts, formally enable communities to work together toward achieving a specific goal. Specific functions enabled by an MOU might include joint review and comment on local land use permits, design and engineering studies, long-term land protection, public education, emergency response actions, and securing funding.



Regional MOU for the protection of the Barnes Aquifer enacted in 1989



BARNES AQUIFER PROTECTION ADVISORY COMMITTEE (BAPAC)

The Barnes Aquifer is the second largest regional aquifer in Massachusetts, provides drinking water to over 40,000 persons in Westfield, Holyoke, Easthampton and Southhampton, and is a federally designated “Sole Source Aquifer” in portions of Easthampton, Holyoke and Southhampton. The Barnes Aquifer Protection Advisory Committee (BAPAC) was formed in 1989 through an intergovernmental compact to protect this important resource. The compact was signed by all four communities and the Pioneer Valley Planning Commission, each with appointed representatives to BAPAC. BAPAC has advisory powers to work with communities on aquifer protection strategies, public outreach and education, and to review and comment on developments of regional impact.

DID YOU KNOW...

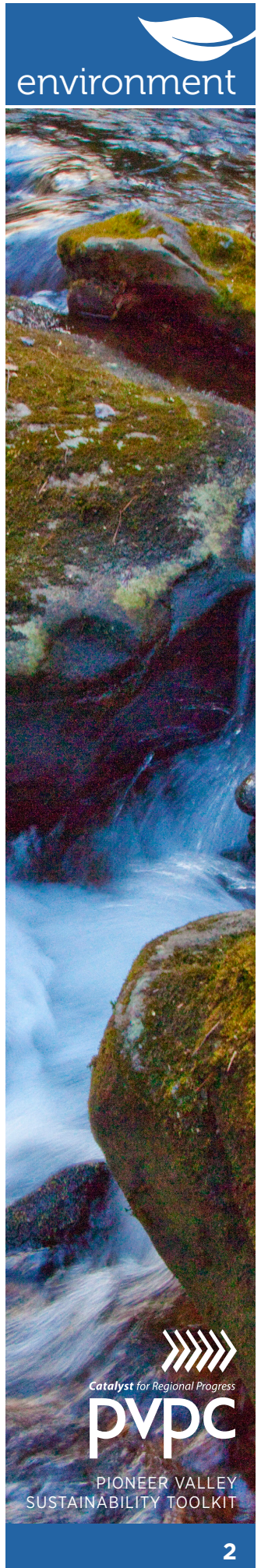
Intergovernmental compacts such as Mutual Aid Agreements have been very important in dealing with regional concerns. Such intergovernmental compacts can be used to deal with a host of regional concerns such as the protection of aquifers, rivers, or mountain ranges that extend beyond the boundaries of a single community. The issue of limited resources in smaller communities can also be addressed through regional efforts such as sharing staff (Building Inspectors) and/or equipment (snow plows, graders, etc.).

CASE STUDIES FROM THE PIONEER VALLEY

Connecticut River Cleanup Committee

Memorandum of Agreement

In 1999, an intergovernmental compact for Connecticut River Cleanup was adopted by the communities of Springfield, Chicopee, Holyoke, Ludlow, South Hadley and the PVPC. This compact has allowed the region to work successfully to secure federal funding earmarks totaling over \$10 million over the past decade. The Connecticut River Cleanup Committee (CRCC) has been effective in educating elected officials and the general public about combined sewer overflow issues. CRCC has also secured grants from the state and federal programs, and has established an effective stormwater committee.





Connecticut River and the City of Springfield

Mount Tom and Mount Holyoke Range Memorandum of Agreement

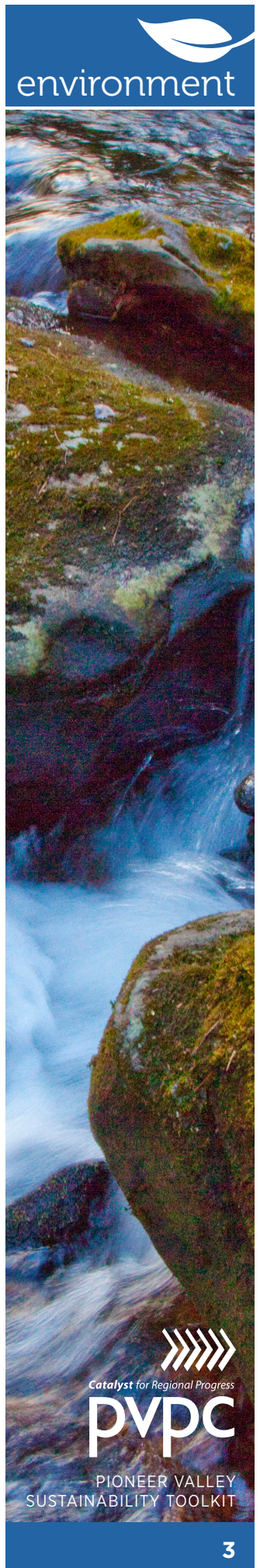
In late 2003, five municipalities and 10 organizations signed a Memorandum of Agreement (MOA) for the Protection of the Mount Tom and Mount Holyoke Ranges. The unique features and location of the Mt. Tom and Mt. Holyoke Ranges in Western Massachusetts, along with the threat of inappropriate development, has led to continuing efforts to protect this area. The ranges are the single most prominent natural feature of the Pioneer Valley and provide a backdrop to the daily lives of citizens throughout the region. The MOA created a committee, the Summit Land Use Task Force, which is comprised of representatives from municipalities, the Commonwealth of Massachusetts, and non-governmental organizations. The agreement states that the purposes of the Task Force are: (1) To advocate for the protection of the unique attributes of the Mt. Tom and Mt. Holyoke Ranges; (2) To improve and coordinate zoning and land use regulation in the Mt. Tom and Mt. Holyoke Ranges to achieve community goals; (3) To assist communities and agencies in efforts to protect the Mt. Tom and Mt. Holyoke Ranges; (4) To educate the general public in regard to issues, threats and opportunities facing the Mt. Tom and Mt. Holyoke Ranges.

FOR MORE INFORMATION, PLEASE CONTACT

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Community Preservation Act

WHAT IS THE COMMUNITY PRESERVATION ACT?

The Community Preservation Act is statewide enabling legislation in Massachusetts giving communities the authority to create a Community Preservation Fund by placing a surcharge on local property tax. The Act allows Massachusetts communities to establish a reliable funding source for open space, historic resources, and community housing purposes.

HOW CAN MY COMMUNITY ENACT THE COMMUNITY PRESERVATION ACT?

The Community Preservation Act must be voted on as a referendum at a local or state election. The Community Preservation Act may be placed on the ballot either through legislative body action (Town Meeting vote) or through a citizen's petition signed by at least 5% of the registered voters. The ballot question must include the percentage of the property tax surcharge. A majority of voters must approve the referendum to enact the Community Preservation Act.

Once the community enacts the Community Preservation Act, the community is then required to create a local community preservation committee responsible for studying the needs, possibilities, and resources of the city or town regarding community preservation. This committee is charged with making recommendations to the local legislative body for the acquisition, creation, and preservation of four community preservation interests: open space, historic resources, land for recreational use, and community housing. The committee may also recommend that moneys be spent to rehabilitate or restore any resources acquired or created through the community preservation fund.

HOW CAN MY COMMUNITY USE THE COMMUNITY PRESERVATION FUNDS?

Of the fund's annual revenues, a minimum of 10 percent each must be directed to open space (not including recreation lands), historic resources, and community housing issues. The remaining 70 percent of the funds may be used for any combination of community preservation issues, including recreational uses, deemed appropriate by and for the community.



IS THERE A STATE MATCH AND HOW IS IT FUNDED?

The commonwealth will provide matching funds through a new Massachusetts Community Preservation Trust Fund, which will be financed through surcharges on certain fees of the registers of deeds.

HOW IS THE STATE MATCH DISTRIBUTED?

The state matching funds will be distributed in up to three (3) funding rounds. The first round distributing 80% of the state funds raised is the Match Distribution round. Each community that has enacted the Community Preservation Act will receive the same percentage match (5-100%) against the total money raised through their surcharge. The current match value is 35%.

The second and third rounds of funding are available for those communities who have adopted the maximum 3% surcharge. The eligible communities will be ranked based on property valuation per capita and population. The funds will be distributed based on the community's ranking.

HOW MUCH WOULD THE CPA SURCHARGE BE?

The following example of potential CPA Surcharges are based on the FY08 Tax Rate of \$13.30 per \$1,000 assessed property value. The table illustrates potential surcharges from 1 to 3% for property valued between \$100,000 to \$300,000 and, potential surcharge amounts when the first \$100,000 assessed value is exempted from the surcharge.

CPA Surcharge Calculator:

TOWN:	Ware					
Tax rate:	\$13.30					
		CPA surcharge for house valued at:				
CPA %	Exemption	\$300,000	\$250,000	\$200,000	\$150,000	\$100,000
3	none	\$119.70	\$99.75	\$79.80	\$59.85	\$39.90
2	none	\$79.80	\$66.50	\$53.20	\$39.90	\$26.60
1	none	\$39.90	\$33.25	\$26.60	\$19.95	\$13.30
3	first \$100K	\$79.80	\$59.85	\$39.90	\$19.95	\$0.00
2	first \$100K	\$53.20	\$39.90	\$26.60	\$13.30	\$0.00
1	first \$100K	\$26.60	\$19.95	\$13.30	\$6.65	\$0.00

Other populations that can be exempted from any surcharge under the Community Preservation Act include:

- » low to moderate income households
- » the elderly
- » the full value of commercial/industrial properties in communities with a classified tax structure

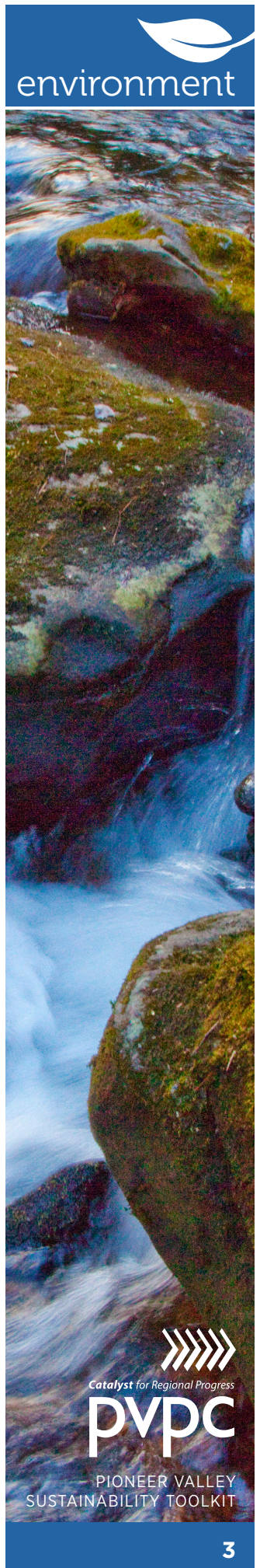
FOR MORE INFORMATION ON THE COMMUNITY PRESERVATION ACT, VISIT:
<http://www.communitypreservation.org/>

FOR MORE INFORMATION, PLEASE CONTACT

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Green Development Performance Standards

WHAT ARE THE OBJECTIVES OF GREEN DEVELOPMENT PERFORMANCE STANDARDS?

The purpose of these standards is to promote high quality and greener developments that also preserve and enhance natural resources and the environment. Green development techniques also protect the quantity and quality of drinking water supplies.

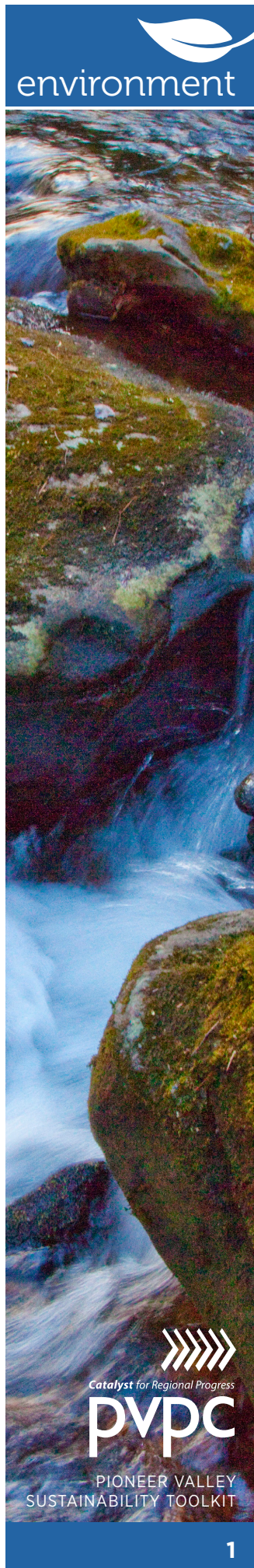
WHY DO WE NEED GREEN DEVELOPMENT PERFORMANCE STANDARDS?

Unregulated new development can have severe impacts on the landscape and environment, including the destruction of trees, wildlife habitat, landscape features, open space and scenic views, the generation of water pollution, heat and light pollution, traffic and excessive waste, and the use of excessive energy and water resources. Green Development Performance Standards can address all of these issues, and promote greener, better quality development with less environmental and energy impacts.

HOW DO GREEN DEVELOPMENT PERFORMANCE STANDARDS WORK?

Green development standards are established in the Zoning Bylaw and are implemented by the Planning Board and Building Inspector through the Site Plan Review or Subdivision review processes. Single family and two-family residential uses must receive Planning Board approval under Limited Site Plan Review and comply with applicable Green Development Performance Standards. Commercial, industrial and civic projects must undergo full Site Plan Review. Review and approval of subdivisions also includes Green Development Standards.

The Green Development Performance Standards address the following issues: limits to site disturbance; tree preservation; passive solar siting; site and context assessment; energy efficiency; landscaping and water reduction; farmland preservation; parking and trip reduction; hazardous materials; heat island reduction; light pollution reduction; recycling; construction waste management; and pedestrian and bicycle access.





Incentives are offered for green development projects that include permeable pavement, a green roof or additional projected open space. Incentives can include additional lot coverage, reduction of parking requirements, and reduction of stormwater detention requirements.

HOW CAN GREEN DEVELOPMENT PERFORMANCE STANDARDS PROTECT OUR DRINKING WATER?

The quality and quantity of drinking water is protected by retaining more of the landscape in its natural state, with native vegetation and natural water drainage patterns. Groundwater recharge is promoted by use of permeable pavement. Water conservation is promoted by minimizing lawn area, use of plants not requiring irrigation, re-use of captured rainwater for watering, and low impact development practices such as rain barrels and rain gardens.

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HOW AND WHERE ARE GREEN DEVELOPMENT PERFORMANCE STANDARDS WORKING?

PVPC developed a model set of Green Development Performance Standards in cooperation with the Town of Palmer, MA. To date, these standards have not yet been adopted.

FOR MORE INFORMATION, PLEASE CONTACT

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Rivers Protection Bylaws

WHAT ARE THE OBJECTIVES OF A LOCAL RIVERS PROTECTION BYLAW?

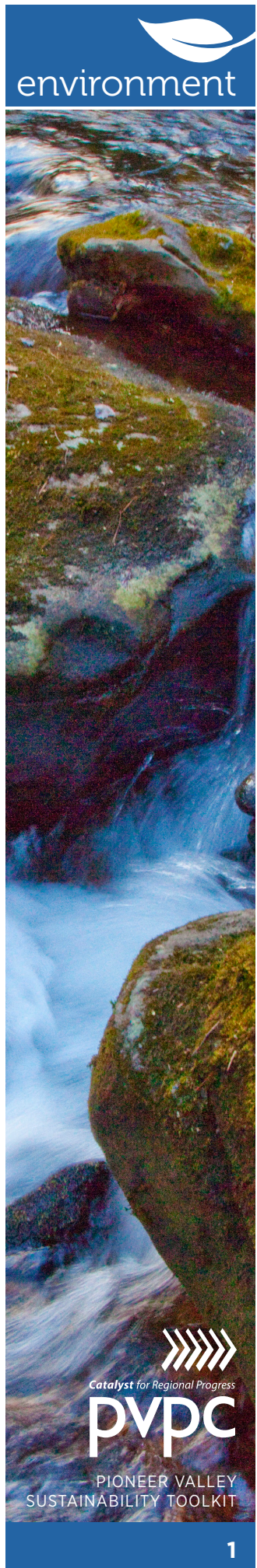
To increase community control over activities on riverfront areas not regulated by the Massachusetts Rivers Protection Act. Although the Rivers Protection Act does offer communities an opportunity to protect river areas, additional regulation may be needed to protect water supplies fed by rivers.

WHY DO WE NEED LOCAL RIVERS PROTECTION BYLAWS?

River channels, riverbank areas, and floodplains are rich ecological areas, providing habitat for a diverse array of birds, fish, plants, and animals. Linear river channels function as wildlife corridors for migrating birds, anadromous fish, and many animals. Rivers also attract people, being ideal places to hike, fish, boat, and enjoy nature. Floodplains are important natural flood storage areas, that if left undeveloped, can help prevent flood damages and save lives in the event of a major flood. However, rivers are under considerable development pressure for a variety of uses, including housing developments, dams and hydroelectric facilities, and recreational activities.

HOW DO LOCAL RIVERS PROTECTION BYLAWS WORK?

A River Protection Overlay District can be designated for a portion of the riverbank from the shoreline landward up to an established distance from each bank. Uses permitted as a matter of right should be limited to those consistent with the scenic qualities of the river, such as agricultural production, recreational uses, reasonable emergency procedures, conservation measures, and residential development on lots with frontage on an existing way (Approval Not Required Development). Residential subdivision in the district can be required to include mandatory clustering, and be located away from the shoreline to the maximum practical extent. River protection districts can also be designed to incorporate floodplain regulations. These regulations prevent development within the floodplain that might increase flood levels and velocities, or cause flood damages due to unanchored materials.



HOW DO LOCAL RIVERS PROTECTION BYLAWS PROTECT WATER SUPPLIES?

Many public water supply wells are located close enough to rivers to induce infiltration from the river into the well's zone of contribution when the well is pumping. In other areas, rivers directly flow into a water supply reservoirs. A River Protection Overlay District can protect river water quality by establishing greater setbacks for new development from the riverbank, prohibiting hazardous land uses in the district, and establishing performance standards for other uses.



Westfield River, Chester, MA

CASE STUDY: WESTFIELD RIVER – NATIONAL WILD AND SCENIC RIVER

The Westfield River has been designated as a National Wild and Scenic River along a 78-mile section of the East Branch, Middle Branch and West Branch of the Westfield River. The corridor width is 200 feet wide from mean high water, corresponding to the width of the Massachusetts River Protection Act. The National Park Service identified outstandingly remarkable values on the Westfield River, including cold water fisheries, recreational amenities, historic resources, historic villages, unique geologic features, rare and endangered species and biodiversity habitat, as well as one of the largest roadless wilderness areas remaining in Massachusetts.

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Did you know river protection design standards can:

- » Require all structures to be located at an established setback (i.e., 100 feet) from the shoreline and be visually screened from the shoreline by a vegetated buffer;
- » Protect the scenic and environmental integrity of the district by prohibiting certain uses that alter the landscape or are hazardous;
- » Require each structure be integrated into the existing landscape to minimize its scenic and environmental impact;
- » Require runoff to be directed toward areas covered with vegetation; and,
- » Prohibit clear cutting of existing vegetation and minimize disruption of wildlife habitat.

In 1993, after years of study, adding protective bylaws, and working with an advisory committee composed of landowners and residents of Becket, Chester, Middlefield, Chesterfield, Worthington and Cummington, Pioneer Valley Planning Commission and Westfield River Watershed Association, 43 miles of the Westfield River were initially designated as a National Wild and Scenic River. In October 2004, the reach of the Wild and Scenic designation was expanded so that it now encompasses over 78 miles of river corridor, and ten communities.

PVPC drafted an intergovernmental compact for managing the river, which led to the creation of a Westfield River Wild and Scenic Advisory Committee. The MOA and Westfield River Greenway Plan outline other river protection strategies including: river protection bylaws; voluntary conservation restrictions; increasing the maintenance at river access points; grants for selected land acquisitions or improvements; riverbank beautification; and salmon restoration.

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Site Plan Review

WHAT ARE THE WATER PROTECTION OBJECTIVES OF SITE PLAN REVIEW?

Site Plan Review allows local governments a mechanism to review site specific development impacts to insure appropriate erosion and sedimentation controls are in place.

WHY DO WE NEED SITE PLAN REVIEW FOR WATER QUALITY?

Protecting the quality and quantity of clean drinking water is important to all communities. Many different methods of protecting and conserving clean drinking water have been used throughout history. One technique used in many communities throughout New England today is the “Site Plan Review” process when changes are made to the land. Site Plan Review allows site specific consideration of development impacts on water quality.

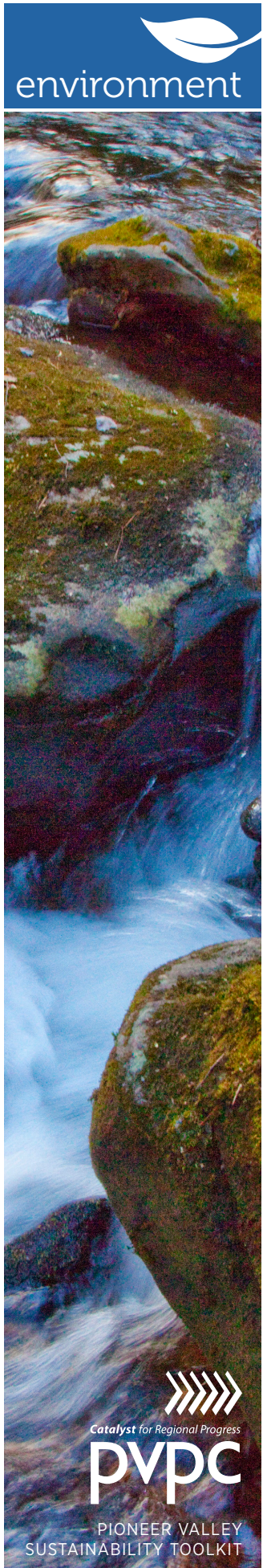
HOW DOES SITE PLAN REVIEW WORK?

Site Plan Review ensures municipal development requirements for certain types of non-residential or multi-unit residential development or re-development projects are adhered to. The plan typically must show buildings, parking areas, landscaping, drainage and other installations on the lot, and their relationship to existing conditions such as roads, neighborhood land uses, natural features, public facilities, ingress and egress roads, interior roads, and similar features. Site Plan Review is an extremely important method to insure that uses permitted by the zoning ordinance are constructed on a site in such a way that they fit into the area without causing drainage, traffic, or lighting problems.

HOW DOES SITE PLAN REVIEW PROTECT WATER QUALITY?

In order to protect water quality through the Site Plan Review process, towns must first identify water resources throughout their town, including all past, present and future possible sources of drinking water for the community from both above-ground and below-ground sources. Once these sources are identified, the watersheds from which these sources are recharged are determined (water sources are recharged by all rainwater and snowmelt that falls within the watershed and flows downhill to the water source). These watersheds can be known as “Water Supply Watersheds.” Mapping water supply sources and their watersheds can be done by drawing sources on a copy of a town map or by using a geographic information system. The United States Geological Survey has produced a map of potential underground aquifers throughout New England.





During the site plan review process, care should be taken to look for threats to surface water and groundwater such as: excessive runoff, toxic chemicals (including those from cars and parking lots), excessive impervious area, cutting of vegetation on steep slopes, excessive removal of native species, lack of adequate reclamation techniques for disturbed sites, poor stormwater management. Site plan and site design review checklists can be made so that a reviewer or team of reviewers has a list of all the factors they should be reviewing.

Cities and towns should first establish zoning ordinances and the site plan review process.

Massachusetts:

Massachusetts General Law Chapter Chapter 40A, the state Zoning Act, contains no specific reference to site plan review, but has been recognized in the courts of Massachusetts as a permissible regulatory tool for controlling “aesthetics and environmental impacts of land use”. This zoning tool is entirely the creation of local ordinances and bylaws, and as a result, the scope of site plan review, as well as the procedures and criteria, are dependent to a large extent on the contents of the individual ordinance or bylaw adopted by the municipality.

Generally, site plan review bylaws and ordinances establish criteria of the layout, scale, drainage, screening, lighting, stormwater maintenance, and other aspects to arrive at the best possible design for a project. Site Plan Review is used in a variety of manners by communities in Massachusetts. Some communities have attached Site Plan Review to the Special Permit process, and procedure for review is consistent with Special Permit review procedure addressed in MGL Chapter 40A, Section 9. Other communities have adopted Site Plan Review to be used with as-of-right uses and allow the reviewing body to impose conditions that do not have the effect of prohibiting the use.

Whether a community decides to adopt Site Plan Review for as-of-right uses, or attached to a Special Permit, the municipality can ensure that one of the criteria for approval is the prevention of pollution of surface and groundwater, soil erosion, increased runoff, and flooding and protection of wetlands, watersheds, aquifers, and well areas. The municipality can also encourage the use of Low Impact Development standards as part of the development process.

New Hampshire:

In New Hampshire, the authority to create zoning laws is presented in the state’s land use planning laws under Revised Statutes Annotated (RSA) 674:16, and the power to establish the site plan review is under 674:43.

In New Hampshire, RSA 674:44 describes the following qualifications for the site plan review process. Projects must:



- » Provide a safe and attractive development, change or expansion
- » Guard against danger or injury to health, safety or prosperity by reason of inadequate protection of the quality of groundwater or any discharge into the environment which might prove harmful to persons, structures or adjacent properties.

Site plan review handbooks like the one that New Hampshire’s Office of Energy and Planning has produced¹ contain requirements for stormwater management, erosion control, perimeters around existing and proposed wells for drinking water, and provisions for requiring state-approved septic systems where applicable.

Towns that adopt zoning ordinances and site-plan review gain the ability to find threats to groundwater and surface water prior to developments, changes or expansions. By working with developers, engineers or citizens in the site-plan review process, adequate protection measures can be discussed and agreed upon early in the process and avoid costly retro-fitting during or after construction. Well-planned sites will help towns to protect both the quality and quantity of drinking water supplies.

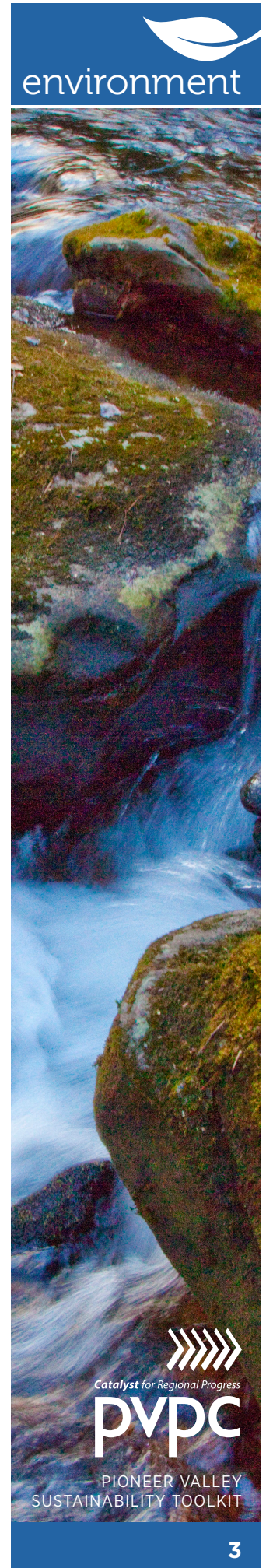
Towns can encourage retro-fit of large parking areas during re-development to implement low impact development (LID) strategies. LID can be used in new development and re-development to insure stormwater remains on-site.

In order to protect surface and groundwater resources, cities and towns should exercise their right to institute zoning laws and the site-plan review process. By working with site developers, engineers and citizens early in the process, water resources can be protected and conserved. By encouraging all parties to negotiate in good faith early in the process, wise use of the land can be discussed and implemented in the site plan, so that costly re-design or retrofitting can be avoided.

HOW AND WHERE IS SITE PLAN REVIEW USED TO PROTECT WATER QUALITY?

One of the primary functions of site plan review is to protect water quality. Most towns and cities with site plan review require evaluation of drainage from the site during and after construction. A New Hampshire model and municipal examples are available on line at:

<http://www.nh.gov/oep/resourcelibrary/referencelibrary/s/siteplanreview/index.htm>.



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EXAMPLES

References

NEW HAMPSHIRE OFFICE OF ENERGY AND PLANNING SITE PLAN REVIEW HANDBOOK:

<http://www.nh.gov/oep/resourcelibrary/referencelibrary/s/siteplanreview/documents/subdivisionandsiteplanreviewhandbook.pdf>

HANOVER, NH SITE PLAN REVIEW REGULATIONS:

[http://www.hanovernh.org/stories/storyReader\\$86](http://www.hanovernh.org/stories/storyReader$86)

<http://web.valley.net/files/hanovernh/SitePlanRegulations.pdf>

LEBANON, NH SITE PLAN REVIEW REGULATIONS:

http://lebanonnh.virtualtownhall.net/public_documents/LebanonNH_PlanDocs/SPREGS.PDF

LEBANON, NH SITE PLAN REVIEW CHECKLIST:

http://lebanonnh.virtualtownhall.net/public_documents/LebanonNH_PlanDocs/Applications/Siteplan%20check.pdf

Contact Information and Links

NH OFFICE OF ENERGY AND PLANNING:

www.nh.gov/oep

FOR MORE INFORMATION, PLEASE CONTACT

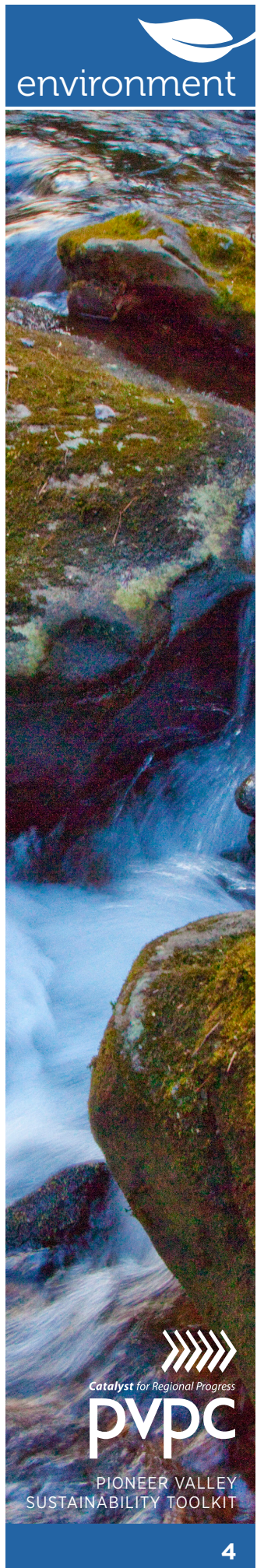
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Transfer of Development Rights

WHAT IS THE OBJECTIVE OF A TRANSFER OF DEVELOPMENT RIGHTS BYLAW?

With the adoption of a Transfer of Development bylaw, communities can preserve farmlands, open space and environmentally sensitive areas such as aquifer recharge areas by directing growth away from lands that should be preserved, to areas well suited for higher density development, such as village centers and areas with adequate infrastructure.



Econolodge in Hadley used the TDR bylaw to reduce the amount of parking

WHY DO WE NEED A TRANSFER OF DEVELOPMENT RIGHTS BYLAW?

Conventional low-density residential zoning allows for wide tracts of land to be developed as sprawl. Conversely, in areas that have emerged as potential community centers, existing zoning may not allow for density levels appropriate to a vibrant commercial or mixed-use district.





TDR provides another option for preserving farmland and open space, which benefits the community, farmers, landowners and businesses. Land is protected without needing public funds. TDR allows more options for businesses to expand in current business zones. TDR promotes creation of compact neighborhood-style residential developments to reduce sprawl. It is completely voluntary, and landowners only participate if they choose to do so.

HOW DOES A TRANSFER OF DEVELOPMENT RIGHTS BYLAW WORK?

Communities identify specific preservation areas as “Sending Areas” and specific development districts as “Receiving Areas”. The TDR bylaw allows development rights to be purchased in the Sending Area and transferred to the Receiving Area for use in more compact residential or business development projects. Project proponents can either purchase development rights directly from farmers or landowners, or can make a cash contribution to the community for purchasing agricultural or open space preservation restrictions.

The amount of money required to purchase these development rights is generally negotiated between the landowners, based on market values. In return for the purchase, landowners in the sending area place a deed restriction on their property. Developers who buy development rights are acquiring the capacity to build higher density on existing lots in a receiving area.

DID YOU KNOW...

The Town of Hadley has had a total of four TDR projects, generating a total of \$338,772 in TDR payment-in-lieu funds. This money has been used to offset the match requirements for APR purchases in the community. As a result, the town has been able to protect over 239 acres, valued at over \$3 million in APR price.

EXAMPLES FROM THE PIONEER VALLEY

Transfer of Development Rights Bylaw in Easthampton, Hadley, Hatfield, and Westfield

Transfer of Development Rights (TDR) bylaw is used to protect valuable working agricultural lands and promote compact development in identified growth centers. TDR bylaws have been adopted in Hadley, Easthampton, Hatfield, and Westfield. The bylaw works by creating two new zoning districts: a Farmland Preservation District and a Receiving District. Development rights can be purchased from the Farmland Preservation District and transferred to the Receiving District to be used for residential, commercial, or industrial development projects. This bylaw essentially moves green space from the Receiving District to the Farmland Preservation District. Adoption of this bylaw can provide a community with another option for farmland protection, and give developers more options for development in already existing growth centers.



For more information on examples of Transfer of Development Rights from across Massachusetts, please refer to the state's Smart Growth / Smart Energy Toolkit developed by the Executive Office of Energy and Environmental Affairs.

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Water Supply Protection Overlay Districts

WHAT ARE THE OBJECTIVES OF A WATER SUPPLY PROTECTION OVERLAY DISTRICT?

Protecting the quality and quantity of clean drinking water is important to all communities. Many different methods of protecting and conserving clean drinking water have been used since the earliest days of civilization. Today many communities throughout New England create Water Supply Protection Overlay Districts to identify water resources and the areas draining to those resources and regulate land use activities within those districts for the protection of the water supply.

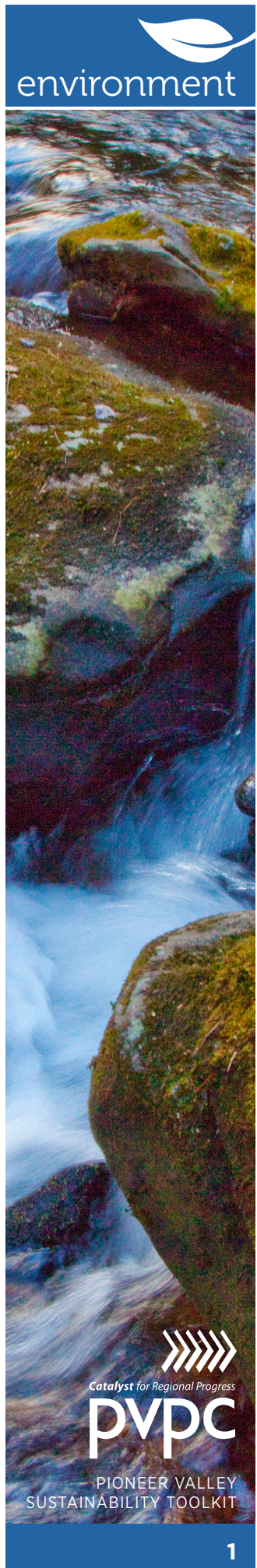
WHY DO WE NEED A WATER SUPPLY PROTECTION OVERLAY DISTRICT?

Controlling land uses in areas that could impact water supplies can prevent contamination and overuse. Clean water is essential for our health and survival. Protecting this valuable resource is a best practice.

HOW DOES A WATER SUPPLY PROTECTION OVERLAY DISTRICT WORK?

To create a Water Supply Protection District, cities and towns must first identify water resources throughout their town, including all past, present and future possible sources of drinking water from both above-ground and below-ground sources. Once these sources are identified, the watersheds from which these sources are recharged are determined (water sources are recharged by all rainwater and snowmelt that falls within the watershed above the source and flows downhill to the water source). Mapping water supply sources and their watersheds can be done by drawing sources on a copy of a town map or by using a geographic information system. Maps of both surface water and potential groundwater sources from underground aquifers throughout New England are available from the United States Geological Survey.

Exact locations of large public water supplies should be distributed only to those who need the information. Having exact locations widely known and available may be a threat to the public water supply.



HOW CAN THE WATER SUPPLY PROTECTION OVERLAY DISTRICT PROTECT OUR DRINKING WATER?

Once the boundaries of the water supply district are determined, cities and towns will then decide what protection and conservation measures should be put in place in these districts. Some examples might include limiting high-risk uses in the district such as heavy industry, restrictions or control of substances that could contaminate drinking water, requiring buffers or setbacks from wells, wetlands and other surface waters in the district, or requiring or encouraging low-impact or no-impact stormwater management systems of any projects or improvements that are proposed in the district. Low-impact stormwater management can be addressed through the use of the water supply district and the implementation of a site-plan review process for developments.

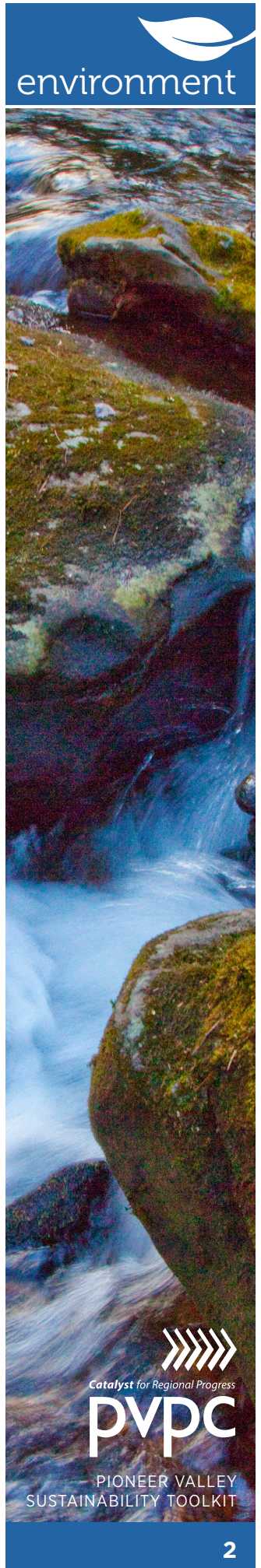
Some communities have chosen to use both regulations and incentives in water conservation districts. Regulations determine what may and may not be done in a certain area. Incentives provide for credits or rebates for using low-impact development techniques (LIDs) and best-management practices (BMPs).

HOW AND WHERE ARE WATER SUPPLY PROTECTION OVERLAY DISTRICTS WORKING?

A few towns have water supply protection districts including Exeter and Newmarket, New Hampshire. You can view these ordinances on-line at

http://des.nh.gov/organization/divisions/water/dwgb/dwspp/ordinance_zoning.htm

The NH Office of Energy and Planning and the Department of Environmental Services work cooperatively in providing guidance for water supply protection in New Hampshire. In Vermont, it is the Agency of Natural Resources at <http://www.anr.state.vt.us/DEC/watersup/swapp.htm>. In Massachusetts, it is the Department of Environmental Protection.



REFERENCES

NH DEPARTMENT OF ENVIRONMENTAL SERVICES, INNOVATIVE LAND USE PLANNING GUIDE:

http://des.nh.gov/organization/divisions/water/wmb/repp/documents/ilupt_chpt_2.5.pdf

EPA MODEL SURFACE WATER AND GROUNDWATER PROTECTION ORDINANCES:

US EPA -

<http://www.epa.gov/owow/nps/ordinance/osm7.htm>

<http://www.epa.gov/owow/nps/ordinance/mol7.htm>

THE STORMWATER CENTER, MODEL ORDINANCE FOR AQUIFER PROTECTION DISTRICT:

http://www.stormwatercenter.net/Model%20Ordinances/Source_Water_Protection/Aquifer%20district%20ordinance.htm

MASSACHUSETTS MODEL GROUNDWATER ORDINANCE:

<http://www.mass.gov/dep/water/modgwpd.pdf>

TOWN OF GRAFTON, MASSACHUSETTS, WATER SUPPLY PROTECTION OVERLAY DISTRICT ORDINANCE:

http://www.town.grafton.ma.us/Public_Documents/GraftonMA_Planning/Documents/ZBL/Grafton%20ZBL%202008%20Section%207.pdf

MAP SAMPLE, WATER SUPPLY PROTECTION OVERLAY:

http://www.southhadley.org/Pages/SouthHadleyMA_Planning/maps/ZoningMap.pdf

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Wetlands Bylaws

WHAT ARE THE OBJECTIVES OF A LOCAL WETLANDS BYLAW?

To increase community control over activities in or near wetland resource areas by imposing stronger protective measures, or increase the jurisdictional area, than the Massachusetts Wetlands Protection Act (G.L. Ch. 131 §40). Although the Wetlands Protection Act does offer communities an opportunity to protect river areas, additional regulation may be needed to protect water supplies hydrologically connected to wetlands.

WHY DO WE NEED LOCAL WETLANDS BYLAWS?

Wetlands are rich ecological areas, providing habitat for a diverse array of birds, amphibians, plants, and animals. Preserved wetlands and woodlands provide significant public health benefits in the form of clean drinking water, groundwater recharge, healthy fisheries, and recreational areas.

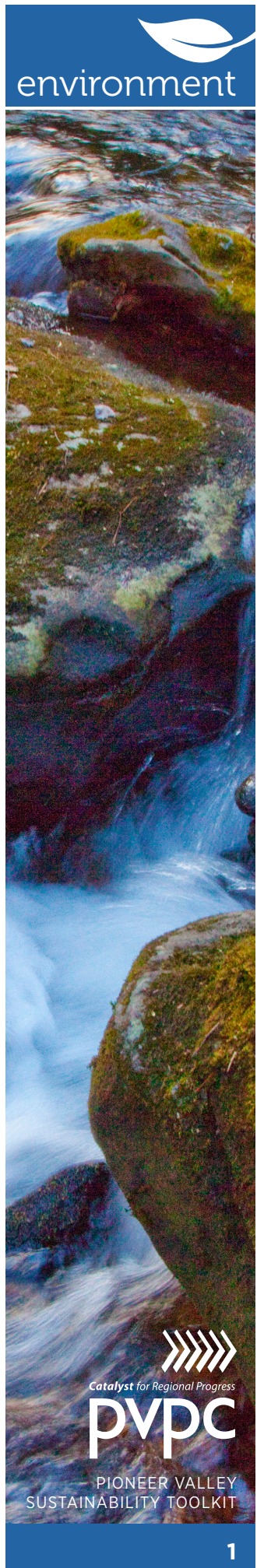
The Wetlands Protection Act is limited to protecting only eight wetland values and covers vegetated wetlands, flood prone areas and other listed resource areas if they border bodies of water. Vernal pools are protected only if they occur in resource areas. Communities usually wish to regulate work over more resource types including isolated vegetated wetlands, vernal pools, and other resources not linked to water bodies and also including adjacent upland areas, work on which may affect wetlands and floodplains.

Did you know that local wetlands bylaws can:

- » Expand Conservation Commission jurisdiction
- » add wetland values warranting local protection
- » Tighten permit and hearing procedures
- » Establish filing and consultant fees
- » Confer authority on the Commission to adopt its own regulations, and
- » Clarify the power to disapprove work in or affecting wetlands and floodplains.

HOW DO LOCAL WETLANDS BYLAWS WORK?

Local Wetland Bylaws are generally administered by the local Conservation Commission in tandem with their local administration of the Wetlands Protection Act. Both state and local standards must be observed. If the municipality holds a dual hearing, for example, I must be advertised, mentioning in the notice both the local law and state Act. If the terms of the two permits differ, this must be made clear in the text of each.



HOW DO LOCAL WETLANDS BYLAWS PROTECT WATER SUPPLIES?

Many lakes, rivers, and aquifers are important local sources of drinking water and require special protection. Open space adjacent to water bodies and over aquifers can help assure good water quality as well as recharge groundwater supplies. Vegetated uplands and wetlands in these watersheds filter pollutants and collect sediments from stormwater running across the land surface.

HOW AND WHERE ARE WETLANDS BYLAWS WORKING?

More than half of the 351 towns and cities in Massachusetts have adopted local wetlands bylaws or ordinances, taking a variety of approaches and using different formats (MACC, 2006).

CASE STUDY: CITY OF NORTHAMPTON, MA

The City of Northampton adopted a local Wetlands Bylaw administered by the Conservation Commission that includes Smart Growth principles encouraging infill development and a smaller environmental footprint in business and industrial zoned districts. Such provisions allow the Conservation Commission to waive performance standards over and above the state Act for such districts.

RESOURCES

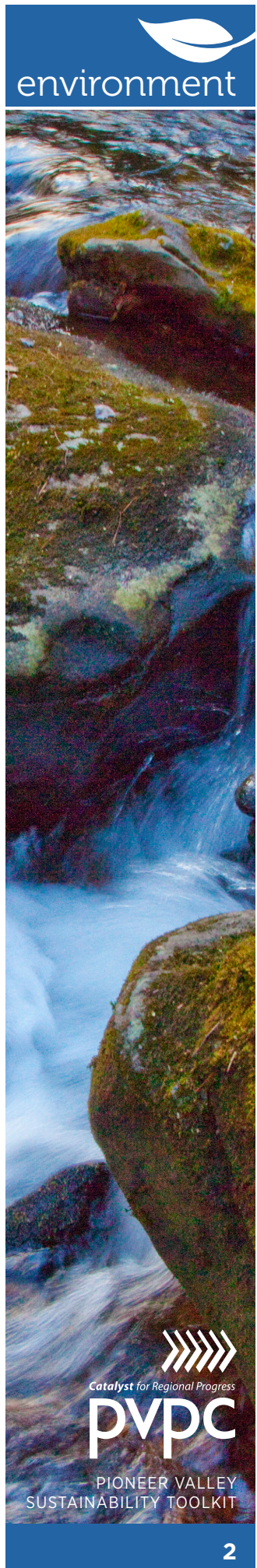
Environmental Handbook for Massachusetts Conservation Commissioners, MACC, 2006

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ENVIRONMENT BYLAWS



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**ENVIRONMENT
BYLAWS**



**Aquifer Protection
District Model Bylaw**



**Code Review
Checklist**



**Conservation
Fund Warrant Article**



**Green Development
Performance Standards**



**LID Design Standards
for Streets Model
Subdivision Regulations**



**Parking Model
Ordinance**



**River Zoning Bylaw
Ware**



**Stormwater Management
& LID Model Bylaw-
Annotated**



**Stormwater Management
Design Criteria and
Standards Model**



**Transfer of Development
Rights Model Bylaw
Palmer**



MODEL WATER SUPPLY PROTECTION DISTRICT

1. PURPOSE OF DISTRICT

The purpose of this Water Supply Protection District is to:

- A. promote the health, safety, and general welfare of the community by ensuring an adequate quality and quantity of drinking water for the residents, institutions, and businesses of the [Town/City] of _____ ;
- B. preserve and protect existing and potential sources of drinking water supplies;
- C. conserve the natural resources of the [Town/City]; and
- D. prevent temporary and permanent contamination of the environment.

2. SCOPE OF AUTHORITY

The Water Supply Protection District is an overlay district superimposed on the zoning districts. This overlay district shall apply to all new construction, reconstruction, or expansion of existing buildings and new or expanded uses. Applicable activities and uses in a portion of one of the underlying zoning districts that fall within the Water Supply Protection District must additionally comply with the requirements of the Water Supply Protection District [Bylaw/Ordinance]. Uses prohibited in the underlying zoning districts shall not be permitted in the Water Supply Protection District.

3. DEFINITIONS

Aquifer: Geologic formation composed of rock, sand or gravel that contains significant amounts of potentially recoverable water.

CMR: Code of Massachusetts Regulations.

DEP: Massachusetts Department of Environmental Protection.

Water Supply Protection District: Those land area(s) designated on a map adopted pursuant to this [bylaw/ordinance] that provide recharge to an existing or planned public drinking water supply well including all areas designated as a Zone II and approved by the DEP and watershed areas of surface drinking water supplies.

Hazardous Material: Any substance or mixture of physical, chemical, or infectious characteristics posing a significant, actual, or potential hazard to water supplies or other hazards to human health if such substance or mixture were discharged to land or water. Hazardous materials include, without limitation: synthetic organic chemicals; petroleum products; heavy metals; radioactive or infectious wastes; acids and alkalis; solvents and thinners in quantities greater than normal household use; and all substances defined as hazardous or toxic under M.G.L. c.21C and 21E and 310 CMR 30.00.

Hazardous Waste: Any waste defined in the Massachusetts Hazardous Waste Regulations, 310 CMR Section 30.010. This includes, but is not limited to, waste oil, waste solvents, waste oil-based paint and waste pesticides.

Impervious Surface: Material or structure on, above, or below the ground that does not allow precipitation or surface water to penetrate directly into the soil.

Landfill: A facility established in accordance with a valid site assignment for the purposes of disposing solid waste into or on the land, pursuant to 310 CMR 19.006.

M.G.L.: Massachusetts General Law Petroleum Product: Petroleum or petroleum by-product including, but not limited to: fuel oil; gasoline; diesel; kerosene; aviation jet fuel; aviation gasoline; lubricating oils; oily sludge; oil refuse; oil mixed with other wastes; crude oils; or other liquid hydrocarbons regardless of specific gravity. Petroleum product shall not include liquefied petroleum gas including, but not limited to, liquefied natural gas, propane or butane.

Non-sanitary wastewater: Wastewater discharges from industrial and commercial facilities containing wastes from any activity other than collection of sanitary sewage including, but not limited to, activities specified in the Standard Industrial Classification (SIC) Codes set forth in 310 CMR 15.004(6).

Open Dump: A facility operated or maintained in violation of the Resource Conservation and Recovery Act (42 U.S.C. 4004(a)(b)), or state regulations and criteria for solid waste disposal.

Potential Drinking Water Sources: Areas that could provide significant potable water in the future.

Recharge Areas: Areas that collect precipitation or surface water and carry it to aquifers. Recharge areas include DEP approved Zone I, Zone II, or Zone III areas.

Septage: The liquid, solid, and semi-solid contents of privies, chemical toilets, cesspools, holding tanks, or other sewage waste receptacles. Septage does not include any material that is a hazardous waste as defined by 310 CMR 30.000.

Sludge: The solid, semi-solid, and liquid residue that results from a process of wastewater treatment or drinking water treatment. Sludge does not include grit, screening, or grease and oil which are removed at the head-works of a facility

Treatment Works: Any and all devices, processes and properties, real or personal, used in the collection, pumping, transmission, storage, treatment, disposal, recycling, reclamation, or reuse of waterborne pollutants, but not including any works receiving a hazardous waste from off the site of the works for the purpose of treatment, storage, or disposal.

Very Small Quantity Generator: Any public or private entity, other than residential, which produces less than 27 gallons (100 kilograms) a month of hazardous waste or waste oil, but not including any acutely hazardous waste as defined in 310 CMR 30.136.

Waste Oil Retention Facility: A waste oil collection facility for automobile service stations, retail outlets, and marinas which is sheltered and has adequate protection to contain a spill, seepage, or discharge of petroleum waste products in accordance with M.G.L. c.21. s.52A.

Zone I: The DEP designated protective radius around a public water system well or well-field.

Zone II: The DEP approved area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated as defined in 310 CMR 22.00.

4. ESTABLISHMENT AND DELINEATION OF WATER SUPPLY PROTECTION DISTRICT

For the purposes of this District, there are hereby established within the [Town/City] certain water supply protection areas, consisting of aquifers or recharge areas, and watersheds to surface water supplies which are delineated on a map. This map is at a scale of _____ and is entitled 'Water Supply Protection District' [Town/City] of _____ dated ____.' This map is hereby made a part of the [Town/City] of _____ zoning [bylaw/ordinance] and is on file in the Office of the [Town/City] Clerk.

5. DISTRICT BOUNDARY DISPUTES

5.1. If the location of the District boundary in relation to a particular parcel is in doubt, resolution of boundary disputes shall be through a Special Permit application to the Special Permit Granting Authority (SPGA). Any application for a special permit for this purpose shall be accompanied by adequate documentation.

5.2. The burden of proof shall be upon the owner(s) of the land to demonstrate that the location of the District boundary with respect to a parcel(s) of land is uncertain. At the request of the owner(s), the [Town/City] of _____ may engage a professional engineer, hydrologist, geologist, or soil scientist to determine more accurately the boundaries of the District with respect to individual parcels of land, and may charge the owner(s) for the cost of the investigation. Amendments to the Water Supply Protection District require [Town meeting /City Council] approval.

5.3. Where the boundary line of the Water Supply Protection District divides a lot or parcel, the requirements established by this bylaw shall apply to the entire lot or parcel.

6. PERMITTED USES

6.1. The following uses are permitted within the Water Supply Protection District, provided that all necessary permits, orders, or approvals required by local, state, or federal law are also obtained:

- A. conservation of soil, water, plants, and wildlife;
- B. outdoor recreation, nature study, boating, fishing, and hunting where otherwise legally permitted;
- C. foot, bicycle and/or horse paths, and bridges;
- D. normal operation and maintenance of existing water bodies and dams, splash boards, and other water control, supply and conservation devices;
- E. maintenance, repair, and enlargement of any existing structure, subject to Section 7 and Section 8 of this [bylaw/ordinance];
- F. residential development, subject to Section 7 and Section 8 of this [bylaw/ordinance];
- G. farming, gardening, nursery, conservation, forestry, harvesting, and grazing, subject to Section 7 and Section 8 of this [bylaw/ordinance];
- H. construction, maintenance, repair, and enlargement of drinking water supply related facilities such as, but not limited to, wells, pipelines, aqueducts, and tunnels.

7. PROHIBITED USES

7.1. The following uses are prohibited within the Water Supply Protection District:

- A. landfills and open dumps as defined in 310 CMR 19.006;
- B. automobile graveyards and junkyards, as defined in M.G.L. c.140B, s.1;
- C. landfills receiving only wastewater and/or septage residuals including those approved by the Department pursuant to M.G.L.c. 21 s.26 through s.53; M.G.L.c. 111 s.17; M.G.L. c.83, s.6 and s.7, and regulations promulgated thereunder;
- D. facilities that generate, treat, store, or dispose of hazardous waste that are subject to M.G.L. c.21C and 310 CMR 30.00, except for:
 - 1) very small quantity generators as defined under 310 CMR 30.000;

- 2) household hazardous waste centers and events under 310 CMR 30.390;
- 3) waste oil retention facilities required by M.G.L. c. 21, s.52A;
- 4) water remediation treatment works approved by DEP for the treatment of contaminated waters

E. petroleum, fuel oil, and heating oil bulk stations and terminals including, but not limited to, those listed under Standard Industrial Classification (SIC) Codes 5983 and 5171, not including liquefied petroleum gas.

F. storage of liquid hazardous materials, as defined in M.G.L.c. 21E, and/or liquid petroleum products unless such storage is:

- 1) above ground level and on an impervious surface; and
- 2) either in container(s) OR above ground tank(s) within a building OR outdoors in covered container(s) OR above ground tank(s) in an area that has a containment system designed and operated to hold either; 10% of the total possible storage capacity of all containers OR 110% of the largest container's storage capacity, whichever is greater.

G. storage of sludge and septage, unless such storage is in compliance with 310 CMR 32.30 and 310 CMR 32.31;

H. storage of deicing chemicals unless such storage, including loading areas, is within a structure designed to prevent the generation and escape of contaminated runoff or leachate;

I. storage of animal manure unless covered or contained within a structure designed to prevent the generation and escape of contaminated runoff or leachate;

J. earth removal, consisting of the removal of soil, loam, sand, gravel, or any other earth material to within 4 feet of historical high groundwater as determined from monitoring wells and historical water table fluctuation data compiled by the United States Geological Survey, except for excavations for building foundations, roads, or utility works;

K. discharge to the ground of non-sanitary wastewater including industrial and commercial process waste water, except:

- 1) the replacement or repair of an existing treatment works that will not result in a design capacity greater than the design capacity of the existing treatment works;
- 2) treatment works approved by the Department designed for the treatment of contaminated ground or surface water and operating in compliance with 314 CMR 5.05(3) or 5.05(13); and,
- 3) publicly owned treatment works.

L. stockpiling and disposal of snow and ice containing deicing chemicals brought in from outside the district;

M. storage of commercial fertilizers, as defined in M.G.L. c.128, s.64, unless such storage is within a structure designed to prevent the generation and escape of contaminated runoff or leachate.

8.0 USES AND ACTIVITIES REQUIRING A SPECIAL PERMIT

8.1. The following uses and activities are permitted only upon the issuance of a Special Permit by the Special Permit Granting Authority (SPGA):

A. All businesses, commercial, and industrial activities permitted in the underlying district either by right or by Special Permit, provided that such activity is not prohibited in Section 7. For uses requiring a Special Permit in the underlying district, the Special Permit required by this section shall be issued by the Special Permit Granting Authority for the underlying district and shall be included as a part of that Special Permit Application. Any approval, findings and conditions required under this bylaw shall be in addition to and incorporated into the findings and conditions of the underlying district's Special Permit.

B. The rendering impervious of great than 15% of the area provided that a system for artificial recharge of precipitation is developed. The management of stormwater and any artificial recharge systems developed shall be designed so as not to result in the degradation of groundwater.

1) For business, commercial or industrial uses, a stormwater management plan shall be developed which provides for the artificial recharge of precipitation to groundwater, where feasible. Recharge shall be attained through site design that incorporates natural drainage patterns and vegetation, and through the use of storm water infiltration basins, infiltration trenches, porous pavement or similar systems. All infiltration practices shall be preceded by oil, grease, and sediment traps or other best management practices to facilitate removal of contamination.

2) For residential uses, recharge shall be attained through site design that incorporates natural drainage patterns and vegetation. To the extent possible, storm water runoff from rooftops, driveways, roadways and other impervious surfaces shall be routed through areas of natural vegetation and/or devices such as infiltration basins, infiltration trenches or similar systems.

Infiltration practices shall be utilized to reduce runoff volume increases. A combination of successive practices may be used to achieve the desired control requirements. Justification shall be provided by the person developing land for rejecting each practice based on site conditions. Any and all recharge areas shall be permanently maintained in full working order by the owner. Provisions for maintenance shall be described in the storm water management plan.

C. The above ground storage of all hazardous materials and petroleum products. However, a Special Permit shall not be required for storage of liquid petroleum products of any kind which are: stored in 5 gallon or less approved portable containers and used for normal residential or commercial grounds maintenance; used for the heating of single family or two-family residence provided such storage is in a free standing container located within a building or in a free standing container with protection adequate to contain a spill the size of the total capacity of

the container and is otherwise in compliance with the Massachusetts Fire Safety Code (527 CMR).

D. Excavation for removal of earth, loam, sand, gravel and other soils or mineral substances provided that such excavation shall not extend closer than five (5) feet above the historical high groundwater table (as determined from on-site monitoring wells and historical water table fluctuation data compiled by the United States Geological survey, whichever is higher). A monitoring well shall be installed by the property owner to verify groundwater elevations. This section shall not apply to excavations incidental to permitted uses, including but not limited to providing for the installation or maintenance of structural foundations, utility conduits or on-site sewage disposal.

E. With respect to pre-existing conforming uses and non-conforming uses, any of the following changes in an existing business, commercial or industrial use:

- 1) increase in generation of hazardous waste above quantities permitted in the Special Permit for the use;
- 2) increase in impermeable surfaces to greater than 15% of lot area;
- 3) change of use;
- 4) enlargement in the building footprint greater than 25% of the existing footprint.

8.2 Special Permit Additional Requirements

In addition to the requirements of M.G.L., Chapter 40A, Section 9, these additional requirements shall apply to all Special Permit Applications.

A. The applicant will submit a complete list of chemicals, pesticides, and fuels to be stored on the premises, except when the quantities are so small as to be considered for normal household use.

B. The applicant will submit a complete list of all hazardous materials. Further, a hazardous material management plan will be filed and it will include the following:

- 1) provisions to protect against the discharge of hazardous materials due to spillage, accidental damage, corrosion, leaking, or vandalism, including spill containment, and clean up procedures;
- 2) provisions for indoor, secured storage of hazardous materials.

C. The applicant will submit evidence of compliance with the Regulations of Massachusetts's Hazardous Waste Management Act 310 CMR 30 and information on anticipated hazardous waste generation rates. Copies of Massachusetts Hazardous Waste reporting forms shall be made available to the Zoning Enforcement Officer upon request.

D. Provisions to control soil erosion and sedimentation.

E. Drainage recharge features to prevent loss of recharge.

F. All projects shall be reviewed by the Permit Granting authority as to the potential for groundwater and surface water contamination. If the Permit Granting Authority after consultation with the Board of Health, Water Commission or any other entity that deems appropriate determines that the project use has potential to pollute groundwater or surface water, it shall prescribe an appropriate groundwater or surface water management program. This program may include the installation of groundwater monitoring wells and a regular testing procedure. The Permit Granting Authority reserves the right to withhold any and all permits until such groundwater or surface water management programs have been approved.

8.4 Performance Standards

All uses, whether allowed by Special Permit or by right, must meet the performance standards herein:

A. Sodium chloride for ice control shall be used at the minimum salt to sand ratio which is consistent with the public highway safety requirements, and its use shall be eliminated on roads which may be closed to the public in winter.

B. The storage of sodium chloride, calcium chloride, chemically treated abrasives or other chemicals used for the removal of ice and snow on roads shall be covered and located in a paved surface with berms, or within a structure designed to prevent the generation and escape of contaminated run-off.

C. Fertilizers, pesticides, herbicides, lawn care chemicals, or other leachable materials shall be used in accordance with the Lawn Care Regulations of the Massachusetts Pesticide Board, 33 CMR 10.03 (30,31), as amended, with manufacturer's label instructions and all other necessary precautions to minimize adverse impacts on surface and groundwater.

D. The storage of commercial fertilizers and soil conditioners shall be within structures designed to prevent the generation an escape of contaminated run-off or leachate.

E. To extent feasible, all new permanent animal manure storage areas shall be covered and/or contained to prevent the generation and escape of contaminated runoff or leachate.

F. All hazardous materials, as defined in M.G. L. Chapter 21 E, must be stored either in a free standing container within a building, or in a free standing container above ground level with protection to contain a spill. A tertiary containment system, with the outer containment designed and operated to contain the container or tank's total storage volume plus an additional 10% must be used.

G. For business, commercial, and industrial uses, to the extent feasible, run-off from impervious surface shall be recharged on the site by storm water infiltration basins or similar systems covered with natural vegetation. Such run-off shall not be discharged directly to rivers, streams, or other surface water bodies. Dry wells shall be used only where other methods are infeasible. All such basins and wells shall be preceded by oil, grease, and sediment traps to facilitate removal of contamination. All recharge areas shall be permanently maintained in full working order by the owner(s). Infiltration systems greater than 3 feet deep shall be located at least 100 feet from drinking water wells, and shall be situated at least 10 feet down-gradient and 100 feet up-gradient from building foundations to avoid seepage problems. Infiltration basins and

trenches shall be constructed with a tree foot minimum separation between the bottom of the structure and maximum groundwater elevation.

H. In accordance with the State Plumbing Code, all vehicle maintenance facilities must have floor drains, unless they receive a variance from the State Plumbing Board, which must be connected to a municipal sewer system or to a state-approved holding tanks in unsewered areas. All other facilities, which use, store or maintain hazardous materials or wastes must, with state approval, seal floor drains or connect them to a sewer system or holding tank.

9.0 PROCEDURES FOR ISSUANCE OF SPECIAL PERMIT

9.1. The Special Permit Granting Authority (SPGA) under this [bylaw/ordinance] shall be the _____. Such special permit shall be granted if the SPGA determines, in conjunction with the [Town/City] [Planning Board, Board of Health, Conservation Commission, Engineer and/or Department of Public Works and Water Department/Water District] that the intent of this [bylaw/ordinance], as well as its specific criteria, are met. The SPGA shall not grant a special permit under this section unless the petitioner's application materials include, in the SPGA's opinion, sufficiently detailed, definite, and credible information to support positive findings in relation to the standards given in this section. The SPGA shall document the basis for any departures from the recommendations of the other [Town/City] boards, departments or commissions in its decision.

9.2. Upon receipt of the special permit application, the SPGA shall transmit one copy to the [Town/City] [Planning Board, Board of Health, Conservation Commission, Engineer and/or Department of Public Works, and Water Department/Water District]. Failure to respond in writing within 35 days of receipt shall indicate approval, or no desire to comment. The necessary number of copies of the application shall be furnished by the applicant.

9.3 The SPGA may grant the required special permit only upon finding that the proposed use meets the following standards, those specified in Section 7 of this [bylaw/ordinance], and any regulations or guidelines adopted by the SPGA. The proposed use must:

A. in no way, during construction or thereafter, adversely affect the existing or potential quality of quantity of water that is available in the Water Supply Protection District; and

B. be designed to avoid substantial disturbance of the soils, topography, drainage, vegetation, and other water-related natural characteristics of the site to be developed.

C. The SPGA may adopt regulations to govern design features of projects. Such regulations shall be consistent with subdivision regulations adopted by the [Town/City].

D. The applicant shall file ____ copies of a site plan and attachments. The site plan shall be drawn at a proper scale as determined by the SPGA and be stamped by a professional engineer. All additional submittals shall be prepared by qualified professionals. The site plan and its attachments shall at a minimum include the following information where pertinent:

- 1) a complete list of chemicals, pesticides, herbicides, fertilizers, fuels, and other potentially hazardous materials to be used or stored on the premises in quantities greater than those associated with normal household use;

- 2) for those activities using or storing such hazardous materials, a hazardous materials management plan shall be prepared and filed with the [Fire Chief and Board of Health]. The plan shall include:
 - a) provisions to protect against the discharge of hazardous materials or wastes to the environment due to spillage, accidental damage, corrosion, leakage, or vandalism, including spill containment and clean-up procedures;
 - b) provisions for indoor, secured storage of hazardous materials and wastes with impervious floor surfaces;
 - c) evidence of compliance with the Massachusetts Hazardous Waste Regulations 310 CMR 30.00; and
 - d) proposed down-gradient location(s) for groundwater monitoring well(s), should the SPGA deem the activity a potential groundwater threat.

E. The SPGA shall hold a hearing, in conformity with the provision of M.G.L. c.40A s. 9, within 65 days after the filing of the application.

F. Notice of the public hearing shall be given by publication and posting and by first-class mailings to "parties of interest" as defined in M.G.L. c.40A s.11. The decision of the SPGA and any extension, modification, or renewal thereof shall be filed with the SPGA and [Town/City] Clerk within 90 days following the closing of the public hearing. Failure of the SPGA to act within 90 days shall be deemed as a granting of the permit.

10.0 ENFORCEMENT

10.1 Written notice of any violations of this [bylaw/ordinance] shall be given by the [Zoning Enforcement Officer/Building Inspector] to the responsible person as soon as possible after detection of a violation or a continuing violation. Notice to the assessed owner of the property shall be deemed notice to the responsible person. Such notice shall specify the requirement or restriction violated and the nature of the violation, and may also identify the actions necessary to remove or remedy the violations and preventive measures required for avoiding future violations and a schedule of compliance.

10.2 A copy of such notice shall be submitted to the [Town/City] [Planning Board, Board of Health, Conservation Commission, Engineer and/or Department of Public Works, and Water Department/District]. The cost of containment, clean-up, or other action of compliance shall be borne by the owner and operator of the premises.

11.0 SEVERABILITY

11.1 A determination that any portion or provision of this overlay protection district is invalid shall not invalidate any other portion or provision thereof, nor shall it invalidate any special permit previously issued thereunder.

Pioneer Valley Green Infrastructure Code Review Checklist

NDPES MS4 Community:

Y/N Checklist Item

Notes (include location in code and any standards)

SECTION 1: NPDES MS4 Permit Compliance

Stormwater Management Program (NPDES Draft permit 1.10)

	Is there an adequate funding source for the implementation of the stormwater management program (adequate funding means that a consistent source of revenue exists for the program)?	
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Illicit Connections (NPDES Draft Permit 2.4.4)

	Is there an ordinance/bylaw that prohibits all non stormwater discharges into the MS4? See allowable exemptions in part 1.4 of draft permit. (NPDES Draft permit 2.4.4)	
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Erosion and Sediment Control/Construction Site SW Runoff Control (NPDES Draft permit 2.4.5)

	Is there an ordinance/bylaw for construction site erosion and sediment control to reduce pollutants in any stormwater runoff discharged to the MS4 from construction activities that result in a land disturbance of greater than or equal to one acre (disturbances less than one acre if that disturbance is part of a larger <u>common plan of development or sale</u>).	
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	Does the regulation have provisions for smaller development projects under 1 acre?	
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	Does the regulation require the use of sediment and erosion control practices at construction sites?	
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	Does the regulation include written procedures for site inspections and enforcement of sediment and erosion control measures at construction sites, including who is responsible for site inspections and who has authority to implement enforcement procedures?	
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	<p>Does the regulation require sediment and erosion control program where land disturbance activities result in stormwater discharges to the MS4 (program shall include BMP appropriate for the conditions at the construction site. May include references to BMP design standards in state manuals. Examples of appropriate sediment and erosion control measures for construction sites include local requirements to:</p> <ul style="list-style-type: none"> i. minimize the amount of disturbed area and protect natural resources; ii. stabilize sites when projects are complete or operations have temporarily ceased; iii. protect slopes on the construction site; iv. protect all storm drain inlets and armor all newly constructed outlets; v. use perimeter controls at the site; vi. stabilize construction site entrances and exits to prevent off-site tracking; vii inspect stormwater controls at consistent intervals; and viii. size stormwater controls to control or manage a specific volume of runoff (e.g. design sediment and erosion control measures to manage 1 inch of runoff or a specific rain event such as the 2 year 24-hour rain event) 	
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	Does the regulation include requirements to control wastes, including but not limited to discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes (these wastes may not be discharged to the MS4)?	
	Does the regulation include written procedures for <i>site plan review</i> . Site plan review shall include a review by the permittee of the site design, the planned operations at the construction site, planned BMPs during the construction phase, and the planned BMPs to be used to manage runoff created after development. The review procedure shall incorporate procedures for the consideration of potential water quality impacts; procedures for pre-construction review; and procedures for receipt and consideration of information submitted by the public. Site plan review procedure shall include evaluation of opportunities for use of low impact design and green infrastructure. When the opportunity exists, the permittee shall encourage project proponents to incorporate these practices into the site design.	
Post Construction Stormwater Management/Stormwater Management in New Development and Redevelopment (NPDES Draft Permit 2.4.6)		
	Is there an ordinance/bylaw that addresses post construction stormwater runoff from new development and redevelopment projects that disturb one or more acres and discharge into the MS4 (disturbances less than one acre if that disturbance is part of a larger common plan of development or redevelopment)?	
	What are the provisions for redevelopment of existing properties?	
	The following are amendments that will be required with new permit. Do these currently exist?	
	a. For new development projects that disturb one or more acres and upon completion results in two or more acres of impervious surfaces, the MS4 shall require compliance with Standards 3, 4, 5, and 6 of the Massachusetts Stormwater Management Standards, regardless of the proximity to resource areas or their buffer zones under the Massachusetts Wetlands Protection Act. (The standards presented below are not exact wordings of the state standards. The standards are summarized at: http://www.mass.gov/dep/water/laws/stmreg.pdf and available at: http://www.mass.gov/dep/water/laws/310c10p.pdf and http://www.mass.gov/dep/water/laws/314c9p.pdf .)	
	i. Standard 3 – Loss of annual groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. In an effort to facilitate implementation of the requirements in Part 2.4.6.8, and Parts 2.2.1(c), (d), (f) and (g), if applicable, and the goal of this standard, the permittee is encouraged to require the capture of at least the 1 inch (90th percentile) storm event. The term “capture” includes practices that infiltrate, evapotranspire, and/or harvest and reuse rainwater. This means that 100 percent of the volume of water from events less than or equal to the 90th percentile event shall not be discharged. In Massachusetts, the 90th percentile storm event is a 1 inch storm event	

	<p>ii. Standard 4 – Stormwater management systems shall be designed to remove 80 percent of the average annual post construction load of Total Suspended Solids.</p>	
	<p>iii. Standard 5 – For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented to eliminate or reduce the discharge of stormwater from such land uses.</p>	
	<p>iv. Standard 6 – Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater practices determined by MassDEP to be suitable for managing discharges to such areas.</p>	
	<p>b. For redevelopment projects that upon completion results in two or more acres of impervious surfaces, the permittee shall require compliance with Standard 7 of the Massachusetts Stormwater Management Standards regardless of the proximity to resource areas or their buffer zones under the Massachusetts Wetlands Protection Act as follows:</p>	
	<p>i. Redevelopment of a previously developed parcel with two or more acres of impervious surfaces, which upon completion does not increase the amount of impervious surface must meet the Stormwater Standard 3 and the pretreatment and structural stormwater best management practices of Standards 4, 5 and 6 only to the maximum extent practicable[1] and improve existing conditions.</p>	
	<p>ii. Redevelopment of a previously developed parcel which upon completion contains two or more acres of impervious surface and results in an increase in the area of the site covered by impervious surfaces must fully meet Standards 3 through 6 of the Massachusetts Stormwater Standards with regard to the increase in impervious surfaces and must meet the requirements of Part 2.4.6.4.b.i above with regard to the total area of the impervious surfaces that are undergoing redevelopment and that existed prior to the start of redevelopment. <u>For pre-existing impervious surfaces, there must be an improvement of existing conditions.</u></p>	
	<p>c. For projects that are exempt from the MassDEP stormwater standards, the permittee’s ordinance or other regulatory mechanism may apply the Massachusetts Stormwater Standards to the “maximum extent practicable”, as defined in the Massachusetts Stormwater Management Standards.</p>	
	<p>Are there procedures to ensure that any stormwater controls or management practices for new development and redevelopment will prevent or minimize impacts to water quality. These procedures may include:</p>	
	<p>requirements to avoid development in areas susceptible to erosion and sediment loss; requirements to preserve areas in the municipality that provide important water quality benefits; requirements to implement measures for flood control; and <u>requirements to protect the integrity of natural resources</u></p>	
	<p>Requires submission of as-built drawings within 90 days of completion of construction projects (See more detail under 2.4.6.6) The as-built drawings must depict all on site controls, both structural and nonstructural, designed to manage the stormwater associated with the completed site (post construction stormwater management).</p>	

	<p>Requires procedures to ensure long-term operation and maintenance of stormwater management practices that are put in place after the completion of a construction project. (May include the use of dedicated funds or escrow accounts for development projects or the acceptance of ownership by the permittee of all privately owned BMPs. May also include development of maintenance contracts between the owner of the BMP and the permittee. Maintenance contract shall include verification of maintenance practices by the owner, allow the municipality to inspect the maintenance practices and perform maintenance if inspections indicate neglect by the owner. Alternatively, these procedures may include the submission of an annual certification documenting the work that has been done over the last 12 months to properly operate and maintain the stormwater control measures. Procedures to require submission of as-built drawings and ensure long term operation and maintenance shall be a part of the SWMP.)</p>	
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SECTION 2: Street Standards in Subdivision Regulations

Street Design and Parking Lot Guidelines (NPDES Draft permit 2.4.5) Perform assessment of current street design and parking lot guidelines and other local requirements that affect the creation of impervious cover. This assessment shall be used to provide information to determine if changes to design standards for streets and parking lots can be modified to support low impact design options. (Document cited by EPA: <http://www.mapc.org/resources/lowimpact-dev-toolkit/roadway-lot-design>)

Please report the town's street requirements on the Street Standards Sheet

Roadway Width and Length

	Is paved roadway width standard set for LID purposes in low density residential developments with less than 500 daily trips? (LID standard: 18-22 feet)	
	At higher densities are parking lanes allowed to also serve as traffic lanes (i.e., queuing streets)?	
	Do street standards promote the most efficient street layouts so as to reduce the overall street length?	Identify how you would do this (frontage requirements, etc.)

Right of Ways

	Is the minimum right of way width less than 45 feet for a residential street?	
	Does the code allow utilities to be placed under the paved section of the ROW?	
	Does the code allow utilities to be placed immediately adjacent to the paved section of the ROW?	
	Do the regulations limit clearing within the right-of-way to the minimum necessary?	
	Do regulations require clearing and grubbing of entire right of way?	
	Are street trees required for new streets?	
	If yes, is this shown in the street cross section that may be provided?	
	Do street standards permit LID stormwater management approaches (i.e. allow swales or other such BMP instead of curb and gutter) or are curbs and gutters REQUIRED improvements?	
	Where curbs are necessary/required, are perforated curbs that allow runoff into swales or other stormwater BMPs allowed?	
	Does the town have criteria for design of roadside swales?	
	Where curb and gutter systems are installed, are inlets / drains required to have a notice regarding discharge to receiving waters?	

Sidewalks

	Where curb and gutter streets are required, are sidewalks required to be disconnected from the stormwater system (e.g. by a green strip)?	
	In low density neighborhoods, are sidewalks permitted on only one side of the road?	
	Is sidewalk width standard set for LID purposes? (LID standard 4 feet or less)	
	In low density neighborhoods, can alternate pedestrian networks be substituted for sidewalks (e.g. trails through common areas)	

Cul de Sacs

	Are dead ends discouraged by the regulations? (e.g. by encouraging or requiring connected streets or one-way loop streets)?	
	Is minimum radius for a cul de sac set for LID purposes (LID standard: 35 feet)?	

	Is curbing required for cul de sacs?	
	Is a landscaped island permitted for cul-de-sacs?	
	Are alternative turnarounds such as hammerhead allowed on short streets in low density residential developments?	
Other		
	Are there provisions indicating that roadways ought to be located so as to protect important natural features, avoiding low areas and steep slopes?	
	Are developers required to rehabilitate soils that have been compacted by construction vehicles?	
SECTION 3: Parking Requirements in Zoning Regulations		
	<i>Please report the town's parking requirements on the Parking Standards Sheet</i>	
	Are parking maximums used in any instances (to prevent too much parking)?	
	Does town require <u>more than 3</u> off street parking spaces per 1,000 sq. ft. of gross floor area for office uses?	
	Does town require <u>more than 4.5</u> off street parking spaces per 1,000 sq. ft. of gross floor area for shopping centers?	
	Does town vary parking requirement by zone to reflect places where more trips are on foot or by transit?	
	Does town have reduced off-street parking requirements for its downtown zoning district?	
	Does the town have lower parking requirements for properties near transit stops?	
	Does the town allow reduced parking requirements for properties within walking distance to multiple services?	
	Does the town have lower parking requirements for properties in the more densely developed residential districts?	
	Does town require <u>more than 2</u> off-street parking spaces per residential unit?	
	Does town require 2 off-street parking spaces per residential unit?	
	Does town require <u>less than 2</u> off-street parking spaces per residential unit?	
	Does town require more than 1 off-street parking space for an accessory dwelling unit?	
	Does the town have lower parking requirements for smaller residential units?	
	Does the town have provisions allowing for shared parking to reduce parking requirements?	
	Are the town's shared parking provisions by right?	
	Does the town provide model shared parking arrangements for private use?	
	Does the town allow alternative measures such as custom parking demand calculations, transportation demand management or in-lieu payments to reduce required parking?	
	Does the town allow for common driveways?	
	If yes, are they allowed by right?	
	Is requirement for standard parking lot stall consistent with LID purposes? (LID Standard: 9 feet or less by 18 feet or less)	
	Is requirement for residential driveway width consistent with LID purposes? (LID Standard: 9 feet wide for one lane / 18 feet wide for two lanes)	

	For larger commercial parking lots, are there provisions requiring compact car spaces?	
	If yes, are at least 30% of parking spaces required to have smaller dimensions for compact cars?	
	Is there a minimum percentage of a parking lot required to be landscaped?	
	Do commercial landscaping requirements for parking areas <u>allow</u> for vegetated areas with bioretention functions?	
	Do commercial landscaping requirements for parking areas <u>encourage</u> vegetated areas with bioretention functions?	
	Is the use of bioretention islands and other stormwater practices within landscaped areas or setbacks <u>allowed</u> (versus requirement for curb and gutter)?	
	Is the use of bioretention islands and other stormwater practices within landscaped areas or setbacks <u>encouraged</u> ?	
	Can porous surfacing materials be used for parking stalls, spillover parking areas, shoulders, etc.?	
	Is the use of porous surfacing materials for parking stalls, spillover parking areas, shoulders, etc encouraged?	

SECTION 4: Local Regulations and Feasibility of Green Infrastructure (NPDES Draft permit 2.4.6.8)

	Are the following practices allowable when appropriate site conditions exist:	
	i. Green roofs;	
	ii. Infiltration practices such as rain gardens, curb extensions, planter gardens, porous and pervious pavements, and other designs to manage stormwater using landscaping and structured or augmented soils; and	
	iii. Water harvesting devices such as rain barrels and cisterns, and the use of stormwater for nonpotable uses.	
	If no, please describe impediments: _____	

SECTION 5: Development Policies in Subdivision Regulations

	Are regulations that govern stormwater within the subdivision code consistent with the Stormwater Management/LID ordinance/bylaw? (see controlling standards, drainage, and other relevant sections)	
	Do the site development standards explicitly permit LID stormwater management approaches?	
	Do planning processes encourage an LID approach? (preliminary plans)	
	Do regulations address context sensitive development measures? (indicate all that apply)	
	Reducing Cut and Fill	
	Minimizing disturbance to hillsides and/or ridgelines	
	Requiring or encouraging preservation of natural vegetation or topography?	
	Do landscaping regulations promote the planting of street trees in private and public development projects?	
	Are there any regulations requiring limits to disturbance on a construction site?	
	Are there any regulations controlling tree clearance or removal of mature trees / forest stands?	
	Does the town have a tree protection or landscaping ordinance (If yes, please get copy)	

SECTION 6: Development Policies in Zoning Regulations

Please report the municipality's dimensional standards on the Dimensional Standards Worksheet

Are regulations that govern stormwater within the zoning code consistent with the Stormwater Management/LID ordinance/bylaw?	
Do planning processes encourage an LID approach? (site plan approval)	
Are bioretention areas, rain gardens, filter strips, swales and constructed wetlands allowed in setback areas?	
Does language on screening and buffers indicate that these areas could be used for stormwater management?	
Are there any special districts or regulations that permit cluster development?	
Is open space (cluster) development permitted by right?	
Are the submittal or reevaluation requirements for open space / cluster developments greater than for conventional development?	
Are there any flexible site design regulations that permit reductions in dimensional requirements to allow cluster development?	
Are there any regulations that permit reductions in dimensional requirements to increase flexibility in building placement?	Note: Reductions in frontages would allow for reduced road length/paved area, perhaps where appropriate such as in open space residential developments, at the outside sideline of curbed streets, and around cul de sacs
What counts towards meeting open space requirements? (indicate all that apply)	
Stormwater management areas (e.g. bioretention areas)	
Wetland areas and water bodies	
Green roofs	
Can open space requirements be reduced if improved stormwater management facilities /open spaces are provided?	

SECTION 7: Board of Health Bylaw and Regulations

Do regulations exceed Title 5 requirements, requiring oversized septic systems or larger setback distances?	<i>Note: They should not require additional setbacks or classify stormwater structures so as to increase minimum setback distances (e.g. some towns require dry wells and bioretention areas to meet the same setbacks as a septic system)</i>
Do regulations require reserve septic fields to be cleared at the time of development?	

SECTION 8: Wetlands Bylaw and Regulations

Do regulations permit the use of low impact stormwater structures (e.g. bioretention areas) within the buffer zone of wetland resource areas?	<i>Note: Projects under 1 acre in jurisdictional areas would be regulated here for stormwater management.</i>
Do regulations increase the required buffer above beyond the 50' required by state law (e.g. to 100 feet or more)	

SECTION 9: Municipal Policies and Programs

	Does the municipality have a plan for water efficiency or reuse?	
	Does the town have a program to address stormwater runoff and/or LID?	
	Does town provide information brochures / manual for homeowners describing rainwater harvesting and stormwater management techniques?	
	Does the town have any LID demonstration projects? (please list)	
	Does the town have policies that promote complete streets or LID considerations within capital improvement plans or in ranking road construction projects?	
	Do town policies require new street trees as part of road reconstruction projects?	
	Do capital improvement plans include tree planting as part of project budgets?	
	Has there been any review of emergency services policies or building and fire regulations to ensure that they allow LID techniques?	
	Has there been any review of local building codes to ensure that they permit LID techniques (e.g. permeable paving) and use of harvested rainwater for interior non-potable uses?	
	Who manages stormwater BMPs after construction? If the town has responsibilities, how are dollars secured for long-term maintenance? If the developer or the new property owner has the responsibilities, has the DPW established mechanisms for enforcement of maintenance agreements for stormwater facilities (e.g. fines)?	

Street Standards Worksheet

Roadway widths indicated in code

Minimum right of ways

Minimum radius for a cul de sac

Minimum sidewalk width

Comparison of Parking Standards

Dimensions for a parking space

Municipal Policies and Programs

Does the town have a program to address stormwater runoff and/or LID?

Does town provide information brochures / manual for homeowners describing rainwater harvesting and stormwater management techniques?

Does the town have any LID demonstration projects? (please list)

Does the town have policies that promote complete streets or LID considerations within capital improvement plans or in ranking road construction projects?

Do town policies require new street trees as part of road reconstruction projects?

Do capital improvement plans include tree planning as part of project budgets?

Has there been any review of emergency services policies or building and fire regulations to ensure that they allow LID techniques?

Has there been any review of local building codes to ensure that they permit LID techniques (e.g. permeable paving) and use of harvested rainwater for interior non-potable uses?

Who manages stormwater BMPs after construction?

If the town has responsibilities, how are dollars secured for long-term maintenance?

If the developer or the new property owner has the responsibilities, has the DPW established mechanisms for enforcement of maintenance agreements for stormwater facilities (e.g. fines)?

Does the DPW have policies for minimizing street width in road reconstruction projects (for LID or traffic calming purposes)?

Does the community have an urban forestry program?

Other:

Dimensional Standards

What is min. requirement for front setbacks for a 1/2 acre residential lot?

LID standard (CWP)

20 feet or less

What is the min. requirement for rear setbacks for a 1/2 acre residential lot?

25 feet or less

What is min requirement for side setbacks for a 1/2 acre residential lot?

8 feet or less

What is min. frontage distance for a 1/2 acre residential lot?

less than 80 feet

Warrant Article to Establish a Conservation Fund

This article requires a majority vote of Town Meeting.

To see if the town will vote:

To establish for the use of the Conservation Commission a conservation fund, as described and authorized in the Conservation Commission Act (G.L. Ch. 40 §8 C). The treasurer shall be the custodian thereof. She/he may deposit or invest the proceeds as set out in the Act; and income therefrom shall be credited to the fund. Money in said fund may be expended by said Commission without further authorization for any purpose authorized by said Act, except that no expenditure for a taking by eminent domain shall be made unless such expenditure has been approved in accordance with said Act. The fund may receive gifts and donations. The town may appropriate money in any year to the fund.

MODEL BYLAW FOR GREEN DEVELOPMENT PERFORMANCE STANDARDS

1.0 Green Development Performance Standards

1.1 Purpose

The purpose of these Green Development Performance Standards is to promote high quality developments that preserve and enhance natural resources and the environment. The standards seek to encourage: preservation or restoration of habitat, farmland and natural site features; use of solar energy and natural light; recharge of aquifers; reuse and recycling; and alternative transportation, including walking, biking and mass transit. In addition, these standards seek to protect water resources and to minimize energy consumption, urban heat island effects, use of potable water and light pollution.

1.2 Applicability

1.21 Limited Site Plan Review with Green Site Design Standards

All single family and two-family residential uses must receive Planning Board approval under the Limited Site Plan Review with Green Site Design Standards section of this bylaw, before a Residential Building Permit may be issued. A public hearing is not required under Limited Site Plan Review. Applicants must meet the standards for:

- a. Limits to Site Disturbance (see Section 1.51)
- b. Tree Preservation (see Section 1.52)
- c. Passive Solar Siting (see Section 1.53)
- d. Energy Efficiency (see Section 1.54)

1.22 Site Plan Review with Green Development Standards

All commercial, industrial and civic projects or uses must demonstrate compliance to the Planning Board with the Green Site Design Standards and the Green Development Performance Standards for Site Plan Review herein, before a Building Permit may be issued. A public hearing is required under Site Plan Review. Applicants must meet the standards for:

- a. Limits to Site Disturbance (see Section 1.51)
- b. Tree Preservation (see Section 1.52)
- c. Passive Solar Siting (see Section 1.53)
- d. Site and Context Assessment (see Section 1.61)
- e. Landscaping and Water Reduction (see Section 1.62)
- f. Farmland Protection (see Section 1.63)
- g. Parking and Trip Reduction (see Section 1.64)
- h. Hazardous Materials (see Section 1.65)
- i. Heat Island Reduction (see Section 1.66)
- j. Light Pollution (see Section 1.67)
- k. Collection and Storage of Recyclables (see Section 1.68)

- l. Construction Waste Management and Topsoil Recovery (see Section 1.69)
- m. Pedestrian and Bicycle Access (see Section 1.70)

1.23 Standards for Subdivisions

All residential subdivisions must comply with the Palmer Subdivision Regulations, including the applicable zoning regulations herein, which include:

- a. Limits to Site Disturbance (see Section 1.51)
- b. Tree Preservation (see Section 1.52)
- c. Passive Solar Siting (see Section 1.53)
- d. Site and Context Assessment (see Section 1.61)
- e. Landscaping and Water Reduction (see Section 1.62)
- f. Farmland Protection (see Section 1.63)
- g. Construction Waste Management and Topsoil Recovery (see Section 1.69)
- h. Pedestrian and Bicycle Access (see Section 1.70)

1.24 Incentivized Standards for Density Bonuses

In addition to applicable standards note in Sections 1.21-23 above, applicants seeking a density bonus under this bylaw must receive a Special Permit from the Planning Board, and demonstrate compliance with the Incentivized Green Development Standards in Section 1.6.

1.3 Definitions

Best Management Practices (BMPs): Practices that have been determined to be the most effective and practicable means of preventing or reducing undesirable environmental impacts.

Conditioned Square Footage: A building's room area that is heated in the winter and/or air conditioned in the summer

Drip Line: The circle that could be drawn on the soil around a tree directly under the tips of its outermost branches. Rain water tends to drip from the tree at this point.

Heat island effect: The increase in ambient temperatures that occurs in developed areas because paved areas and buildings absorb more heat from the sun than natural landscape.

Infiltration: The downward movement of water from the surface to the subsoil.

Low Impact Development (LID): A set of approaches that seeks to mimic a site's pre-development hydrology by using design techniques that infiltrate, filter, store, evaporate and detain runoff close to its source. Instead of conveying, managing and/or treating stormwater in large, end-of-pipe facilities, LID utilizes small-scale, decentralized practices that infiltrate, treat, evaporate, and transpire rain water and snow melt. These practices include bioretention areas, grassed swales, reduced impervious areas, preservation of open space, increased development

density, smaller lot sizes, reconfiguration of lots, alternative street and parking design, and alternative structural stormwater treatment methods.

Passive Solar Heat Gain: The increase in temperature in a space, object or structure that results from solar radiation. The amount of solar gain is affected by the strength of the sun, and by the ability of any intervening material to transmit or resist the radiation.

Recharge: The process by which groundwater is replenished by precipitation through the percolation of runoff and surface water through the soil.

1.4 Submission Requirements

1.41 Submission Requirements for Limited Site Plan Review with Green Site Design Standards

- a. A Site Development Plan with supporting documentation, noting:
 - (1) True north and south directions;
 - (2) Total site area to be disturbed, including materials storage and the total quantity of all cut and fill areas;
 - (3) Identify limit-of-work perimeter control measures that will maintain the disturbance limits (i.e. locations of construction barrier fencing);
 - (4) Identify / describe construction Best Management Practices to be implemented;
 - (5) Describe the plan for inspecting and maintaining limit-of-work perimeter controls and other BMPs;
 - (6) Design strategies that minimize site disturbance;
 - (7) Describe the plan for phasing of construction operations, including removal of vegetation and restoration of disturbed areas after construction is complete.

1.42 Submission Requirements for Site Plan Review with Green Development Standards

- a. All site plans for commercial, industrial and civic projects shall be prepared by a registered architect, landscape architect, or professional engineer unless this requirement is waived by the Planning Board because of unusually simple circumstances.
- b. All plans shall be submitted on standard 24" x 36" sheets, as well as in digital (PDF) format.
- c. The submission packet shall include additional narrative and supporting documentation as necessary to demonstrate that the performance standards have been met.
- d. Provide a Site Development Plan in accordance with Section 1.41 above. The submission packet shall include:
 - » Detailed plans for landscaping;
 - » Details on construction practices;

- » a map delineating active farmland, prime agricultural soils and soils of state and local importance.
- e. Provide a Tree Inventory that identifies significant groups of trees or individual specimen trees (including species, size and health), prepared by an Arborist, Landscape Architect, Ecologist, or other qualified professional. The Tree Inventory shall:
 - (1) Note any wooded environmentally sensitive areas, such as floodplains, stream corridors, steep slopes, rare species habitat or wetland buffer zones.
 - (2) Indicate whether each tree or grouping of trees is recommended for preservation, transplant, or removal.
 - (3) Describe provisions for the protection, maintenance and management of trees to be preserved, including the location of protective fencing, and replacing any trees moved or lost during construction. Show that project grading changes, structures, construction work zones, and areas for storing construction materials and debris will not occur within the drip line or essential root zone of any trees or groupings of trees designated for protection.
 - (4) Identify the location, condition, and species for all larger individual trees with a circumference at breast height (4.5 feet above ground) of 25 inches or greater.

1.43 Procedural Requirements for Limited Site Plan Review with Green Site Design Standards

1.44 Procedural Requirements for Site Plan Review with Green Development Standards

Applicants shall comply with all Site Plan Review requirements in the Town of _____ zoning bylaw, Section ____.

1.5 Green Site Design Standards

The Planning Board shall review and evaluate whether the Site Development Plan maximizes consistency with the following Green Site Design Standards.

1.51 Limits to Site Disturbance

- a. No clearing or site disturbance may occur on a parcel before a Building Permit is issued.
- b. Applicants must demonstrate that they will, to the extent feasible, minimize land clearing, alteration of natural topography and features, destruction of vegetation, soil compaction, damage to root systems and associated environmental impacts, in order to preserve open space and undisturbed land.
- c. The site design shall preserve natural topography outside of the development footprint to reduce unnecessary land disturbance and to preserve natural drainage channels on the site.

- d. The site design shall attempt to minimize and balance cut and fill, to reduce total land disturbance and minimize the importing or exporting of earth materials from the site.
- e. The site design shall protect hilltops and scenic views. Placement of buildings, structures, or parking facilities shall not detract from the site's scenic qualities and shall blend with the natural landscape. Building sites shall be directed away from the crest of hills, and foundations shall be constructed to reflect the natural terrain.
- f. Sites shall be designed in such a way as to avoid impacts to rare and endangered species and wildlife habitat on a site, and to maintain contiguous forested areas.
- g. Clearing for utility trenching shall be limited to the minimum area necessary to maneuver a backhoe or other construction equipment.
- h. Limit-of-work controls (also know as perimeter controls or development envelopes) for structures, driveways, parking, wastewater disposal, lawn areas, utility work, and any grading associated with the development shall be installed and maintained to establish the disturbance limits of clearing and grading activities.
- i. Efforts to minimize the clearing and grading on a site associated with construction activities shall be employed, such as parking of construction vehicles, offices/trailers, and stockpiling of equipment/materials in areas already planned for permanent structures, and not in areas of protected trees, wetlands, and/or their vegetated buffers.
- j. The extent of a site exposed at any one time shall be limited through phasing of construction operations. Effective sequencing shall occur within the boundaries of natural drainage areas. Timely re-vegetation of disturbed areas must occur immediately after grading is complete. In no case shall land be left unstabilized over the winter season.
- k. Clearing of vegetation and alteration of topography shall be limited to 35% of the site for residential uses, or 40% of the site for commercial, industrial or institutional uses. Native vegetation shall be planted in disturbed areas as needed to enhance or restore wildlife habitat.

1.52 Tree Preservation

- a. The Planning Board shall review and evaluate whether the Site Development Plan maximizes:
 - (1) Preservation of open space and trees on the site
 - (2) Retention of existing stands of trees, trees at the site perimeter, contiguous vegetation with adjacent sites, and specimen trees
- b. Forested areas shall be preserved if they are associated with:
 - (1) Significant forest communities as defined herein
 - (2) Wetlands, waterbodies and their buffers
 - (3) Critical wildlife habitat areas
 - (4) Slopes over 25 percent
- c. Trees with a circumference at breast height (4.5 feet above ground) of 60 inches shall be preserved. The entire area within the dripline and critical root zone of preserved trees, including understory vegetation, shall be retained in an undisturbed state.

- d. Any trees recommended for preservation or trees on adjacent properties that are moved or lost during construction shall be replaced.
- e. Transplanting methods that maximize plant survival shall be used.
- f. Prior to clearing, excavation, grading or other construction activities, all vegetation to be retained shall be surrounded by temporary protective fencing (i.e. orange construction fencing) or other measures. All trees on adjacent properties whose drip lines extend into the project site shall also be protected. Barriers shall be constructed outside the dripline and critical root zone of all vegetation to be protected.
- g. Materials shall not be stored within the drip line of trees to be protected.
- h. Additional Best Management Practices shall be used to protect trees during construction (i.e. pruning, soil aeration, trunk wrapping, root pruning, watering, etc.).
- i. All protective measures shall be maintained until all construction work is completed and the site is cleaned up.

1.53 Solar Design

- a. The Planning Board shall review and evaluate whether the Site Development Plan is compatible with the following design guidelines:
 - (1) Takes advantage of passive solar heat gain in the winter by:
 - i. Orienting buildings with the long axis running east-west. The long axis of a building should face within 10 degrees of due south if possible.
 - ii. Designing south-facing glass to be between 7 and 12 percent of conditioned square footage, and minimizing window areas to the north, east, and west.
 - iii. Selecting south-facing windows that maximize heat gain. This may include windows with high Solar Heat Gain Coefficients (i.e. SHGC=.30-.60), or clear (uncoated) double- or triple- paned glass.
 - iv. Using materials with high thermal mass to increase heat retention and moderate temperature swings in winter. Locate brick, stone, ceramic tile, concrete and other high mass materials as close to south-facing windows as possible.
 - (2) Reduces passive solar heat gain in the summer by:
 - i. Using overhangs, awnings, porches, deciduous trees, and other control elements to shade windows. Architectural elements or trees should fully shade south-facing windows during the summer months, and allow full sun on windows during the wintertime.
 - (3) Makes use of natural lighting within the building(s) without compromising thermal energy efficiency.
 - (4) Accommodates future solar electric installations on the development project or on neighboring buildings by:
 - i. Building south-facing roofs with the optimal slope of 30 degrees, if feasible (Note: does not apply to flat roof commercial buildings.)

- ii. Preserves solar access to south facing roofs of existing neighboring structures. Do not site trees, objects, or structures that shade (or will shade) neighboring south facing roofs.

1.54 Energy Efficiency

Applicants must demonstrate that all structures will, to the extent feasible, conserve energy use and maximize energy efficiency.

- a. All new buildings and homes are encouraged to meet LEED standards (U.S. Green Building Council's Leadership in Energy and Environmental Design standards).

1.6 Green Development Standards

The Planning Board shall review and evaluate whether the Site Development Plan maximizes consistency with the following Green Development Standards.

1.61 Site & Context Assessment

- a. The Planning Board shall review and evaluate whether the Site Development Plan thoroughly considers the site's context and interrelationships to surrounding features and the community, including:
 - (1) Significant on-site and nearby natural features that may affect the site design, including soils, landforms and rock outcroppings, trees, natural features, slopes, views, water bodies, hydrology and drainage conditions, wetlands, the location of the site within the watershed, floodplains, evidence of erosion or unstable slopes, habitats, endangered species, air quality, noise.
 - (2) Significant on-site and nearby man-made features that may affect the site design, including existing structures, walkways, roads, driveways, parking lots, fences and signs.
 - (3) Existing municipal facilities, services and infrastructure, including sewage, water supply, other utilities, schools, easements, utility poles, overhead power lines, lighting, and fire hydrants.
 - (4) Whether the site has existing historical or archaeological structures or features, and has provisions for preserving these features.
 - (5) Access to transit, pedestrian, bicycle and alternative transportation connections, including existing or possible pedestrian and bicycle connections from the site to bus stops, high density residential areas, commercial districts, open space and recreational areas, and regional trails.
- b. The Planning Board shall review and evaluate whether the development will "fit" within and connect to the site's larger context.

1.62 Landscaping and Water Reduction

- a. The Planning Board shall review and evaluate whether the Site Development Plan has landscaping feature including:

- (1) Minimized the total lawn area;
- (2) Maximized use of plants and landscaping with low maintenance requirements, and that require little or no irrigation.
- (3) Minimized use of potable water for landscape irrigation by installing high-efficiency irrigation systems, using mulch to prevent water evaporation, irrigating with captured rainwater, and reusing building greywater, where feasible.
- (4) Incorporates Low Impact Development practices for stormwater management, including use of rain barrels and rain gardens.

1.63 Farmland Protection and Buffering

Applicants must, to the extent feasible, avoid development and indirect impacts to prime, significant, or working farmland.

- b. To prevent destruction of on-site farmland, applicants must either:
 - (1) Avoid development of Prime Farmland, Farmland of State or Local Importance, or working farmland; or
 - (2) If the development will take place on Prime Farmland, Farmland of State or Local Importance, or working farmland, minimize impacts through cluster design or other open space preservation techniques;
 - (3) Where prime or significant farmland soils will not be preserved, explain why preservation was not possible within the site design, and indicate strategies for mitigating the impacts of this loss of farmland.
- c. If the development site is adjacent to working farmland, the site plan shall:
 - (1) Provide a buffer of landscaping from the property line that abuts the adjacent farming operation;
 - (2) Protect farmland from trespass and vandalism using, at minimum, (in addition to the screening requirements described above) a 4' high fence.
 - (3) Prevent stormwater runoff from impermeable surfaces from entering adjacent agricultural land.

1.64 Parking and Trip Reduction

- a. The Planning Board shall review and evaluate whether the Site Development Plan meets the following standards to reduce parking and personal vehicle trips, and, to the extent feasible, to support walking, cycling, and use of alternative transportation:
- b. Parking:
 - (1) The site design shall reserve some parking spaces for compact cars, low emission and fuel efficient vehicles, and/or carpools and vanpools.
 - (2) The site design shall not exceed the maximum applicable parking requirements in Section __ of the Zoning Bylaw.
- c. Trip Reduction:

- (1) Designate areas for carpool drop off and pick up, vanpool parking, ride boards, and shuttle services to mass transit.
 - (2) Develop ride sharing measures.
 - (3) Encourage use of mass transit.
 - (4) Provide bicycle storage and changing rooms.
 - (5) Reduce on-site driving through efficient design of roads and parking areas.
- a. Community Connectivity
- (1) Encourage pedestrian and bicycle access to and travel within the site.
 - (2) Design the development so that it reflects and connects to its immediate and larger context.
 - (3) Provide a Site Circulation Map that shows vehicle, pedestrian and bicycle routes within the site.

1.65 Handling and Storage of Hazardous Materials

All hazardous materials shall be protected from exposure to stormwater. All outdoor storage facilities for fuel, hazardous materials or wastes, and potentially harmful raw materials shall be located within an impervious, diked containment area adequate to hold the total volume of the liquid kept within the storage area.

- a. Describe and locate all hazardous materials that will be stored on site.
- b. Use “Best Management Practices” to handle and store hazardous materials so that infiltration systems, water bodies, and storm drains do not receive contaminated runoff.
- c. Employ measures for spill prevention and response.

1.66 Heat Island Reduction

Applicants must demonstrate that the development will, to the extent feasible, reduce urban heat island effects.

- a. Select paving materials, landscaping, and roofing materials that will reduce heat island effects. “Cool pavements” include reflective paving products or permeable pavements. “Cool roofs” include cool-colored metal roofs and roof coatings.
- b. Cover at least 50% of the site hardscape with shade or vegetation or reflective paving materials. In addition to vegetation, shade can be provided by architectural elements or covered parking spaces with reflective roofing material.
- c. Develop a green roof. See Incentivized Green Performance (Section 1.8).

1.67 Light Pollution Reduction

Applicants must demonstrate that the development will, to the extent feasible, minimize light pollution, including glare and light trespass, while maintaining safety, visibility and security of individuals and property.

a. The Planning Board shall review and evaluate whether the Site Development Plan meets the following standards to reduce light pollution:

- (1) All outdoor lighting shall have full cutoff-type fixtures. Cutoffs shall shield bulbs from visibility and may consist of internal baffles or reflectors or external panels or other mechanisms.
- (2) General site lighting shall focus light downwards in order to prevent light from going upwards or reaching off-site areas. General site lighting shall not exceed 90 degrees, the horizontal plane of bottom of lamp fixture. No uplighting is allowed: parking, security and aesthetic lighting must shine downward.
- (3) Spotlights used to illuminate buildings, signs or specific site features shall be targeted on such objects so as to prevent direct uplighting. Cutoffs shall limit lighting to a 45 degree angle above the horizontal plane.
- (4) Upward search or spotlighting of the sky for entertainment or advertising purposes is prohibited.
- (5) Lighting shall be shielded to prevent direct glare and light trespass and shall be contained to the target area to the extent feasible.
- (6) Light trespass beyond the property line, and light above a 90 degree horizontal plane, is prohibited.
- (7) All nonessential lighting, including display, parking and sign lighting, shall be turned off after business hours, leaving only the lighting necessary for site security.
- (8) For each interior light, the design should prevent the maximum candela from exiting through windows. Alternatively, employ automatic controls to ensure that interior lights are shut off after dark when there are no building occupants.
- (9) The Site Development Plan shall specify the lowest lighting power densities necessary to meet the minimum requirements of each lighting task, and shall meet the following site lighting output standards by district:

Zoning District ¹	Maximum (footcandle)	Site Average ² (footcandle)	Footcandle at Property Line
RR, SR	0.8	NA	0
TR	3	1	0
VCI, VCII, VCIII, VCIV, GB, NB	5	2	0
HB	5	2.5	0
IA, IB	3	1	0
Notes: 1 Does not include overlay zoning districts 2 Standard for averaging as established by the Illuminating Engineering Society of North America.			

- (10) Lighting directed on buildings and wall signs shall conform to these output standards for commercial uses. (Maximum footcandles shown for various surface coloring/texture). These standards are in addition to those designated above and shall not result in lighting that exceeds those allowed on the site as described in (9) above.

Surface Types	Adjoining Residential Districts (footcandles)	Business Districts (footcandles)
Light (reflective) surfaces	5	15
Medium-light surfaces	10	20
Medium-dark surfaces	15	30
Dark (absorbing) surfaces	20	50

(11) Pole heights shall be a maximum of 25 feet in parking lots for commercial and industrial uses within commercial and industrial parking lots and along streets. The maximum height in the Central Business District, General Business, and Neighborhood Business Districts and in all residential districts shall be 16 feet. Greater pole heights may be allowed with site plan approval from the Planning Board. Lamp wattage should be lower on poles that are lower heights.

- i. Commercial streets average between 0.8 footcandles to one footcandle
- ii. Local and collector streets average 0.3 footcandles to 0.8 footcandles.

(12) Signs should be illuminated from the top or internally illuminated. Internal illumination is allowed so long as it does not cause light to be directed upward or off the property boundaries and conforms to other standards herein.

- b. The town encourages the use of energy-efficient lamps for all outdoor applications. In order of preference, the following are recommended lamp types: Compact fluorescent white light and low pressure sodium; metal halide and fluorescent; high-pressure sodium.

1.68 Collection and Storage of Recyclables

Applicants must demonstrate that the development will, to the extent feasible, facilitate reduction of waste by building occupants by providing an easily accessible area(s) that serves the entire building(s) that is dedicated to collection and storage of paper, cardboard, glass, plastics and metals for recycling. Applicants should consider providing areas for collection and recycling of other materials such as organic wastes.

1.69 Construction Waste Management and Topsoil Recovery

Applicants must demonstrate that the development will, to the extent feasible, minimize construction waste and loss of topsoil resulting from demolition, construction and land disturbance activities.

- a. To the greatest extent feasible, recycle or salvage at least 50% of non-hazardous construction and demolition debris.

- b. Provide details on construction waste management and topsoil recovery, including identification of all materials that will be diverted from final disposal for reuse on site, charitable donation, and recycling.
- c. Salvage or recycle waste cardboard, metal, brick, acoustical tile, concrete, plastic, clean wood, glass, gypsum wall-board, carpet and insulation.
- d. Preserve and re-apply at least 6" of the site's topsoil and at least 12" of the site's subsoil.

1.70 Pedestrian and Bicycle Access

Applicants must demonstrate that the development will, to the extent feasible, provide accessibility for pedestrians and bicycle use within the development and from the development to adjacent properties.

- a. Sidewalks are required in all residential subdivisions, and for all commercial, industrial and civic uses.
- b. Bicycle racks and other bicycle amenities are encouraged in all developments.
- c. Linkages to town-wide or regional bicycle/pedestrian pathways are encouraged in all developments.
- d. Bicycle/pedestrian pathways are encouraged for improved internal circulation within large developments, and should be linked to adjacent properties or pathways wherever feasible.

1.8 Incentivized Green Performance Standards

An applicant may submit an application for a Special Permit to the Planning Board, which demonstrates that the development plan incorporates any of the green development practices listed in 1.8(a) below, or other enhanced green development practices as approved by the Planning Board, in exchange for the incentives described in 1.8(b) below.

- a. Eligible green development practices include:
 - (1) Green roofs
 - (2) Permeable pavement
 - (3) Additional open space, farmland and habitat protection beyond applicable zoning requirements
- b. The applicant may select the best incentive option(s) for their project:
 - (1) Floor Area Ratio (FAR) bonus
 - (2) Partial to full waiver of parking space requirements. To obtain this waiver, the applicant must demonstrate that sufficient parking will be available to the development (i.e. through shared parking, use of on-street parking, reduced vehicle use, timing, etc.).
 - (3) Reduction of stormwater detention requirements (green roofs only)

1.81 Special Permit Process for Green Performance Incentives

(1) The applicant proposing a green performance incentive exchange shall make application to the Planning Board for a Special Permit. The application shall clearly illustrate, on their Site Development Plan, the proposed green development practice to be employed in the proposed project, and the proposed incentive selected in exchange for the green development practice.

(2) Prior to final approval of a Special Permit, the applicants proposed to protect additional open space shall tender to the Planning Board a valid instrument granting to the Town/City a permanent Conservation Restriction or Agricultural Preservation Restriction for the proposed protected land.

(5) Upon advice of the Town/City Counsel that the Conservation Restriction or Agricultural Preservation Restriction document is valid and sufficient, there must be a vote by the Board of Selectmen authorizing Conservation Commission acceptance of the Conservation Restriction or Agricultural Preservation Restriction. If the Special Permit application is valid and sufficient, the Conservation Commission, acting on behalf of the Town/City, shall accept the Conservation Restriction or Agricultural Preservation Restriction, for approval by the appropriate state agency, and for recording in the County Registry of Deeds.

1.82 Dimensional and Density Regulations

(1) Each Green Performance Standard is equivalent to one of the incentives shown in the Table of Exchange Standards for Green Performance Standards, found below in this section.

2) The maximum limits on density, lot coverage, and parking reductions permitted to be developed by Special Permit in the Receiving District shall be determined by reference to the Table of Exchange Standards for Green Performance Standards found below in this section.

TABLE OF EXCHANGE STANDARDS FOR GREEN PERFORMANCE STANDARDS

Green Performance Standard	Incentive	Notes
1 acre of protected land, beyond applicable zoning requirements, equals or 1 acre of permeable pavement or 2000 s.f. of green	2000 s.f. of additional commercial or industrial floor area or Partial waiver of parking requirements or Reduction of stormwater detention requirements,	1) The Planning Board may allow an increase in lot coverage from the 30% maximum lot coverage required in Section ___ of the Zoning Bylaw, up to a maximum 70% lot coverage. 2) The Planning Board may reduce the minimum parking requirements in Section ____ of the Zoning Bylaw/ordinance for off-street parking area. The Planning Board may reduce this requirement for off-street parking area to a minimum of 75% of the required parking.

roof	as determined by Planning Board.	
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1.73 Special Permit Criteria

(1) The Planning Board shall not grant any special permit for Green Performance Standards unless it finds the following criteria are met:

(a) The proposed use is in harmony with the purposes of this bylaw/ordinance.

(b) The proposed use meets all of the procedural, dimensional and density requirements of this bylaw/ordinance.

Optional Additions to this Model Bylaw

1.9 Stormwater Detention and Recharge

Applicants must demonstrate that the project will manage stormwater discharges and, to the extent feasible, maximize groundwater recharge.

Note: If a Stormwater Permit is obtained by an applicant pursuant to the Town of _____ Stormwater Bylaw, the stormwater detention and recharge requirements described herein are not applicable.

- a. Provide a Stormwater Management Plan with drawings, a narrative, and calculations demonstrating that:
 - (1) No new stormwater conveyances (i.e. outfalls) will discharge untreated stormwater directly to or cause erosion in wetlands or water;
 - (2) Post-development peak discharge rates will not exceed pre-development peak discharge rates;
 - (3) 80 percent of the average annual post-development load of total suspended solids (TSS) will be removed;
 - (4) The annual recharge rate from the post-development site will equal the annual recharge rate from the pre-development sites; and;
 - (5) At least 44 percent of TSS will be removed prior to discharge to an infiltration device using Best Management Practices (BMPs) for stormwater management described in the Massachusetts Stormwater Handbook.

1.10 Erosion and Sedimentation Control

Applicants must demonstrate that the construction and development plans will, to the extent feasible, minimize impacts from erosion, sedimentation and dust.

Note: If a Stormwater Permit is obtained by an applicant pursuant to the Town of _____ Stormwater Bylaw, and if the applicant has submitted an Erosion and Sedimentation Control Plan that conforms to the requirements of the National Pollutant Discharge Elimination System (NPDES), the erosion and sedimentation control requirements described herein are not applicable.

a. Provide an Erosion and Sedimentation Control Plan that:

- (1) Describes measures that will be taken to minimize impacts from erosion, sedimentation, and dust during construction and land disturbance activities;
- (2) Describes soil, construction, and waste materials to be stored on site, as well as the controls that will be used to minimize exposure of the materials to stormwater.
- (3) Prevents the design release rate of any stormwater structure from increasing stream channel erosion downstream; and
- (4) Ensures that the banks of detention, retention, and infiltration basins are stabilized with vegetation, are sloped at a gentle grade not exceeding 4:1 to a depth of two feet (2') below the control elevation, and have sinuous rather than straight shorelines to maximize the vegetated area.

Additions to Definitions:

Total Suspended Solids (TSS): A water quality measurement, usually abbreviated TSS, that is listed as a conventional pollutant in the U.S. Clean Water Act. Suspended solids in water reduce light penetration in the water column, can clog the gills of fish and invertebrates, and are often associated with toxic contaminants because organics and metals tend to bind to particles.

Peak discharge: The maximum instantaneous rate of flow during a storm, usually in reference to a specific design storm event.

Post-development: The state of a site after development-related construction activities are completed.

Pre-development. The state of a site prior to development. The pre-development state shall be interpreted as the state of a site at the time of property purchase for the permitted development project.

Model Subdivision Regulations – LID Provisions, Tyringham, MA

Section 9. Design Standards and Required Improvements Streets Location and Layout

1. **Swales, drainage, and curbs:** Curbs are generally not appropriate in Tyringham, where most roads are gravel and very few curbs exist, except in very limited circumstances where stormwater will be confined to feed into a formalized underground drainage system. Streets designed without curbs, however, shall use Low Impact Development (LID) drainage systems to closely mimic natural systems that meet the following standards:
 - a. *All* of the stormwater from a 1” NRCS design storm drains into the ground and does not leave the site. A 1” NRCS design storm is a storm with 1” of rain within a 24 hour period. More than 80% of Western Massachusetts storms are at or below this level.
 - b. Water leaving the road enters grassed swales graded flat enough to avoid erosion and hold and treat water.
 - c. Measures to reduce runoff, improve groundwater recharge, and improve stormwater quality, such as rain barrels (barrels at the base of roof gutter leaders that store stormwater and provide water for future lawn and garden use), Rain gardens (rain is captured and retained in depressions carefully planted with native vegetation and allowed to drain into the ground.)
 - d. Curbs are only appropriate in narrow defined areas without opportunity for grassed swales or in village center-type projects. In those areas curbs shall be Type 2 bituminous concrete or cement concrete curbs or granite curbs Type SB (sloped) placed on the bituminous binder, if the road is paved, or granite curbs if the road is gravel. Curbs shall utilize a 6” reveal (or 6” of curbing exposed above the street pavement). The installation of bituminous berm, granite curb, granite edging and granite curb corners shall conform to the relevant provisions of the Standard Specifications. All catch basin frames shall have granite curb inlets (Type VB) shall be built against and shall be installed true to the horizontal and vertical alignment.

Article XVIII

Off-Street Parking and Loading Regulations

§171-95.

A. General Off-Street Parking Requirements.

(1) For all zoning districts, except the Village Center Districts (VC), off-street parking spaces shall be provided for every new structure, the enlargement of an existing structure, or the development of a new land use in accordance with the TABLE OF OFF-STREET PARKING REGULATIONS and other requirements contained herein.

- a. Computation of Spaces. When the computation of required parking or loading spaces results in the requirement of a fractional space, any fraction of one-half ($\frac{1}{2}$) or more shall require one (1) space. An existing structure which is enlarged or an existing use which is extended or expanded after the effective date of this ordinance shall be required to provide off street parking and loading spaces in accordance with the TABLE OF OFF-STREET PARKING REGULATIONS, unless the increase in units or measurements amounts to less than twenty five (25) percent, whether such increase occurs at one time or in successive stages. (Amended Ord 2007- 07, RTCM 3/7/07)
- b. Continuance. Required off-street parking or loading spaces, which, after development, are later designated as, and accepted by the Town for, off-street parking or loading purposes, shall continue to serve the uses or structures to meet these requirements so long as said use or structure remains.

(2) For all zoning districts, except the Village Center Districts (VC), in cases of a change in use where the existing use (or in cases of vacancy, the next previous use) did not provide for the number of off-street parking spaces required under this Ordinance. In situations where the proposed use would require a larger number of off-street parking spaces, the proposed use shall only have to provide an additional number of off-street parking spaces equal to the difference between the number required under this ordinance for the proposed use and the number required under this ordinance for the previous use. Under no circumstances shall this §171-95. (2) be interpreted to allow a reduction in parking when the required amount of parking spaces for the proposed use would be available on the site. (Amended Ord 2007- 07, RTCM 3/7/07)

(3) For Village Center Districts (VC) only, no additional off-street parking is required for the continued use or reuse of existing buildings, as long as that use or reuse does not increase the total floor area within the building. However, off-street parking shall be provided for any new structure, for an enlargement or addition to an existing building, in accordance with the following Table of Off-Street

(4) Parking Regulations. For purposes of this ordinance, the replacement of an amount of floor space equal to that in existence at the time of enactment of this

ordinance is not considered to be an addition of new space, and is, therefore, exempt from these parking requirements. Also, the addition of a second floor to one-story buildings existing in the VC Districts at the time of the enactment of this ordinance shall be exempt from these parking requirements so as to encourage the restoration of building heights in the District which are more uniform and consistent with the scale of development which has historically existed. However, the addition of third, fourth and fifth floors to said one-story buildings in the VC District in existence at the time of adoption of this ordinance shall be subject to the parking requirements as set forth in the Table of Off-Street Parking Regulations. The Planning Board may waive parking requirements when it can be demonstrated that sufficient public parking is available in the immediate vicinity of the proposed use. (Amended Ord 2007- 07, RTCM 3/7/07)

(5) The number of off-street parking spaces required to serve added floor space in the Village Center Districts (VC) is shown in parenthesis. Where no parenthesized number appears, the parking requirement for added floor space in the VC District is the same as that which applies in all other zoning districts.

(6) Parking shall be provided to serve the parking needs which are generated by a particular use or structure.

B. General Lot Design.

(1) Existing Spaces. Parking or loading spaces being maintained in any district in connection with any existing use on the effective date of this ordinance, or any spaces subsequently provided in accordance with this ordinance, shall not be decreased or any way removed from service to the use originally intended to be served, so long as said use remains, unless a number of parking or loading spaces is constructed elsewhere, such that the total number of spaces conforms to the requirements of the Tables of this Article, provided this regulation shall not require the maintenance of more parking or loading spaces than is required according to the Tables. (Amended Ord 2007- 07, RTCM 3/7/07)

(2) Location of Loading Spaces. The loading spaces required for the uses listed in the Table of Off-Street Loading Requirements shall in all cases be on the same lot as the use they are intended to serve. In no case shall the required loading spaces be part of the area used to satisfy the parking requirements of this ordinance. (Amended Ord 2007- 07, RTCM 3/7/07)

(3) Location of Parking Spaces. Required off-street parking spaces shall be provided on the same lot as the principal use they are required to serve. When practical difficulties exist which prevent their establishment of the same lot, the Planning Board may grant a Special Permit to allow spaces to be on a non-municipal lot, the closest point of which is no further than three hundred (300) feet from the premises to which they are appurtenant. A Special Permit issued under this provision shall be coterminous with the length of the lease and shall expire if and when the lease for said parking expires.

(a) Whenever feasible, parking areas shall be located to the side or rear of the structure, and not within the front yard of a structure.

(b) Whenever feasible, parking areas shall be shared with adjacent businesses.

[1] An agreement, lease, deed, contract or easement establishing shared use of a parking facility shall be submitted to, and approved by, the Planning Board. The approved agreement shall be recorded in the Registry of Deeds prior to the issuance of an occupancy permit for the project.

[2] In the event that a shared parking agreement is terminated, those uses with less than the required number of spaces shall notify the Planning Board within fourteen (14) days and do one of the following:

- a. Provide at least fifty (50) percent of the required parking within one hundred twenty (120) days and provide the remaining required parking within one (1) year following termination of the shared use agreement; or
- b. Demonstrate to the Planning Board, using a study deemed reliable by the Board, that the available parking is sufficient to accommodate the use's peak parking demand; or
- c. Apply for and receive a variance from the Zoning Board of Appeals for less than the required number of spaces.

(c) Whenever feasible, parking areas shall not be located within twenty (20) feet of the street line of any lot. (Amended ATM June 11, 2003, Article 11)

(d) Parking areas shall be designed so that vehicular lights shall be screened or directed away from oncoming traffic.

(e) Porous pavement may be used on up to twenty (20) percent of the required number of spaces to decrease the amount of impervious surface in the parking area. No landscaping is required in the porous paving area.

C. Specific Requirements for Parking Spaces.

(1) Parking spaces must be at least nine (9) feet by eighteen (18) feet in size, exclusive of maneuvering area and reasonable access.

(2) All off-street spaces shall have bumper and wheel guards where needed to protect abutting structures, properties or plantings. Parking areas shall be designed so that parked vehicles do not extend over pedestrian walkways or sidewalks.

(3) Interior drive widths within parking lots shall be as follows:

- (a) For ninety (90) degree parking – twenty four (24) feet
- (b) For sixty (60) degree parking – eighteen (18) feet
- (c) For forty-five (45) degree parking – thirteen (13) feet
- (d) For thirty (30) degree parking - eleven (11) feet

(4) It is the obligation of the owner of the property upon which a building or use is located to provide and maintain all required parking and loading spaces as long as such building or use is in existence.

D. Additional Parking and Loading Space Standards.

- (1) All parking and loading areas shall comply with the following:
 - (a) The layout of the parking area shall allow sufficient space for the storage of plowed snow without reducing the number of required parking spaces, unless removal by some other means is provided.
 - (b) Any fixture used to illuminate any parking area shall be so arranged as to direct the light away from the street and away from adjoining premises used for residential purposes.
 - (c) Parking and loading spaces shall be so arranged as to prohibit backing of vehicles onto any street.
 - (d) No portion of a driveway's entrance or exit shall be closer than fifty (50) feet to the curb line of an intersecting street nor shall it be closer than fifty (50) feet to any portion of an existing driveway located in a Business or Industrial District.
 - (e) Any two driveways leading to or from the same street and from the same lot shall not be within thirty (30) feet of each other at their intersection with the front lot line.
 - (f) A driveway's entrance or exit shall not exceed, at its intersection with the front lot line, a width of fifteen (15) feet for single, two and three-family uses; and thirty (30) feet for all other uses.
 - (g) The parking area and access driveways thereto shall be graded and drained so as to dispose of all surface water accumulation in accordance with acceptable engineering practices and in accordance with the Town of Palmer street entrance permit standards.
 - (h) Except on a farm, not more than one (1) commercial vehicle, and said vehicle shall not exceed a weight of ten thousand (10,000) pounds gross weight, shall be parked or in any way stored on any lot in any Residential (R) District (that is used for residential purposes). This shall not pertain to a vehicle housed within the confines of a garage or accessory building.
 - (i) No private access street or driveway serving a parking lot for nonresidential use shall cross property in a residential district except with a Special Permit granted by the Planning Board under the provisions of Article V.
 - (j) No more than one (1) unregistered motor vehicle or trailer, or one (1) registered motor vehicle or trailer not in operating condition (any vehicle that does not have a valid registration legally issued by a governmental authority), and no motor vehicle accessories which are not parts of said one vehicles, may be parked, stored or otherwise placed on a parcel of land in the Town of Palmer without a Special Permit from the Town Manager or Chief of Police. This section shall not apply to the parking, storage or otherwise placing of unregistered motor vehicles and/or motor vehicle accessories where such parking, storage or placement is in connection with a legally established business selling new and/or used automobiles and trucks, or

automotive repair or automobile service stations. (Amended Ord 2007- 07, RTCM 3/7/07)

[1] All permitted unregistered motor vehicles and/or motor vehicle accessories shall be screened from the view of the public and from abutting public ways and from abutting properties by being enclosed within a structure or sight impervious fencing or screening.

(k) A Driveway Permit shall be obtained from the Town Manager, for all new or relocated driveways or parking lots. (Amended Ord 2007- 07, RTCM 3/7/07)

(l) Any use (drive-ins, etc.), which requires the 'stacking' of vehicles waiting in line, must conform to the standards outlined in Article XV, §171-91.

(m) There shall not be any business operation for vehicle repair for profit or gasoline or oil service facilities or any repair made to any motor vehicles, except on a lot occupied by a permitted automotive use. Any gasoline or oil facilities shall be at least twenty-five (25) feet from any lot line.

(n) There shall not be any storage of materials or equipment or display of merchandise within parking areas except as part of approved building operations.

(2) In addition to the above, all parking and loading areas containing over five (5) spaces, including automotive and drive-in establishments of all types shall either be contained within structures or shall also comply with the following:

(a) The area shall be effectively screened with suitable planting or sight impervious fencing on each side which adjoins or faces the side or rear lot line of a lot situated in any Residential "R" District or any lot containing a residential use.

(b) The area and access driveways thereto shall be surfaced with bituminous concrete or cement concrete material. The Planning Board may allow construction of an alternative all-weather surface if it can be demonstrated to the satisfaction of the Board that such surface will be durable, dustless and continuously maintained. However, bituminous or cement concrete must be used in all areas of a ten (10%) percent slope or greater. The location of spaces shall be suitably marked by painted lines or other appropriate markings.

(c) A substantial bumper of masonry, steel, or heavy timber, or a concrete curb or berm curb which is backed, shall be placed at the edge of surfaced areas except driveways in order to protect abutting structures, properties and sidewalks and screening materials. In addition, a minimum four (4) foot wide sidewalk is required to separate spaces from the building that they serve.

(d) In all Zoning Districts except the General Business (GB), the Planning Board may grant a Special Permit to allow the reduction of the parking space requirements to eighty (80) percent of that

required in the Table of Off-Street Parking Regulations where conditions unique to the use will reasonably justify such a reduction, provided that a greater percentage reduction may be allowed where joint use of the same spaces by two or more uses or establishments is justifiable by virtue of the fact that the uses or establishments generate peak demand at substantially different time periods.

- (e) In the design of parking lots serving uses located in Business or Industrial Districts which provide more than seventy-five (75) parking spaces, the expanse of pavement shall be interrupted by separating rows of parking spaces from each other and from driveways by using planting strips which may also contain pedestrian sidewalks at least six (6) feet in width combined. Provision of these required planting strips shall take into account the need to store snow, the need to locate light poles, the need to allow safe pedestrian movement, the need to maximize emergency access, and the need to separate different traffic movements. Any modification to a particular parking lot which caused the lot to exceed the seventy-five (75) car standard shall cause the provision of planting strips to be required in the entire lot. All proposals to construct or modify such parking lots shall be reviewed by the Planning Board in light of the requirements of this Section.
- (f) Fire lanes or emergency access points required for buildings or other structures shall be protected from unauthorized parking through the provision of curbs, mountable barriers, landscaped areas or such other improvements subject to the approval of the Fire Chief and Chief of Police, which in turn meets the objective of precluding parking in the restricted area.

E. Shared Parking

1) Shared On-Site Parking

To implement shared on-site parking, the applicant shall provided analyses as part of Site Plan Review to demonstrate that proposed uses are either competing or non-competing.

- a) Non-competing Uses. In mixed-use developments, applicants may propose a reduction in parking requirements based on an analysis of peak demands for non-competing uses. Up to [75%] of the requirements for the predominant use may be waived by the Planning Board if the applicant can demonstrate that the peak demands for two uses do not overlap. An applicant may use the latest peak demand analyses published by the Institute of Traffic Engineers (ITE) or other source acceptable to the [Planning Board].***
- b) Competing Uses. In mixed-use developments, applicants may propose a reduction in parking requirements where peak demands do overlap. In these cases, the Planning Board may reduce the parking requirements of the predominant use by up to [30%].***

2) Off-Site Parking

Separate from, or in conjunction with Shared Parking provisions, an applicant may use off-site parking to satisfy their parking requirements. As part of Site Plan Review, the applicant shall provide the necessary information to comply with the following standards:

- a) Off-site parking shall be within [five hundred (500)] feet of the property for which it is being requested.***
- b) Off-site parking may only be provided if the off-site lot has an excess number of spaces or if the applicant can demonstrate that the on-site and off-site uses have non-competing peak demands.***
- c) The amount of required parking spaces being reduced on-site shall be equal to the amount being provided off-site and can account for up to 100% of the minimum required on-site parking.***
- d) Off-site parking spaces provided by a separate private property owner shall be subject to a legally binding agreement that will be presented to the Planning Board during the Site Plan Review process or as a condition of approval. If the conditions for shared parking become null and void and the shared parking arrangement is discontinued, this will constitute a zoning violation for any use approved expressly with shared parking. The applicant or property owner must then provide written notification of the change to the Zoning Enforcement Official and, within 60 days of that notice, provide a remedy satisfactory to the Commission to provide adequate parking.***
- e) Off-site parking provided by means of a public parking facility shall be limited to [50%] of the overall parking requirement [for daytime peak uses].***
- f) On-street parking spaces that [intersect or] are completely contained within the frontage of the property may be counted toward the minimum parking requirements.***
- g) Uses sharing a parking facility shall provide for safe, convenient walking between uses and parking, including safe, well marked pedestrian crossings, signage, and adequate lighting.***

F. Parking Lot Design

1) Compact Cars

Applicant may design up to 30% of their parking spaces for compact cars in accordance with the dimensions listed in Section 7.B of this bylaw. Compact car spaces shall be grouped together to the greatest possible extent in areas clearly designated for compact cars. Parking lots shall have a system of signs beginning at the entrance that clearly indicates the location of compact car spaces.

2) Parking Space and Travel Lane Dimensions

For the purposes of this bylaw, minimum parking space width shall be measured perpendicular to the center line of the parking space. For standard cars the minimum parking space width shall be nine (9) feet. For compact cars, the minimum parking space width shall be eight (8) feet. Travel lanes and associated module widths shall conform to the following minimum standards:

<i>Parking Angle</i>	<i>Parking Stall Width (1)</i>		<i>Travel Lane (one way)</i>		<i>Travel Lane (two way)</i>	
	<i>Standard Space</i>	<i>Compact Car</i>	<i>Standard Space</i>	<i>Compact Car</i>	<i>Standard Space</i>	<i>Compact Car</i>
<i>Parallel</i>	9'	8'	12'	12'	24'	22'
<i>45 degrees</i>	18'	16'	14'	12'	24'	22'
<i>60 degrees</i>	21'	17.5'	16'	14'	24'	22'
<i>75 degrees</i>	22'	19'	19'	16'	24'	22'
<i>90 degrees</i>	20'	17'	22'	19'	24'	22'

1 Measured from the inner most point on the parking space centerline perpendicular to the edge of the Travel Lane.

G. Landscaping Standards for Parking Lot Stormwater Management

Landscaping is required for all parking lots and may be designed in one of two ways as related to stormwater management pursuant to the requirements in Section 4: 1) Low Impact Development (LID) Parking Area Design; or 2) Conventional Parking Area Design. LID Landscaping Plans shall denote a drainage design where [75% or more] of the [first half inch] of stormwater runoff from impervious surfaces is treated for water quality by a combination of LID techniques in accordance with the most recent version of the Massachusetts DEP Stormwater Management Manual. Conventional Parking Area Design shall denote a parking lot landscape design that does not meet the criteria for LID Parking Area Design.

Acceptable LID techniques shall include vegetated swales, rain gardens or bioretention facilities, permeable pavers, infiltration facilities and constructed wetlands. Cisterns and grey water systems that recycle stormwater runoff may also be included in these calculations.

For parking areas that will contain fewer than [ten (10)] spaces, compliance with the design standards set forth in this bylaw shall be determined by the Zoning Enforcement Officer.

1) Conventional Parking Area Design Standards

The landscaping requirements in this section are intended to provide a baseline set of standards toward reducing the visual impacts of large areas of pavement, improving the overall environment or parking areas by providing areas for shade

and heat reduction, and enhancing the overall aesthetic appeal of parking areas. The following standards shall apply to all Conventional Parking Lot Design as defined in this bylaw.

a) Amount. Developments with proposed parking areas of [ten (10)] spaces or more shall provide a minimum of 10% of the total parking area as landscaped open space.

b) Buffers. Landscaping shall be required between non-residential uses or mixed use developments and existing or future residential development areas. Buffer zones shall be a minimum of [twelve (12) feet] in width and shall substantively screen the site from view through the use of evergreen vegetation at least six feet in height. Fences may be used as part of screening but shall not include chain link fences. These requirements shall not apply to non-residential or mixed use development that are designed to integrate existing or future neighboring residences into the site through the use of walkways, bicycle paths or other pedestrian amenities.

c) Parking Lot Entrances. Parking lot entrances shall be landscaped minimally with a combination of trees and shrubs. These areas may also be used for signage in compliance with [INSERT REFERENCE TO SIGNAGE SECTION OF BYLAW]. No trees or shrubs shall be planted in a way to obstruct sight lines of motorists.

d) Parking Aisles. The ends of parking aisles that are more than [fifteen (15) spaces] in length shall incorporate landscape islands at either end of the row. Where the length of parking aisles exceeds [twenty-five (25)] spaces, an intermediary landscaped island shall be installed at regular intervals. This interval shall not be more than every [thirteen (13)] spaces. Landscape islands used at the end of parking aisles shall enclose. The width of landscaped islands at their ends shall not be less than [four (4)] feet and not less than [eight (8)] feet at their midpoint.

e) Plant Selection. No tree, shrub or plant shall be proposed for use within a parking area that has been identified as an Invasive Species by the Massachusetts Plant Advisory Group in the latest version of The Evaluation of Non-Native Plant Species for Invasiveness in Massachusetts (with annotated list), has been identified as invasive or banned on the Massachusetts Prohibited Plant List as periodically updated by the Massachusetts Department of Agricultural Resources, or in any other reputable scientific publication that may be acceptable to the Board. All size and location design elements shall comply with the following specifications: a) Shade or canopy trees shall be three (3) inches DBH with a height of not less than twelve (12) feet above grade; b) Small or minor shade trees shall be two and one-half (2.5) inches DBH with a height of not less than nine (9) feet above grade; c) Ornamental or

flowering fruit trees shall be two (2) inches DBH with a height of not less than seven (7) feet above grade; d) Evergreen trees used for screening shall be not less than six (6) feet in height above grade. Fencing may be used in conjunction with vegetated screening [but chain link fence shall not be allowed]; e) Shrubs shall be not less than one and one-half (1.5) feet in height above grade. f) Turf may be used but shall not be installed in strips less than six (6) feet in width.

H. LID Parking Area Design Standards

The purpose of these standards is provide the Zoning Enforcement Officer or the parties involved with Site Plan Review the opportunity to review plans for a lower impact approach to managing stormwater in parking areas. The following information is therefore required of an applicant choosing to treat any portion of a parking lot with LID stormwater management techniques. This informationshall be prepared by a Massachusetts registered Professional Engineer and shall comply with the design and implementation guidelines provided in the latest version of the Massachusetts DEP Stormwater Management Manual. Where portions of the parking lot are not using acceptable LID techniques, the standards for Conventional Parking Lot Design in Section 8.A shall apply.

- 1) Delineation of all drainage areas inclusive of areas outside of the parking envelope that will contribute stormwater runoff to the parking area;*
- 2) Proposed topography at two-foot contour intervals;*
- 3) Site Plan showing drainage pathways and locations of proposed BMPs;*
- 4) Typical profiles of BMPs;*
- 5) Sizing calculations for BMPs that demonstrate adequate conveyance and/or water quality treatment of the [first half inch of stormwater runoff from impervious surfaces];*
- 6) Sizing calculations for BMPs that illustrating proposed management of runoff resulting from 2-year, 10-year, and 100-year event;*
- 7) List of plantings associated with vegetated BMPs;*
- 8) Location of areas reserved for snow storage;*
- 9) Location of any screening between residential and non-residential properties. Buffer zones shall be a minimum of [six (6) feet] in width and shall substantively screen the site from view through the use of evergreen vegetation at least six feet in height. Fences may be used as part of screening but shall not include chain link fences. These requirements shall not apply to non-residential or mixed use development that are designed to integrate existing or future neighboring residences into the site through the use of walkways, bicycle paths or other pedestrian amenities.*
- 10) Location of test pits, depth to seasonal high ground water and soil percolation rates for those areas designated for recharge;*
- 11) Schematic diagrams of any gray water or cistern systems proposed for the parking area;*
- 12) An Operation and Maintenance (O&M) Plan shall be submitted by the applicant to the Zoning Enforcement Officer or the [Planning Board] that*

conforms to the standards for O&M Plans detailed in the most recent version of the Massachusetts DEP Stormwater Management Manual. The LID requirements listed above are designed to mirror the Massachusetts

Town of Palmer, Massachusetts

Chapter 171 – Zoning Ordinance

§171-96. TABLE OF OFF-STREET PARKING REGULATIONS

Section 171-96: Table of Off Street Parking Requirements	
Use	Number of Off Street Parking Spaces (When it is deemed that additional parking spaces are required in a VC District, the number in parentheses (xx) shall be used)
Dwelling, one, two, and three family units and Townhouses and condominiums	Two per unit (1.0 per unit)
Dwelling, multi-family	Two per dwelling unit, except housing for the elderly, in which case, it shall be one for each two dwelling units (1.0 per two units)
Lodging house, and similar type of group activities.	One per rental or sleeping unit. Any bedroom or group of two beds in a single room constitutes a sleeping unit. For lodging houses only, the Planning Board may issue a Special Permit to allow a reduction in the required number of parking spaces to one per every two rental or sleeping units.
Theater, gymnasium, auditorium, church or similar place of public assembly, with seating facilities	One for each three seats of total seating capacity (one for each six seats)
Automobile retail and service establishment, and other retail and service establishment utilizing either indoor or outdoor display areas, which are unusually extensive in relation to customer traffic	One per 500 square feet of gross floor space. In the case of outdoor display areas, one for each vehicle allowed by the license for the site
Hotel, motel, tourist court	One for each sleeping room plus one for each 400 sq. ft. of public meeting area and restaurant space
Drive-in eating establishment	One per 30 square feet of gross floor area
Drive-in establishment	One per 100 square feet of gross floor area
Tourist home/bed and breakfast	Two spaces, plus one additional space for each rooming unit. <i>Bed and breakfast:</i> <i>Maximum: 1.2 spaces per guest room or suite</i>

	<i>Minimum: 1 space per guest room or suite</i>
Establishments selling foods prepared on premises, where consumption is primarily off the premises	Three for each four seats of seating capacity, plus one for each 100 square feet of kitchen area and waiting area
Sit-down restaurants, lounges, bars, and nightclubs breakfast facility	One for each four seats of total seating capacity, plus one per each 300 square feet of gross kitchen area (one for each four seats of total seating capacity, plus one per each 500 square feet of gross kitchen area) <i>Restaurants:</i> <i>Maximum: 10 per 1000 square feet GFA.</i> <i>Minimum: 6 per 1000 square feet GFA</i>
Commercial, retail and personal service establishments (excluding convenience stores)	One per each 200 square feet of gross floor area (1.0 per 500 square feet) Excluding all areas used for storage and/or utility uses. Except this may be reduced by Planning Board to one per 250 square feet for businesses with over 20,000 square foot floor areas. <i>Large-scale Retail:</i> <i>Maximum: 4 per 100 square feet GFA.</i> <i>Minimum: 2 per 1000 square feet GFA</i> <i>Free Standing Retail:</i> <i>Maximum: 3 per 1000 square feet GFA</i> <i>Minimum: 1 per 1000 square feet GFA</i> <i>Shopping Centers:</i> <i>Maximum: 4 per 1000 square feet GFA</i> <i>Minimum: 3 per 1000 square feet GFA</i>
Convenience Stores	One per 150 square feet.
Miscellaneous professional and business offices, including banks, insurance and real estate establishments	One per each 200 square feet of gross floor area (1.0 per 500 square feet) Excluding all areas used for storage and/or utility uses. <i>Bank: Maximum: 3 per 1000 square feet GFA.</i> <i>Minimum: 2 per 1000 square feet GFA</i>
Medical/dentist office building	One per each 200 square feet of gross floor area (1.0 per 400 square feet) Excluding all areas used for storage and/or utility uses. <i>General office Building:</i> <i>Maximum: 4 per 1000 square feet GFA.</i> <i>Minimum: 2 per 1000 square feet GFA</i>

	<p>Medical Office Building:</p> <p>Maximum: 8 per 1000 square feet GFA</p> <p>Minimum: 2 per 1000 square feet GFA</p>
Wholesale establishment	One per each 1,000 square feet gross floor space
Warehouse or storage establishment	One per two employees on the two largest shifts combined
Manufacturing or industrial establishment	<p>One per each 800 square feet of gross floor space OR .75 per each employee of the combined employment of the two largest successive shifts, whichever is the larger</p> <p>Industrial plant:</p> <p>Maximum: 2 per 1000 square feet GFA.</p> <p>Minimum: 1 per 1000 square feet GFA</p>
Hospital	One and one-half spaces per bed at design capacity
Business, trade, or industrial school or college	One for each 200 square feet of gross floor area in classrooms, including space for the gymnasium or the auditorium whichever has the larger capacity at one space per (3) three seats.
Country club	One for each four regular club members, plus one space for each employee
YMCA, community facility (Town building, recreation, etc.)	One per each 400 square feet of gross floor space (none)
Libraries and museums	<p>One per each 750 square feet of gross floor space (none)</p> <p>Maximum: 2 per 1000 square feet GFA</p> <p>Minimum: 1 per 1000 square feet GFA</p>
Transportation terminal	One for each 500 square feet of gross floor area
Public utility	<p>1. One for each 300 square feet of gross floor area devoted to office use.</p> <p>2. One for each 800 square feet of gross floor area per other use</p>
Funeral parlors	One for each four seats of seating capacity.
Car washing facility (automatic or conveyor)	One per employee plus stacking spaces equivalent to 5 times the maximum capacity of the facility
Mixed use	Sum of various uses computed separately
Elementary and Junior High School	One space for each teacher and employee, including space for the gymnasium or the auditorium

	whichever has the larger capacity at one space per three (3) seats.
High School	One space for each teacher and employee, plus one space per each four students, including space for the gymnasium or the auditorium, whichever has the larger capacity at one space per three (3) seats. <i>Public and Private Educational Institutions:</i> <i>Maximum: 1 space per 3 seats in the classroom</i> <i>Minimum: 1 space per 5 seats in the classroom</i>
Large scale conference and Entertainment centers	1 per three (3) seats or 1 per three (3) persons attending during peak hours.
Flea Market	Four (4) spaces per vendor
Outdoor recreational use	1 per three (3) persons attending during peak hours. (Added ATM – June 16, 2003 – Article 11)
<i>Nursing Home</i>	<i>Maximum: 3 per 1000 square feet GFA</i> <i>Minimum: 2 per 1000 square feet GFA</i>
<i>Day Care Centers</i>	<i>Maximum: 1 space per 4 children at max. capacity</i> <i>Minimum: 1 space per 8 children at max. capacity</i>
<i>Personal Services</i>	<i>Maximum: 2 per 1000 square feet GFA</i> <i>Minimum: 2 per 1000 square feet GFA</i>
<i>Churches and Places of Worship</i>	<i>Maximum: 1 space per 3 seats in portion of building used for services</i> <i>Minimum: 1 space per 5 seats in portion of building used for services</i>
<i>Social, Fraternal Clubs and Organizations</i>	<i>Maximum: 4 per 1000 square feet GFA</i> <i>Minimum: 3 per 1000 square feet GFA</i>
Any use permitted by this ordinance not interpreted to be covered by this schedule	Closest similar use as shall be determined by the Zoning Enforcement Officer

§171-97. Handicap Parking.

A. All parking areas shall be provide handicapped accessible parking spaces, as required by the federal American with Disabilities Act (ADA), and as specified in the table below, except for the following uses which are specifically exempted in ADA requirements:

- (1) Owner occupied buildings with no more than four (4) units.
- (2) Single family homes, not owner occupied, sold or rented without the use of a broker.

(3) Housing operated by religious organizations and private clubs that limit occupancy to members.

B. Parking for the handicapped shall be provided at the rate specified in the table below:

Total Spaces in Lot	1-25	26-50	51-75	76-100	101-150	151-200	201-300	301-400	401-500	501-1000	1000 & Over
Minimum Number of Accessible spaces	1	2	3	4	5	6	7	8	9	2% of total	20 plus 1 for each 100 over 1000

C. One (1) van accessible handicap space is required for each eight (8) standard handicap spaces required. At least one (1) van accessible space is required for each use.

D. Accessible spaces shall be eight feet (8'-0") wide, with an adjacent access aisle five feet (5'-0") wide, and shall be marked with signs and pavement paint. One (1) in every eight (8) accessible spaces shall have an access aisle eight feet (8'-0") (rather than five feet (5'-0")) and shall be signed "Van Accessible".

§171-98. Off-Street Loading and Unloading Requirements.

A. For every building hereafter erected for Retail and Service Commercial, Wholesale, Transportation and Industrial, and Community Facility use as specified in the Table of Use Regulations and for every such use hereinafter established in an existing building or area, the off-street loading and unloading requirements presented in the Table of Off-Street Loading Regulations shall apply.

§ 171-99. Table of Off Street Loading Regulations.

Type of Use	First Loading Space	Second Loading Space	Each Additional Space
Retail Trade	20,000 sq. ft.	60,000 sq. ft.	One for 60,000 sq. ft. of GFA
Wholesale Distribution	20,000 sq. ft.	60,000 sq. ft.	One for 60,000 sq. ft. of GFA
Hotels and Motels	20,000 sq. ft.	100,000 sq. ft.	One for each 100,000 sq. ft. of GFA
Business Services	75,000 sq. ft.	200,000 sq. ft.	One for each 250,000 sq. ft. of GFA
Other Services	75,000 sq. ft.	200,000 sq. ft.	One for each 250,000 sq. ft. of GFA
*Hospital	20,000 sq. ft.	100,000 sq. ft.	One for each 100,000 sq. ft. of GFA

Manufacturing	15,000 sq. ft.	40,000 sq. ft.	One for each 60,000 sq. ft.
Motor Freight Terminal and Warehousing	15,000 sq. ft.	40,000 sq. ft.	One for each 60,000 sq. ft.
Community Facility, School, Church, Town Building, Recreation Area, etc.	75,000 sq. ft.	150,000 sq. ft.	One for each 200,000 sq. ft.
Public Utility Establishment with over 5,000 sq. ft. of GFA	75,000 sq. ft.	150,000 sq. ft.	One for each 200,000 sq. ft.

*Space used for ambulance receiving at a hospital is not used to meet these loading requirements.

WARE RIVER PROTECTION AND FLOODPLAIN ZONING

1. Ware River Protection and Floodplain District

A. Purposes.

The purposes of the Ware River Protection and Floodplain District are to:

1. Protect public water supplies in the Town of Palmer along the Ware River;
2. Protect life, public safety and property from flooding hazards;
3. Preserve the natural flood control and flood storage characteristics of the floodplain;
4. Promote the preservation of agricultural lands along the Ware River;
5. Prevent any alterations to the natural flow of the river;
6. Protect fisheries and wildlife habitat within and along the Ware River;
7. Control erosion and siltation;
8. Enhance and preserve existing scenic or environmentally sensitive areas along the shoreline;
9. Conserve shore cover and encourage well-designed developments;
10. Prevent water pollution caused by erosion, sedimentation, nutrient or pesticide run-off, and poorly sited waste disposal facilities.
11. Preserve and maintain the groundwater table and water recharge areas within the floodplain.
12. Maintain the wild and scenic qualities of the Ware River .

B. District Delineation

1. The Ware River Protection and Floodplain Zoning District is herein established as an overlay district and includes:
 - a) All special flood hazard areas designated as Zone A or Zones A1-30 on the Palmer Flood Insurance Rate Maps (FIRM) for the Ware River, dated _____, on file with the Town Clerk, and hereby made a part of this By-Law;
 - b) The riverfront area, as defined in MGL Chapter 131, section 40 and this bylaw, including all land situated between a river's mean annual high water line and a parallel line located two hundred (200) feet away, measured horizontally, along the entire length of the Ware River within the Town of Palmer, ***except for designated Densely Developed Areas in Thorndike Village, which are subject to a riverfront area which includes all land situated between the river's mean annual high water line and a parallel line located twenty-five (25) feet away, in accordance with MGL Chapter 131, section 40.***
2. The boundaries of the Ware River Protection and Floodplain District shall be determined by scaling distances on the Flood Insurance Rate Map. When interpretation is needed as to the exact location of the boundaries of a District, the Building Inspector shall make the necessary interpretation.

C. Definitions

1. Animal Feedlots: A confined, fenced area designed for intensive feeding of livestock;
2. Buffer: A strip of land, measured landward from the riverbank, which must be left in its natural, vegetated condition.

3. Erosion and Sediment Control BMPs: Practices for controlling construction-related soil erosion and sediment including, but not limited to, staked hay bales, filter fences, hydro-seeding and phased development.
4. Mean Annual High-Water Line: With respect to a river, the line that is apparent from visible markings or changes in the character of soils or vegetation due to the prolonged presence of water and which distinguishes between predominantly aquatic and predominantly terrestrial land.
5. Natural Riverbank Best Management Practices: Practices for riverbank maintenance which promote habitat creation and restoration and treatment and infiltration of stormwater runoff including, but not limited to, native vegetation, soil stabilization matting and geotextiles, and dormant live woody brush layers, fascines and stakes, but not including rock riprap.
6. River: A natural flowing body of water that empties to any ocean, lake, or other river and which flows throughout the year.
7. Riverfront Area: That area of land situated between a river's mean annual high-water line and a parallel line located two hundred feet away, measured outward horizontally from the river's mean annual high-water line.

D. Development Regulations

1. All development within the Ware River Protection and Floodplain District, including structural and non-structural activities, whether permitted as a right or by Special Permit must be in compliance with the Massachusetts River Protection Act and the Massachusetts Wetlands Protection Act, (MGL Ch131 s40), and with the requirements of the Massachusetts State Building Code pertaining to construction in the Flood Plain (currently Section 744).
2. *All utilities shall meet the following standards:*
 - (i) *ALL new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system.*
 - (ii) *New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the system and discharge from the system into flood waters.*
 - (iii) *New on-site waste disposal systems shall be located to avoid impairment or contamination from them during the flooding and shall be located no less than 150 feet from the riverbank. Replacement of existing on-site waste disposal systems shall be located as far away from the riverbank as is feasible.*

E. Use Regulations

1. Permitted Uses

The following uses in the Ware River Protection and Floodplain District of low flood damage potential and causing no obstruction to flood flows shall be permitted, provided they do not require structures, fill, or storage of material or equipment *except as specifically allowed below*:

- a. Agricultural uses such as farming, grazing, and horticulture, including barns or farm-related structures.
- b. Forestry uses.
- c. Outdoor recreational uses, including fishing, boating, play areas and foot, bicycle or horse paths.
- d. Conservation of water, plants, and wildlife.
- e. Wildlife management areas.
- f. Buildings lawfully existing prior to the adoption of these provisions.
- g. ***Public parking or staging area for recreational uses, including but not limited to fishing or canoe launch areas.***

2. Prohibited Uses

- a. No altering, dumping, filling, or removal of riverine materials or dredging is permitted. Maintenance of the riverbank may be done under requirements of MGL Ch 131s 40, and any other applicable laws, by-laws, and regulations, and must be done using natural riverbank best management practices.
- b. No impoundments, dams, or other water obstructions may be located within the District.
- c. Commercial or industrial uses are prohibited in the district, except for uses specifically allowed by Special Permit in Section 4 of this bylaw..
- d. Parking or storage of vehicles, trailers or equipment within 200 feet of the riverbank is prohibited. The Special Permit Granting Authority may consider whether a variance from this prohibition is warranted, where a hardship exists due to lot size or configuration.
- e. Dumping of trash, garbage or other materials on or near the riverbank is prohibited.
- f. Construction of any kind on slopes of greater than 25% within the district is prohibited.
- g. No discharge of pollutants directly to the Ware River or its tributaries is permitted.
- h. No logging roads may be located within the river or riverbank areas, as defined in the Massachusetts Wetlands Protection Act.
- i. All other uses not specifically permitted or allowed by site plan approval within the overlay zone are prohibited.

3. Restricted Uses

- a. All forest cutting of any size shall require the filing of a Forest Cutting Plan in accordance with the Massachusetts Forest Cutting Practices Act (MGL Ch 132s 40-46). All forest cutting plans shall require a licensed forester to file the plan and oversee the cutting work.
- b. No cutting of forest or vegetation shall occur within fifty (50) feet of the river bank. In the area between fifty (50) and one hundred (100) feet from the river bank, no more than 50% of existing forest shall be cut. Exempted from the requirements in this section are: the cutting or management of state-listed invasive species; installation of wildlife habitat; management of flow obstructions; removal of nuisance vegetation (i.e. dangerous or hazardous); removal of flood

debris; or riverbank restoration activities permitted by the Conservation Commission. In considering whether forest or vegetation cutting shall be permitted, the Planning Board shall consider the following guidelines:

- i. Forest or vegetation cutting shall conserve woody habitat along riverfront areas that is important to fish and wildlife;
 - ii. Stream flow obstructions which are dangerous to boaters shall be removed, but other woody debris which is not dangerous should be left for fish habitat.
- c. Fenced animal grazing areas must be located at least fifty feet from the riverbank, with a naturally vegetated fifty-foot buffer strip along the river to reduce runoff to the river, and a fence to prevent animals from encroaching on the buffer strip.

4. Uses by Special Permit

- a. ***Except for those uses permitted by right in Section E-1, no structure or building in the Ware River Protection and Floodplain District shall be erected, constructed, substantially improved, reconstructed, or otherwise created or moved; no earth or other materials dumped, filled, excavated, or transferred, unless a Special Permit is granted by the Planning Board.***
- b. The following uses may be allowed by Special Permit in accordance with the Special Permit regulations of this Zoning By-Law, and additional restriction and criteria contained herein:
 - i. Single family residences.
 - ii. Residential accessory uses including garages, driveways, private roads, utility rights-of-way and on-site waste-water disposal systems.
 - iii. Home-based businesses, mixed commercial/residential use structures, and other small-scale commercial uses with are compatible with riverfront areas;
 - iv. Enlargement or alteration of an existing structure, provided that the addition is no more than 25% larger than the footprint of the structure that existed at the time of the adoption of this bylaw.
 - v. Animal feedlots, in conformance with Conservation Practice Standards established by the Natural Resource Conservation Service (NRCS).
 - vi. ***Commercial and industrial uses in areas zoned VC IV Thorndike Village CE, VC II Three Rivers Village and Neighborhood Business, provided that such development is consistent with the purposes of this bylaw, meets all other applicable provisions of this bylaw, and will not result in alteration, filling or removal of existing vegetative cover within 25 feet of the river's mean annual high water line.***

5. Special Permit ***Requirements in the Ware River Protection and Floodplain District***

- a. ***All uses allowed by Special Permit in the Ware River Protection and Floodplain District must meet the following requirements:***

- i. Within Zone A 1-30, where base flood elevation is not provided on the FIRM, the applicant shall obtain any existing base flood elevation data. These data will be reviewed by the Building Inspector for their reasonable utilization toward meeting the elevation or flood proofing requirements, as appropriate, of the State Building Code.
- ii. No encroachments (including fill, new construction, substantial improvements to existing structures, or other development shall be allowed unless it is demonstrated by the applicant that the proposed development, as a result of compensating actions, will not result in any increase in flood levels during the occurrence of a 100-year flood in accordance with the Federal Emergency Management Agency's regulation for the National Flood Insurance Program.
- iii. Construction on slopes of 10-25% within the district, shall require the preparation and submittal of an erosion and sediment control plan, describing best management practices which will be employed to prevent construction-related impacts to river water quality.
- iv. The proposed use shall comply in all respects to the provisions of the underlying District in which the land is located.
- v. The Board may specify such additional requirements and conditions as it finds necessary to protect the health, safety and welfare of the public and the occupants of the proposed use.
- vi. Within 10 days of the receipt of the application the Board shall transmit one copy of the development plan to the Conservation Commission, Board of Health and Building Inspector. Final action shall not be taken until reports have been received from the above Boards or until thirty-five (35) days have elapsed.
- vii. A buffer strip extending at least two hundred (200) feet in depth, to be measured landward from each bank of the Ware River shall be required for all lots within the Ware River Protection and Floodplain District. ***In the VC IV Thorndike Village CE, VC II Three Rivers Village and Neighborhood Business Zones, this buffer strip may be reduced to 25 feet for commercial and industrial uses.*** If any lot, existing at the time of adoption of this By-Law, does not contain sufficient depth, measured landward from the river bank, to provide a two hundred (200) foot buffer strip, the buffer strip, may be reduced to 50% of the available lot depth, measured landward from the river bank. For purposes of this By-Law, the river bank shall be defined as the river's seasonal high water mark. The buffer strip shall include trees and shall be kept in a natural condition.
- viii. On-site wastewater disposal systems shall be located as far from the Ware River as is feasible.

6. *Special Permit Criteria*

- a. In addition to the Special Permit Procedures in Section _____, in order to issue a Special Permit, the Planning Board must find that the proposed use is compliant with the following provisions:
 - a) Not create increased flood hazards which are detrimental to the public health, safety and welfare;
 - b) Comply in all respects to the provisions of the underlying District or Districts within which the land is located;
 - c) Comply with all applicable State and Federal laws, including the Massachusetts Wetlands Protection Act (MGL Ch 131 s40);
 - d) Be situated in a portion of the site that will conserve riverfront vegetation and the integrity of the buffer strip, and maximize open space retention;
 - e) Be integrated into the existing landscape through features such as vegetative buffers and through retention of the natural shorelines;
 - f) Not result in water pollution, erosion or sedimentation;
 - g) Minimize obstruction of scenic views from publicly accessible locations;
 - h) Preserve unique natural and historical features;
 - i) Minimize tree, vegetation and soil removal and grade changes.

Note: The following may be redundant with other section of Palmer Zoning Bylaw:

7. Nonconforming Uses

- a. Any lawful use, building, structures, premises, land or parts thereof existing at the effective date of this By-Law or amendments thereof and not in conformance with the provisions of this By-Law shall be considered to be a nonconforming use.
- b. Any existing use or structure may continue and may be maintained, repaired, and improved, but in no event made larger.
- c. Any nonconforming structure which is destroyed may be rebuilt on the same location but no larger than its overall original square footage.

8. Enforcement and Penalties

a. Violations

Any development activity that has commenced or is conducted contrary to this bylaw may be restrained by injunction or otherwise abated in a manner provided by law.

b. Notice of Violation

When the Planning Board determines that an activity is not being carried out in accordance with the requirements of this bylaw, it shall issue a written notice of violation to the owner of the property. The notice of violation shall contain:

- i. the name and address of the owner applicant;
- ii. the address when available or the description of the building, structure, or land upon which the violation is occurring;
- iii. a statement specifying the nature of the violation;
- iv. a description of the remedial measures necessary to bring the development activity into compliance with this Bylaw and a time schedule for the completion of such remedial action;

- v. a statement of the penalty or penalties that shall or may be assessed against the person to whom the notice of violation is directed;
 - vi. a statement that the determination of violation may be appealed to the municipality by filing a written notice of appeal within fifteen (15) days of service of notice of violation.
- c. Stop Work Orders
Persons receiving a notice of violations will be required to halt all construction activities. This “stop work order” will be in effect until the _____ confirms that the development activity is in compliance and the violation has been satisfactorily addressed. Failure to address a notice of violation in a timely manner can result in civil, criminal, or monetary penalties in accordance with the enforcement measures authorized in this Ordinance.
- d. Criminal and Civil Penalties
Any person who violates any provision of this ordinance, valid regulation, or the terms or conditions in any permit or order prescribed or issued thereunder, shall be subject to a fine, payable to the town, not to exceed \$300.00 for each day such violation occurs or continues or subject to a civil penalty, which may be assessed in an action brought on behalf of the Town in any court of competent jurisdiction.
- e. Non-Criminal Disposition
As an alternative to criminal prosecution or civil action, the Town of Palmer may elect to utilize the non-criminal disposition procedure set forth in the town bylaws. The _____ shall be the enforcing entity. The penalty for the 1st violation shall be up to \$100. The penalty for the 2nd violation shall be up to \$200. The penalty for the 3rd and subsequent violations shall be \$ 300.00. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.
- f. Restoration of Lands
Any violator may be required to restore land to its undisturbed condition. In the event that restoration is not undertaken within a reasonable time after notice, the _____ may take necessary corrective action.
8. Severability
The invalidity of any section or provision of this Bylaw shall not invalidate any other section or provision thereof.

MODEL STORMWATER MANAGEMENT / LID BYLAW - Annotated

Section 1 Purpose and Authority

- A. The purpose of this section is to protect, maintain, and enhance the public health, safety, and general welfare of the citizens of [name of Town/City] by establishing minimum requirements and procedures to control the adverse impacts associated with stormwater runoff from new development and redevelopment.
- B. The objectives of this section are:
1. Establish regulations for land development activities that preserve the health of water resources by reducing the adverse impacts to water quality from stormwater discharges to rivers, lakes, reservoirs and streams in order to attain federal water quality standards;
 2. Require that new development, redevelopment and all land conversion activities maintain the natural hydrologic characteristics of the land in order to reduce flooding, stream bank erosion, siltation, nonpoint source pollution, property damage and the integrity of aquatic habitats and stream channels;
 3. Prevent the discharge of pollutants, including hazardous chemicals, into stormwater runoff;
 4. Minimize the volume and rate of stormwater which is discharged, to rivers, streams, reservoirs, lakes and combined sewers that flow from any site during construction and following development;
 5. Prevent erosion and sedimentation from land development, and reduce stream channel erosion caused by increased runoff;
 6. Require pre-development and post-development runoff volume and quality to be equivalent or improved by reducing runoff volumes, increasing infiltration and, improving runoff water quality.
 7. Provide for the recharge of groundwater aquifers and maintain the base flow of streams;
 8. Encourage the use of Low Impact Development (LID) practices such as reducing impervious cover, treating and infiltrating stormwater at the source, utilizing environmentally sensitive site design and, the preservation of open space and natural areas, to the maximum extent practicable;
 9. Coordinate site plans which include open space with the Town/City's Open Space and Recreation Plan [or other community plans] to promote the connection of open space corridors.
 10. Provide stormwater facilities that are attractive, maintain the natural integrity of the environment, and are designed to protect public safety;
 11. Minimize damage to public and private property from flooding;

12. Establish maintenance provisions to ensure the stormwater treatment devices and facilities will continue to function as designed;
13. Establish procedures for the City/Town's review of stormwater management plans, and for the City/Town's inspection of approved stormwater controls; and,
14. Comply with state and federal statutes and regulations relating to stormwater discharges.

COMMENT: Palmer added the following objectives:

Inform the public about the value and benefits of groundwater recharge, pollution reduction and importance of clean water.

It is the intent that upon having followed the guidance of the Ordinance that the applicant will have done sufficient planning and documentation for Conservation Commission review (where there is jurisdiction) and for U.S. Environmental Protection Agency review where a National Pollution Discharge Elimination System construction general permit is required.

C. The Authorized Permitting Agency shall administer and implement this [division/chapter/section].

COMMENT: *Authorized permitting agency* may vary depending on staffing capabilities and expertise of individual boards and departments. Most communities seek to incorporate Stormwater Permit review alongside other permit application review.

Example (Westfield) - The board of public works or planning board or city council when an eligible project involves a zoning special permit, site plan approval or definitive subdivision approval. When a project requires a Notice of Intent from the Conservation Commission and does not require review or permitting from any of the aforementioned boards and departments, the Conservation Commission shall administer and implement this section.

In the case of a special permit, site plan approval and/or definitive subdivision approval said application for a stormwater management permit shall be incorporated and included as a part of the applications for such other zoning and/or subdivision permit approvals, and shall be issued with and become a part of said other approved zoning and/or subdivision permits. In the case of a Notice of Intent to the Conservation Commission, said application for a Stormwater Management Permit shall be incorporated and included as part of the applications if none of the aforementioned permits are also triggered by the project.

Example (Palmer) – Authority shared between Department of Public Works and the Planning Board. Authorized Administrative Agency is the Department of Public Works for all development projects involving new construction of single or two-family dwellings, and any additions to existing single or two-family dwellings that result in ≤25% increase in floor area, vehicle traffic, parking, number of tenants, and/or number of employees. The Department of Public Works shall also administer this Ordinance for

any land disturbance of one acre or more that does not fall under the Planning Board's purview under this Ordinance. The Planning Board is the Authorized Administrative Agency for all other land or building uses, and additions that result in >25% increase in floor area, vehicle traffic, parking, number of tenants, and/or number of employees. Authorized Administrative Agency can include Building Inspector or Planning Board employees or agents designated to administer and implement this Ordinance by vote of either board.

Some communities also identify an Authorized Enforcement Agency if different than Authorized Administrative Entity (permit granting authority)

Example (Palmer) - Authorized Enforcement Agency The Zoning Enforcement Officer, Department of Public Works, Conservation Commission, Planning Board, Town Manager, and/or its employees or agents.

Section 2 Definitions

The following definitions describe the meaning of the terms used in this ordinance:

Adverse impact: Any deleterious effect on waters or wetlands, including their quality, quantity, surface area, species composition, aesthetics or usefulness for human or natural uses which are or may potentially be harmful or injurious to human health, welfare, safety or property, to biological productivity, diversity, or stability or which unreasonably interfere with the enjoyment of life or property, including outdoor recreation.

Authorized permitting agency: The [board of public works or planning board or conservation commission or city council] when an eligible project involves a [zoning special permit, site plan approval or definitive subdivision approval or building permit or Notice of Intent].

COMMENT: See Section 1 Purpose and Authority above for further guidance on designating an Authorized permitting agency.

Best management practices (BMP): Stormwater management systems and facilities including structural or biological devices, manmade or natural, that temporarily store, treat, or convey stormwater runoff to reduce flooding, remove pollutants, recharge groundwater, and provide other amenities. They can also be nonstructural practices that reduce pollutants at their source. BMPs are further described in a stormwater design manual, *Massachusetts Stormwater Handbook: Volume 2 Technical Guide for Compliance with the Massachusetts Stormwater Management Standards* (February 2008, Massachusetts Department of Environmental Protection), *Clean Water Act: The Federal Water Pollution Control Act* (33 U.S.C. section 1251 et seq.) as hereinafter amended.

Construction activity: Disturbance of the ground by removal or moving of vegetative surface cover or topsoil, grading, excavation, clearing or filling.

Design storm: A rainfall event of specified size and return frequency that is used to calculate the runoff volume and peak discharge rate to a BMP.

Detention: The temporary storage of storm runoff in a BMP, which is used to control the "peak discharge" rates, and which provides gravity settling of pollutants.

Discharge of pollutants: The addition from any source of any pollutant or combination of pollutants into storm drain systems or into the waters of the United States or commonwealth from any source.

Disturbance: Any land clearing, grading, bulldozing, digging or similar activities.

Drainage area: That area contributing runoff to a single point measured in a horizontal plane, which is enclosed by a ridgeline.

Drywell: Similar to an infiltration trench but smaller with inflow from a pipe; commonly covered with soil and used for drainage areas of less than 1 acre such as roadside inlets and rooftops runoff.

Easement: A right of use over the property of another, generally for a specific purpose such as rights of access or rights regarding flowing waters or drainage.

Environmental Site Design (ESD): Site planning and layout that seeks to create pockets of development that avoid sensitive natural areas to prevent disruption of the natural hydrology and habitat function of the site.

Flow attenuation: Prolonging the flow time of runoff to reduce the peak discharge.

Groundwater: All water beneath the surface of the ground not contained in a manmade structure.

Hydrology model: One of the following:

- * TR-20, a watershed hydrology model developed by the Natural Resources Conservation Service Act that is used to route a design storm hydrograph through a pond;
- * TR 55, or Technical Release 55, "Urban Hydrology for Small Watersheds" is a publication developed by the Natural Resources Conservation Service to calculate stormwater runoff and an aid in designing detention basins; or,
- * Hydrocad.

Illegal discharge: Any direct or indirect non-stormwater discharge to storm drain systems, except as specifically exempted in [insert reference to local Illicit Discharge Detection and Elimination Bylaw]. The term does not include a discharge in compliance with an NPDES stormwater discharge permit or resulting from fire fighting activities exempted pursuant to aforementioned bylaw.

Illicit connection: Any surface or subsurface drain or conveyance, which allows an illegal discharge into storm drain systems. Illicit connections include conveyances which allow a non-stormwater discharge to storm drain systems including sewage, process wastewater or wash water and any connections from indoor drains, sinks or toilets, regardless of whether said connection was previously allowed, permitted or approved before the effective date of this division.

Impervious surfaces: Developed areas, such as pavement or rooftops, which prevent the infiltration of water into the soil. Any material or structure on or above the ground that prevents water from infiltrating the underlying soil.

Infiltration: The downward movement of water from the surface to the subsoil.

Infiltration trench: A stormwater management excavation filled with aggregate which removes both soluble and particulate pollutants. Trenches are not intended to trap coarse sediments.

Low Impact Development (LID): A set of approaches that seeks to mimic a site's predevelopment hydrology using design techniques that infiltrate, filter, store, evaporate and detain runoff close to its source. Instead of conveying, managing and/or treating stormwater in large, end-of-pipe facilities, LID utilizes small-scale, decentralized practices that infiltrate, treat, evaporate, and transpire rain water and snow melt including bioretention areas, grassed swales, reducing impervious areas, preservation of open space, development density, lot size and configuration, street design, parking design, and other structural stormwater treatment methods.

Municipal separate storm sewer system (MS4) or municipal storm drain system: The system of conveyances designed or used for collecting or conveying stormwater, including any road with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, retention or detention basin, natural or manmade or altered drain channel, reservoir, and other drainage structure that together comprise the storm drainage system owned and operated by the City of Westfield.

National Pollutant Discharge Elimination System (NPDES) stormwater discharge permit: A permit issued by the United States Environmental Protection Agency or jointly with the state that authorizes the discharge of pollutants to waters of the United States.

Non-stormwater discharges: Any discharge to the storm drain systems not composed entirely of stormwater.

Outfall: The terminus of a storm drain or other stormwater structure where the contents are released.

Owner: Every person who alone, jointly or severally with others:

1. Has legal title to any building, structure or parcel of land; or,
2. Has care, charge or control of any building, structure, or parcel of land in any capacity including but not limited to, an agent, executor, executrix, administrator, administratrix, trustee or guardian of the estate of the holder of legal title; or,
3. Lessee under a written lease agreement; or,
4. Mortgagee in possession; or,
5. Agent, trustee or other person appointed by the courts.

Peak discharge: The maximum instantaneous rate of flow during a storm, usually in reference to a specific design storm event

Permeable soils: Soil materials with a sufficiently rapid infiltration rate so as to greatly reduce or eliminate surface and stormwater runoff. These soils are generally classified as NRCS hydrologic soil types A and B.

Person: Any individual, association, partnership, corporation, company, business, organization, trust, estate, administrative agency, public or quasi-public corporation or body, the commonwealth or political subdivision thereof or the federal government, to the extent permitted by law and agent of such person.

Pollutant: Any element of property or sewage, agricultural, industrial or commercial waste, runoff, leachate, heated effluent, or other matter whether originating at a point or nonpoint source, that is or may be introduced into any sewage treatment works or waters of the commonwealth. Pollutants shall include:

1. Paints, varnishes and solvents;
2. Oil and other automotive fluids;
3. Nonhazardous liquid and solid wastes and yard wastes;
4. Refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordnances, accumulations and floatables;
5. Pesticides, herbicides and fertilizers;
6. Hazardous materials and wastes; sewage, fecal coliform and pathogens;
7. Dissolved and particulate metals;
8. Animal wastes and residues;
9. Rock, sand, salt and soils;
10. Construction wastes and residues;
11. Noxious or offense matter of any kind.

Process water: Any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any material, intermediate product, finished product or waste product.

Recharge: The process by which groundwater is replenished by precipitation through the percolation of runoff and surface water through the soil.

Retention: The holding of runoff in a basin without release except by means of evaporation, infiltration, or emergency bypass.

Start of construction: The first land-disturbing activity associated with a development, including land preparation such as: clearing and grubbing, grading and filling; installation of streets and walkways; excavation for basements; footings, piers or foundations; erection of temporary forms; and installation of accessory buildings such as garages.

Stormwater: Runoff from precipitation or snow melt.

Storm drain system: The system of conveyances designed or used for collecting or conveying stormwater, including any road with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, retention or detention basin, natural or manmade or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drainage system on public or private ways within the _____.

Swale: A natural depression or wide shallow ditch used to temporarily store, route, or filter runoff.

Toxic or hazardous material or waste: Any material which, because of its quantity, concentration, chemical, corrosive, flammable, reactive, toxic, infectious or radioactive characteristics, either separately or in combination with any substance or substances, constitutes a present or potential threat to human health, safety, welfare of to the environment. Toxic or hazardous materials include any synthetic organic chemical, petroleum product, heavy metal, radioactive or infectious waste, acid and

alkali, and any substance defined as toxic or hazardous under M.G.L.A. c. 21C and c. 21E, and the regulations at 310 CMR 30.000 and 310 CMR 40.000.

Uncontaminated: Water containing no pollutants.

Watercourses: A natural or manmade channel through which water flows or a stream of water, including a river, brook or underground stream.

Waters of the commonwealth: All waters within the jurisdiction of the Commonwealth, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, wetlands, coastal waters and groundwater.

Wastewater: Any sanitary waste, sludge or septic tank or cesspool overflow and water that during manufacturing, cleaning or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct or waste product.

Section 3 Applicability

COMMENT: NPDES only requires stormwater controls for sites disturbing one acre or more. Some communities have chosen to regulate additional uses and disturbances whether or not they disturb one acre or more of land, such as the construction of single-family dwellings.

Example (Palmer) - ...all land disturbance uses requiring a Special Permit, Site Plan Approval, and any residential uses, including residential dwellings that create land disturbances and require a Building Permit. It shall also apply to all other land disturbances of one acre or more.”

NPDES requires communities to regulate stormwater discharges to the MS4. Some communities have chosen to regulate stormwater management at sites that do not discharge to the MS4 and manage all stormwater on site in order to establish community wide standards for achieving improved water quality and groundwater recharge objectives.

A. Applicability

This [division/chapter/section] shall apply to stormwater entering the municipally-owned storm drainage system, and stormwater on private property for those activities identified in Section 3 (B) whether or not flows enter the municipally owned storm drainage system.

B. Permit or Waiver Required

Prior to the commencement of construction for any proposed development listed below, a stormwater management permit, or a waiver of the requirement for a stormwater management permit, must be approved by the applicable authorized permitting agency. No person shall, on or after the effective date of the section, initiate any land clearing and grubbing, land grading, earth moving or development activities without first complying with this ordinance. The following uses and activities shall be required to submit drainage reports, plans, construction drawings, specifications and as-constructed information in conformance with the requirements of this [division/chapter/section]:

1. Multifamily residential developments involving four or more units;

2. Any new commercial, industrial, and institutional structures under the same ownership, with at least 5,000 square feet of gross floor area, 10,000 square feet of impervious surface, or that require ten or more parking spaces;
3. Redevelopment or additions to existing commercial, industrial, and institutional uses which result in an additional impervious surface area or gross floor area of greater than 5,000 square feet, or which results in an increase of ten or more parking spaces.
4. Construction activities and subdivisions disturbing greater than or equal to one acre.
5. Development or redevelopment involving multiple separate activities in discontinuous locations or on different schedules if the activities are part of a larger common plan of development that together disturbs one or more acres.

C. Exemptions

The following uses and activities are exempt from the requirements for submittal and approval of a Stormwater Management Plan. All exempt uses and activities must still comply with the purposes and the stormwater performance standards of this [division/chapter/section]. Failure of an exempt use or activity to comply with the provisions of this [division/chapter/section] shall be interpreted as a violation and exempt status revoked.

1. Any agricultural activity which is consistent with an approved soil conservation plan prepared or approved by the Natural Resources Conservation Service;
2. Any logging which is consistent with a timber management plan approved under the Forest Cutting Practices Act by Massachusetts Department of Environmental Management;
3. Developments that do not disturb more than one acre of land, provided that they are not part of a larger common development plan;

COMMENT: Some communities have chosen to regulate disturbances smaller than one acre such as the construction of single-family dwellings. For those communities, this exemption is not appropriate.

4. Repairs to any stormwater treatment system deemed necessary by the [town/city Department of Public Works/Highway Department];
5. Any emergency activity that is immediately necessary for the protection of life, property or the environment, as determined by the [Department of Public Works/Highway Department]; and
6. Any uses and activities not specified in subsection (3)(B).

D. Stormwater Design Manual

A stormwater design manual, Massachusetts Stormwater Handbook: Volume 2 Technical Guide for Compliance with Massachusetts Stormwater Management Standard (Massachusetts Department of Environmental Protection, February 2008), as updated or amended, is hereby incorporated by reference

as part of this [division/chapter/section], and shall furnish additional policy, criteria and information including specifications and standards, for the proper implementation of the requirements of this division. This manual includes a list of acceptable stormwater treatment practices, including the specific design criteria for each stormwater practice. The manual may be updated and expanded from time to time, based on improvements in engineering, science, monitoring and local maintenance experience, at the discretion of the Massachusetts Department of Environmental Protection. Stormwater treatment practices that are designed and constructed in accordance with these design and sizing criteria will be presumed to meet the minimum water quality performance standards.

Section 4 Permit Procedures and Requirements

A. Permit required

No owner or operator may apply for nor be issued any of the building, grading, or other land development permits required for land disturbance activities as described in subsection (3) above, and no owner shall commence any such land disturbance activities, without the prior approval of a stormwater management permit from the authorized permitting agency and meeting the requirements of this [division/chapter/section].

B. Application

Application for approval of a stormwater management permit shall include the following:

1. A Stormwater Management Plan which shall contain sufficient information to describe the nature and purpose of the proposed development (see Section 5 Stormwater Management Plan Contents below). The plan shall serve as the basis for all subsequent construction.
2. Supporting computations, drawings, and sufficient information describing the manner, location, and type of measures in which stormwater runoff and erosion will be managed for the entire development during and after construction.
3. Ongoing maintenance agreement.
4. Nonrefundable permit fee.

COMMENT: Fees are discussed in detail under (H) below.

The applicant may request, and the authorized permitting agency may grant, a waiver from any information requirements it judges to be unnecessary to the review of a particular plan.

C. Procedures for review and approval of stormwater permits

1. A stormwater management plan (or an application for waiver) shall be submitted to the authorized permitting agency for review and approval for any proposed development specified in subsection (4). [Number of] copies of the stormwater management plan shall be submitted (along with all other documents required for any zoning or subdivision permits/approvals when required).
2. The procedures for review and approval of stormwater management plans shall be consistent with review procedures of the authorized permitting agency, as appropriate to the use.

3. The authorized permitting agency shall refer copies of the stormwater management plan to [*the city engineer, department of public works, planning department, water department, health department, conservation commission, building department and the gas and electric department*] for review, and shall consider any comments submitted by said departments during the review period.

4. The authorized permitting agency shall hold a public hearing. [*The planning board and city council shall hold their public hearing as part of their special permit, site plan approval and/or definitive subdivision approval process. The board of public works shall hold its public hearing within 45 days of the receipt of a complete application and shall take final action within 45 days from the close of the hearing unless such time is extended by agreement between the applicant and board. Notice of the public hearing shall be given by publication in a local paper of general circulation, by posting and by first-class mailings to abutters at least seven days prior to the hearing.*]

COMMENT: It is recommended that the procedures of the public hearing and amount of time for final action be consistent with other permits issued by the authorized permitting authority.

D. Criteria for review of stormwater management plans

In addition to other criteria used by the authorized permitting agency in making permit decisions, for the uses specified in this [*division/section/chapter*], said authorized permitting agency must also find that the stormwater management plan submitted with the permit application meets the following criteria:

1. The stormwater management plan is consistent with the purposes and objectives of this division in subsection (1);
2. The stormwater management plan meets the performance standards described in subsection (6); and,
3. The stormwater management plan meets the design requirements in subsection (7).

E. Authorized permitting agency action

The authorized permitting agency's action, rendered in writing, shall consist of either:

1. Approval of the stormwater management permit application based upon determination that the proposed stormwater management plan meets the purposes in subsection (1), the standards in subsection (6), and is in compliance with the requirements set forth in this [*division/section/chapter*]; or,
2. Approval of the stormwater management permit application subject to any conditions, modifications or restrictions required by the board which will ensure that the project meets the purposes in subsection (1) and the performance standards in subsection (6); or,
3. Disapproval of the stormwater management permit application based upon a determination that the proposed stormwater management plan, as submitted, does not meet the purposes in

subsection (1) and the performance standards in subsection (6) to adequately protect water resources, as set forth in this [division/section/chapter].

Failure of the authorized permitting agency to take final action upon an application within the time specified above shall be deemed to be approval of said application. Upon certification by the city clerk that the allowed time has passed without authorized permitting agency action, the authorized permitting agency must issue a stormwater management permit.

F. Inspections

No plan will be approved without adequate provision for inspection of the property before development activity commences. The applicant shall arrange with the authorized permitting agency (or its appointed agent) for scheduling the following inspections, or upon request by the authorized permitting agency, shall have a qualified third party as determined by the [City Engineer /DPW Superintendent] perform the inspections and submit a detailed report as to their findings:

1. Initial inspection prior to approval of any plan;
2. Erosion control inspections after site clearing, rough grading and final grading to ensure erosion control practices are in accord with the plan;
3. Bury inspection prior to backfilling of any underground drainage or stormwater conveyance structures; and,
4. Final inspection when all work, including construction of stormwater management facilities and landscaping have been completed.

Inspection reporting shall either approve it or notify the applicant in writing in what respects there has been a failure to comply with the requirements of the approved plan. Any portion of the work which does not comply shall be promptly corrected by the applicant or the applicant will be subject to the bonding provisions of subsection (9) or the penalty provisions of subsection (10). The authorized permitting agency or its agent may conduct random inspections to ensure effective control of erosion and sedimentation during all phases of construction.

G. Right of entry for inspection

The filing of a Stormwater Management Permit application shall be deemed as the property owner's permission to the authorized permitting agency, or its agent, for the right to enter the property at reasonable times and in a reasonable manner for the purpose of the inspection. This includes the right to enter a property when it has a reasonable basis to believe that a violation of this [division/section/chapter] is occurring or has occurred, and to enter when necessary for abatement of a public nuisance or correction a violation.

H. Stormwater permit fees

COMMENT: Fee structures vary greatly and are determined by the availability of each communities staffing and funding resources to oversee permit applications, review plans, perform inspections, and seek enforcement if needed. Some communities set a fee for the review of the application and a

separate fee for inspections. One fee rather than two separate fees with separate accounting needs is recommended to provide for both application review and inspection services.

If the bylaw establishes a single authorized permitting authority, the fees can be set via regulations adopted by that board. However, if there are multiple permit granting authorities, the fee should be established in the bylaw.

Communities also have the right to require applicants to pay reasonable costs for outside professional expertise employed by the municipality to assist in review of an application in accordance with MGL Chapter 44, Section 53G.

Example (Westfield) - For permits issued by the Planning Board, Conservation Commission or City Council, no additional fee is required. For permits issued by the Board of Public Works the fee for review of any land development application shall be based on the amount of land to be disturbed at the site and the fee structure established by the board.

The stormwater permit fee is as follows _____ .

Section 5 Contents of the stormwater management plan

COMMENT: For communities seeking to regulate disturbances from single-family dwellings, a less technical stormwater management plan is required. For all other activities regulated under this bylaw, a more detailed stormwater management plan is required.

1. A Stormwater Management Plan submitted with the permit application shall contain sufficient information for the Authorized Permitting Agency to evaluate the environmental impact, effectiveness and acceptability of the measures proposed for reducing adverse impacts from construction stormwater runoff and post-development stormwater runoff. This plan shall comply with the criteria established in the [division/section/chapter] and must be submitted with the stamp and signature of a professional Engineer (PE) licensed in the Commonwealth of Massachusetts.

2. For land altering activity subject to this [division/section/chapter] involving construction of a single-family dwelling, where “approval is not required” (ANR), as defined in the Subdivision Control Act, and that disturbs less than 1 acre of land, the Stormwater Management Plan shall include:

- a. A locus map;
- b. The existing zoning and land use at the site;
- c. The proposed land use;
- d. The location(s) of existing and proposed easements;
- e. The location of existing and proposed utilities;
- f. The site's existing and proposed topography with contours at two-foot intervals unless the applicant can demonstrate that the proposed activity will meet the requirements of this [division/section/chapter] without such information;
- g. Proposed limits of disturbance;

- h. Estimate of the total area expected to be disturbed by excavation, grading or other construction activities;
- i. Description of existing site hydrology;
- j. Description and location of existing stormwater conveyances, impoundments, and wetlands on or adjacent to the site or into which stormwater flows;
- k. Description of the proposed management systems post-construction for runoff from impervious surfaces including roofs and driveways and the locations of any foundation drains, curtain drains, or other site features that serve to collect and convey stormwater and their outfalls; and
- l. Description of erosion and sediment control measures during construction.

3. For all other land altering activity subject to this [*division/section/chapter*], the Stormwater Management Plan shall fully describe the project in narrative, drawings and calculations and shall include:

- a. A locus map;
- b. The existing zoning, and land use at the site;
- c. The proposed land use and area of disturbance;
- d. The location(s) of existing and proposed easements;
- e. The location of existing and proposed utilities;
- f. The site's existing and proposed topography with contours at two-foot intervals;
- g. Description of existing site hydrology;
- h. A description and location of existing stormwater conveyances, impoundments, and wetlands on or adjacent to the site or into which storm water flows;
- i. A delineation of 100-year flood plains, if applicable;
- j. Estimated seasonal high groundwater elevation (November to April) in areas to be used for stormwater retention, detention, or infiltration;
- k. The existing and proposed vegetation and ground surfaces with runoff coefficient for each;
- l. A drainage area map showing pre and post-construction watershed boundaries, drainage area and storm water flow paths;
- m. A description and drawings of all components of the proposed drainage system including:
 - (1) Locations, cross sections, and profiles of all brooks, streams, drainage swales and their method of stabilization;
 - (2) All measures for the detention, retention or infiltration of water;
 - (3) All measures for the protection of water quality;
 - (4) The structural details for all components of the proposed drainage systems and storm water management facilities;
 - (5) Notes on drawings specifying materials to be used, construction specifications, and typicals;
 - (6) Expected hydrology with supporting calculations;
 - (7) Proposed improvements including location of buildings or other structures, impervious surfaces, and drainage facilities, if applicable;
 - (8) A description of construction and waste materials expected to be stored on site, and a description of controls to reduce pollutants from these materials including storage practices to minimize exposure of the materials to stormwater, and spill prevention and response;
 - (9) Timing, schedules, and sequence of development including clearing, stripping, rough grading, construction, final grading, and vegetative stabilization; and,

- (10) A maintenance schedule for the period of construction.
- n. Environmentally sensitive site design and LID analysis demonstrating application of principles, where feasible, through:
 - (1) reduced impervious surface coverage through street design, street width, parking design, and sidewalks;
 - (2) open space/tree retention;
 - (3) increased development density in exchange for open space protection in other areas of site; and,
 - (4) incorporation of decentralized, naturalized LID stormwater management systems to treat and infiltrate stormwater at the source.

Section 6 Stormwater management performance standards

A. Minimum control requirements

Projects that require a permit under this [division/section/chapter] must meet the standards of the Massachusetts Stormwater Management Standards. These standards are:

1. No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or water of the commonwealth.
2. Stormwater management systems must be designed so that post-development peak discharge rates do not exceed predevelopment peak discharge rates.
3. Loss of annual recharge to groundwater should be minimized through the use of infiltration measures, including but not limited to environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance, to the maximum extent practicable. The annual recharge from the post-development site should approximate the annual recharge rate from the predevelopment or existing site conditions, based on soil types.
4. Stormwater management systems must be designed to remove 80 percent of the average annual load (post development conditions) of total suspended solids (TSS).
5. For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. The use of infiltration practices without pretreatment is prohibited.
6. Stormwater discharges within the Zone II or Interim Welhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined to be suitable for managing discharges to such area, as provided by the Massachusetts Stormwater Handbook.

7. Redevelopment of previously developed sites must meet the stormwater management standards to the maximum extent practicable. However, if it is not practicable to meet all the standards, new (retrofitted or expanded) stormwater management systems must be designed to improve existing conditions.
8. Erosion and sediment controls must be implemented to prevent impacts during disturbance and construction activities.
9. All stormwater management systems must have an operation and maintenance plan to ensure that systems function as designed.

When the proposed discharge may have an impact upon a sensitive receptor, including streams, wetlands, vernal pools, storm sewers, and/or combined sewers, the authorized permitting agency may require an increase in these minimum requirements, based on existing stormwater system capacity.

B. Stormwater management measures

1. Stormwater management measures shall be required to satisfy the minimum control requirements and shall be implemented in the following order of preference:
 - a. Infiltration, flow attenuation, and pollutant removal of runoff on site to existing areas with grass, trees, and similar vegetation and through the use of open vegetated swales and natural depressions;
 - b. Use of stormwater on site to replace water used in industrial processes or for irrigation;
 - c. Stormwater detention structures for the temporary storage of runoff which is designed so as not to create a permanent pool of water; and
 - d. Stormwater retention structures for the permanent storage of runoff by means of a permanent pool of water; and,
 - e. Detention and evaporation of stormwater on rooftops or in parking lots.
2. Infiltration practices shall be utilized to reduce runoff volume increases. A combination of successive practices may be used to achieve the applicable minimum control requirements.
3. Best management practices shall be employed to minimize pollutants in stormwater runoff prior to discharge into a separate storm drainage system or water body.
4. All stormwater management facilities shall be designed to provide an emergency overflow system, and incorporate measures to provide a non-erosive velocity of flow along its length and at any outfall.
5. The designed release rate of any stormwater structure shall be modified if any increase in flooding or stream channel erosion would result at a downstream dam, highway, structure, or normal point of restricted stream flow.

COMMENT: Prioritize LID approach first - decentralized, watershed-wide approaches that treat and infiltrate stormwater at the source rather than large end of pipe systems.

Example (Palmer) - Stormwater best management practices that mimic natural hydrology (i.e., nonstructural and small-scale upland management approaches) should be considered as first-line practices. Given appropriate soils and conditions, all opportunities to use nonstructural and small-scale upland management designs must be exhausted prior to exploring end-of-pipe stormwater management approaches.

C. Specific design criteria

Additional policy, criteria, and information including specifications and design standards may be found in the stormwater design manual.

1. All projects subject to this [division/section/chapter] must consider the following environmentally sensitive site design and Low Impact Development (LID) techniques:
 - (a) Identify, map and preserve the site's natural features and environmentally sensitive areas such as wetlands, native vegetation, mature trees, slopes, drainage ways, permeable soils, flood plains, woodlands, and prime agricultural soils to the maximum extent practicable;
 - (b) Minimize grading and clearing;
 - (c) Delineate potential building envelopes, avoiding environmental resource areas and appropriate buffers by clustering buildings and reducing building footprints;
 - (d) Develop methods to minimize impervious surfaces, and protect and preserve open space. Reduce impervious surfaces where ever possible through alternative street design, such as omission of curbs and use of narrower streets, shared driveways and through the use of shared parking areas;
 - (e) Manage runoff using smaller, decentralized, low-tech stormwater management techniques to treat and recharge stormwater close to the source;
Lengthen flow paths and maximize sheet flow;
 - (f) Use nonstructural, low-tech methods including open drainage systems, disconnection of roof runoff and street sweeping where possible;
 - (g) Use native plant vegetation in buffer strips and in rain gardens (small planted depressions that can trap and filter runoff);
 - (h) Use of vegetation that does not require irrigation during periods of drought; and,
 - (i) Integrate the following techniques into the site design to create a hydrologically functional site, including but not limited to the following:
 - (1) Grass swales along roads;
 - (2) Rain gardens;
 - (3) Buffer strips;
 - (4) Use of roof gardens where practicable;
 - (5) Use of amended soils that will store, filter and infiltrate runoff;
 - (6) Bioretention areas;
 - (7) Use of rain barrels and other cisterns to provide additional stormwater storage; and,
 - (8) Use of permeable pavement.
2. Infiltration systems
 - (a) Infiltration systems shall be equipped with clean stone and or filter fabric adjacent to the soil or other sediment removal mechanisms;

- (b) Infiltration systems greater than three feet deep shall be located at least ten feet from basement walls;
- (c) Due to the potential for groundwater contamination, dry wells shall not be an acceptable method for management of runoff containing pollutants;
- (d) Infiltration systems designed to handle runoff from commercial or industrial impervious parking areas shall be a minimum of 100 feet from any drinking water supply well;
- (e) Infiltration systems shall not be used as sediment control basins during construction unless specific plans are included to restore or improve the basin surface;
- (f) Infiltration basins shall be constructed with a three foot minimum separation between the bottom of the structure and the seasonal high groundwater elevation, as determined by a certified soil evaluator; and,
- (g) Provisions shall be made for safe overflow passage, in the event of a storm which exceeds the capacity of an infiltration system.

3. Retention and detention ponds

Retention and detention ponds shall be designed and constructed in accordance with the criteria of the Massachusetts Stormwater Handbook: Volume 2 Technical Guide for Compliance with Massachusetts Stormwater Management Standard (Massachusetts Department of Environmental Protection, February 2008), as updated or amended.

4. Natural topography and land cover

The applicant shall give consideration in any plan to incorporating the use of natural topography and land cover such as natural swales, and depressions as they exist prior to development to the degree that they can accommodate the additional flow of water.

5. Swales

The authorized permitting agency shall give preference to the use of swales in place of the traditional use of curbs and gutters based on a case by case review of stormwater management plans by the city engineer and authorized permitting agency.

6. Public safety

The applicant shall consider public safety in the design of any stormwater facilities. The banks of detention, retention, and infiltration basins shall be sloped at a gentle grade into the water as a safeguard against personal injury, to encourage the growth of vegetation and to allow the alternate flooding and exposure of areas along the shore. Basins shall have a four-to-one slope to a depth two feet below the control elevation. Side slopes must be stabilized and planted with vegetation to prevent erosion and provide pollutant removal. The banks of detention and retention areas shall be designed with sinuous rather than straight shorelines so that the length of the shoreline is maximized, thus offering more space for the growth of vegetation;

7. Where a stormwater management plan involves direction of some or all runoff off of the site, it shall be the responsibility of the applicant to obtain from adjacent property owners any easements or other necessary property interests concerning flowage of water. Approval of a stormwater management plan does not create or affect any such rights.

8. All applicants for projects which involve the storage or use of hazardous chemicals shall incorporate handling and storage "best management practices" that prevent such chemicals

from contaminating runoff discharged from a site into infiltration systems, receiving water bodies or storm drains, and shall include a list of such chemicals in the application and the Material Safety Data Sheets (MSDS) for each listed chemical

9. Runoff from parking lots and streets shall be treated by oil and water separators or other controls to remove oil and sediment;

10. The basic design criteria methodologies and construction specifications, subject to the approval of the authorized permitting agency and review and recommendation of the city engineer, shall be those generally found in the most current edition of the Massachusetts Stormwater Handbook: Volume 2 Technical Guide for Compliance with Massachusetts Stormwater Management Standard (Massachusetts Department of Environmental Protection, February 2008), as updated or amended.

D. Design requirements for construction related activities

The design requirements for construction related activities in the Stormwater Management Plan are:

1. Minimize total area of disturbance;
2. Sequence construction activities to minimize simultaneous areas of disturbance;
3. Minimize peak rate of runoff in accordance with the Massachusetts DEP Stormwater Policy;
4. Minimize soil erosion and control sedimentation during construction. Prevention of erosion is preferred over sedimentation control;
5. Divert uncontaminated water around disturbed areas;
6. Maximize groundwater recharge;
7. Install and maintain all erosion and sediment control measures in accordance with the manufacturer's specifications and good engineering practices;
8. Prevent off-site transport of sediment including off-site vehicle tracking of sediment;
9. Protect and manage on- and off-site material storage areas (overburden and stockpiles of dirt, borrow areas, or other areas used solely by the permitted project are considered a part of the project);
10. Comply with applicable federal, state and local laws and regulations including waste disposal, sanitary sewer or septic system regulations, and air quality requirements, including dust control;
11. Prevent adverse impact from the proposed activities to habitats mapped by the Massachusetts Natural Heritage and Endangered Species Program as endangered, threatened or of special concern, estimated habitats of rare wildlife and certified vernal pools, and priority habitats of rare species;
12. Institute interim and permanent stabilization measures. The measures shall be instituted on a disturbed area as soon as practicable but no more than 14 days after construction activity has temporarily or permanently ceased on that portion of the site; and,
13. Properly manage on-site construction and waste materials.

E. Maintenance

1. Operation, maintenance and inspection agreement
 - (a) Prior to issuance of any building permit for which stormwater management is required, the authorized permitting agency shall require the applicant or owner to execute an operation, maintenance and inspection agreement binding on all subsequent owners of land served by the private stormwater management facility. The agreement shall be designed to ensure that water quality standards are met in all seasons and

throughout the life of the system. Such agreement shall provide for access to the facility at reasonable times for regular inspections by the [town/city] or its authorized representative and for regular or special assessments of property owners to ensure that the facility is maintained in proper working condition to meet design standards and any provision established. The agreement shall include:

- (1) The name(s) of the owner(s) for all components of the system.
 - (2) Maintenance agreements that specify:
 - i. The names and addresses of the person(s) responsible for operation and maintenance
 - ii. The person(s) responsible for financing maintenance and emergency repairs.
 - iii. A maintenance schedule for all drainage structures, including swales and ponds.
 - iv. A list of easements with the purpose and location of each.
 - v. The signature(s) of the owner(s).
2. Stormwater management easements as necessary for:
- (a) Access for facility inspections and maintenance;
 - (b) Preservation of stormwater runoff conveyance, infiltration, and detention areas and facilities, including flood routes for the 100-year storm event.
 - (c) Direct maintenance access by heavy equipment to structures requiring regular cleanout.
3. Stormwater management easement requirements
- (a) Purpose of each easement shall be specified in the maintenance agreement signed by the property owner.
 - (b) Stormwater management easements are required for all areas used for off-site stormwater control, unless a waiver is granted by the city.
 - (c) Easements shall be recorded with the registry of deeds prior to issuance of a certificate of completion.
4. Changes to operation and maintenance plans
- (a) The owner(s) of the stormwater management system must notify the authorized enforcement agency of changes in ownership or assignment of financial responsibility.
 - (b) The maintenance schedule in the maintenance agreement may be amended to achieve the purposes of this bylaw by mutual agreement of the authorized permitting agency and the responsible parties. Amendments must be in writing and signed by all responsible parties. Responsible parties must include owner(s), persons with financial responsibility, and persons with operational responsibility.
 - (c) The agreement shall be recorded by the applicant and/or owner in the land records of the registry of deeds. Proof of such recording shall be filed by the applicant and/or owner with the authorized permitting agency.
 - (d) The agreement shall also provide that, if after notice by the city engineer to correct a violation requiring maintenance work, satisfactory corrections are not made by the owner(s) within 30 days, by the authority, granted inter alia, Amendment Article 89 to Article II of the Massachusetts Constitution, Chapter 294 of the Acts of 1920, as amended, Sections one through twenty-four of Chapter 83 of the General Laws of the

Commonwealth of Massachusetts, the City may seek civil penalties of up to \$5,000 for each day of violation of this division, and/or seek remedy in Superior Court.

COMMENT: Amendment Article 89 to Article II of the Massachusetts Constitution, Chapter 294 of the Acts of 1920, as amended, Sections one through twenty-four of Chapter 83 of the General Laws of the Commonwealth of Massachusetts, allows municipalities to seek civil penalties of up to \$5,000 for each day for stormwater related violations, and/or seek remedy in Superior Court.

5. Maintenance responsibility

- (a) The owner of the property on which work has been done pursuant to this division for private stormwater management facilities, or any other person or agent in control of such property, shall maintain in good condition and promptly repair and restore all grade surfaces, walls, drains, dams and structures, vegetation, erosion and sediment control measures and other protective devices. Such repairs or restoration and maintenance shall be in accordance with approved plans.
- (b) A maintenance schedule shall be developed for the life of any stormwater management facility and shall state the maintenance to be completed, the time period for completion, and who shall be legally responsible to perform the maintenance. This maintenance schedule shall be printed on the stormwater management plan.
- (c) Records of installation and maintenance.
- (d) Failure to maintain practices.

F. Performance bond

The authorized permitting agency shall require from the developer a surety or cash bond, irrevocable letter of credit, or other means of security acceptable to the authorized permitting agency prior to the issuance of any building permit for the construction of a development requiring a stormwater management facility. The amount of the security shall not be less than the total estimated construction cost of the stormwater management facility. The bond so required in this subsection shall include provisions relative to forfeiture for failure to complete work specified in the approved stormwater management plan, compliance with all of the provisions of this division and other applicable laws and regulations, and any time limitations. The bond shall not be fully released without a final inspection of the completed work by the [city engineer], submission of "as-built" plans, and certification of completion by the authorized permitting agency of the stormwater management facilities being in compliance with the approved plan and the provisions of this division.

G. Enforcement and penalties

1. Violations

Any development activity that has commenced or is conducted contrary to this division may be restrained by injunction or otherwise abated in a manner provided by law.

2. Notice of violation

When the authorized permitting agency or its designated agent determines that an activity is not being carried out in accordance with the requirements of this division, it shall issue a written notice of violation to the owner of the property. The notice of violation shall contain:

- (a) The name and address of the owner applicant;

- (b) The address when available or the description of the building, structure, or land upon which the violation is occurring;
- (c) A statement specifying the nature of the violation;
- (d) A description of the remedial measures necessary to bring the development activity into compliance with this division and a time schedule for the completion of such remedial action;
- (e) A statement of the penalty or penalties that shall or may be assessed against the person to whom the notice of violation is directed;
- (f) A statement that the determination of violation may be appealed to the Authorized Permitting Authority by filing a written notice of appeal within 15 days of service of notice of violation.

3. Stop work orders

Persons receiving a notice of violations will be required to halt all construction activities. This "stop work order" will be in effect until the authorized permitting agency or its designated agent confirms that the development activity is in compliance and the violation has been satisfactorily addressed. Failure to address a notice of violation in a timely manner can result in civil, criminal, or monetary penalties in accordance with the enforcement measures authorized in this division.

4. Criminal and civil penalties

Any person who violates any provision of this division, valid regulation, or the terms or conditions in any permit or order prescribed or issued there under, shall in accordance with Section 10 of Chapter 83 of the Massachusetts General Laws, be subject to a civil penalty of \$5,000 for each day such violation occurs or continues, which may be assessed in an action brought on behalf of the [city/town] in any court of competent jurisdiction together with such equitable relief as is appropriate.

5. Noncriminal disposition

As an alternative to criminal prosecution or civil action, the city may elect to utilize the noncriminal disposition procedure set forth in [Town/City Bylaw/Ordinance]. The [Department of Public Works] shall be the enforcing entity. The penalty for the first violation shall be up to \$100.00. The penalty for the second violation shall be up to \$200.00. The penalty for the third and subsequent violations shall be \$300.00. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

COMMENT: Not all municipalities have adopted Noncriminal Disposition procedures. If your community has not done so, these procedures would need to be enacted separately as part of the General Bylaws/City Ordinance in order to utilize this alternative mode of enforcement.

6. Restoration of lands

Any violator may be required to restore land to its undisturbed condition. In the event that restoration is not undertaken within a reasonable time after notice, the [Department of Public Works] may take necessary corrective action, the cost of which shall become a lien upon the property until paid.

7. Holds on occupancy permits

Occupation permits will not be granted until corrections to all stormwater practices have been made and accepted by the [*Department of Public Works*].

8. Severability

The invalidity of any section or provision of this section shall not invalidate any other section or provision thereof.

Stormwater Management Design Criteria and Standards

The following design criteria and performance standards may be used for Special Permits or Site Plan Review in lieu of adopting a Stormwater Management / LID Bylaw inclusive of these requirements.

Section 1.0 Stormwater Management Design Criteria and Standards

A. Performance Standards

No site plan shall be approved unless the plan adheres to the following performance standards:

1. post-development peak discharge rates will not exceed pre-development discharge rates (based on a 24-hour, two year frequency storm event);
2. no new stormwater conveyances will discharge untreated stormwater directly to or cause erosion and sedimentation in wetlands or any other surface water body;
3. the annual groundwater recharge from the post-development site will be approximately the same as the annual recharge rate from the pre-development site, based on soil types;
4. stormwater systems will remove 80 percent of the average annual post-development load of total suspended solids (TSS);
5. pretreatment will occur prior to all infiltration systems;
6. Low Impact Development (LID) stormwater systems will be employed to the greatest extent practicable;
7. erosion and sedimentation controls must be implemented to prevent impacts during disturbance and construction activities;
8. where it is not practical to meet these standards on previously developed sites, new stormwater management systems will improve existing conditions; and,
9. For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

When the proposed discharge may have an impact upon a sensitive receptor, including but not limited to lakes, ponds, streams, wetlands, vernal pools, storm sewers, and/or buildings, the permit granting authority may require an increase in these minimum requirements.

B. Stormwater Management Measures

1. Stormwater management measures shall be required to satisfy the performance standards and shall be according to the following order of preference:
 - a. Infiltration, flow attenuation, and pollutant removal of runoff through the use of open vegetated swales, natural depressions, or underground systems.
 - b. Stormwater detention structures for the temporary storage of runoff which are designed so as not to create a permanent pool of water.
 - c. Stormwater retention structures for the permanent storage of runoff by means of a permanent pool of water.

2. *Infiltration Practices.* Infiltration practices shall be utilized to reduce runoff volume increases where appropriate. A combination of successive practices may be used to achieve the applicable minimum control requirements. Justification shall be provided by the applicant for rejecting each practice based on site conditions.
3. *Best Management Practices.* Best management practices shall be employed to minimize pollutants in stormwater runoff prior to discharge into a combined or separate storm drainage system, water body, or infiltration system.
4. *Emergency Overflow System.* All stormwater management facilities shall be designed to provide an emergency overflow system, which shall incorporate measures to provide a non-erosive velocity of flow along its length and at any outfall.
5. *Designed Release Rate.* The designed release rate of any stormwater structure shall be modified if any increase in flooding or stream channel erosion would result at a downstream dam, highway, structure, or natural point of restricted stream flow or result in increased combined sewer overflow or sewer backups.

C. Specific Design Criteria

Additional policy, criteria and information including specifications and design standards may be found in the *Massachusetts Stormwater Handbook: Volume 2 Technical Guide for Compliance with Massachusetts Stormwater Management Standard* (Massachusetts Department of Environmental Protection, February 2008).

1. Low Impact Development Techniques

All projects subject to these standards must consider the following environmentally sensitive site design and Low Impact Development (LID) techniques:

- a. Identify, map and preserve the site's natural features and environmentally sensitive areas such as wetlands, native vegetation, mature trees, slopes, drainage ways, permeable soils, flood plains, woodlands, and prime agricultural soils to the maximum extent practicable;
- b. Minimize grading and clearing;
- c. Delineate potential building envelopes, avoiding environmental resource areas and appropriate buffers by clustering buildings and reducing building footprints;
- d. Develop methods to minimize impervious surfaces, and protect and preserve open space. Reduce impervious surfaces wherever possible through alternative street design, such as omission of curbs and use of narrower streets; shared driveways; and shared parking areas;
- e. Manage runoff using smaller, decentralized, low-tech stormwater management techniques to treat and recharge stormwater close to the source;
- f. Lengthen flow paths and maximize sheet flow;
- g. Use nonstructural, low-tech methods, including open drainage systems, disconnection of roof runoff, and street sweeping where possible;
- h. Use native plant vegetation in buffer strips and in rain gardens (small planted depressions that can trap and filter runoff);
- i. Use drought resistant vegetation;
- j. Integrate LID techniques into the site design to create a hydrologically functional site, including but not limited to the following:
 - 1) Grass swales along roads;

- 2) Rain gardens;
- 3) Buffer strips;
- 4) Use of roof gardens where practicable;
- 5) Use of amended soils that will store, filter, and infiltrate runoff;
- 6) Bioretention areas;
- 7) Use of rain barrels and other cisterns to provide additional stormwater storage; and
- 8) Use of permeable pavement.

2. Infiltration Systems

- a. Infiltration systems shall be equipped with clean stone and or filter fabric adjacent to the soil and have appropriate sediment removal mechanisms.
 - b. Infiltration systems greater than three feet (3') deep shall be located at least ten (10') feet from basement walls.
 - c. Infiltration systems shall not be used where there is a likelihood that they may lead to groundwater contamination.
 - d. Due to the potential for groundwater contamination from dry wells, they shall not be an acceptable method for management runoff containing pollutants;
 - e. Infiltration systems designed to handle runoff from commercial or industrial impervious parking areas shall be a minimum of four hundred feet (400') from any water supply well.
 - f. Infiltration systems shall not be used as sediment control basins during construction unless specific plans are included to restore or improve the basin surface.
 - g. Infiltration basins shall be constructed with a three foot (3') minimum separation between the bottom of the structure and the seasonal high groundwater elevation, as determined by a certified soil evaluator; and
 - h. Provisions shall be made for safe overflow passage in the event of a storm which exceeds the capacity of an infiltration system.
3. Retention and detention ponds shall be designed for flow volumes calculated in accordance with the criteria of the *Massachusetts Stormwater Handbook: Volume 2 Technical Guide for Compliance with Massachusetts Stormwater Management Standard* (Massachusetts Department of Environmental Protection, February 2008), as updated or amended.
 4. The applicant shall give consideration in any plan to incorporating the use of natural topography and land cover, such as natural swales and depressions as they exist prior to development, to the degree that they can accommodate the additional flow of water.
 5. The permitting authority shall give preference to the use of swales and other LID systems in place of the traditional use of curbs and gutters based on a case by case review of the stormwater management plan.
 6. The applicant shall consider public safety in the design of any stormwater facilities. The banks of detention, retention, and infiltration basins shall be sloped at a gentle grade into the water as a safeguard against personal injury, to encourage the growth of vegetation, and to allow the alternate flooding and exposure of areas along the shore. Basins shall have a 4:1 slope to a depth two feet (2') below the control elevation. Side slopes must be stabilized and planted with vegetation to prevent erosion and provide pollutant removal. The banks of retention areas shall be designed with sinuous rather than straight shorelines so that the length of the shoreline is maximized, thus offering more space for the growth of vegetation.

7. Where a Stormwater Management Plan involves direction of some or all runoff off of the site, it shall be the responsibility of the applicant to obtain from adjacent property owners any easements or other necessary property interests concerning flowage of water. Approval of a Stormwater Management Plan does not create or affect any such rights.
8. All applicants for projects which involve the storage or use of hazardous chemicals shall incorporate handling and storage "best management practices" that prevent such chemicals from contaminating runoff discharged from a site into infiltration systems, receiving waterbodies, or storm drains, and shall include a list of such chemicals in the application and the Material Safety Data Sheets (MSDS) for each listed chemical.
9. Runoff from parking lots shall be treated by oil/water separators or other controls to remove oil and sediment. Oil separators shall be located in non-infiltration catch basins or manholes. Outlets from the above described structures may be to infiltration systems.
10. The basic design criteria, methodologies, and construction specifications shall be those generally found in the *Massachusetts Stormwater Handbook: Volume 2 Technical Guide for Compliance with Massachusetts Stormwater Management Standard* (Massachusetts Department of Environmental Protection, February 2008), as updated or amended).

D. Design Requirements for Erosion and Sediment Control for Construction Related Activities

The design requirements of the Erosion and Sediment Control plan for construction related activities are:

1. Minimize total area of disturbance;
2. Sequence construction activities to minimize simultaneous areas of disturbance;
3. Minimize peak rate of runoff;
4. Minimize soil erosion and control sedimentation during construction. Prevention of erosion is preferred over sedimentation control;
5. Divert uncontaminated water around disturbed areas;
6. Maximize groundwater recharge;
7. Install and maintain all erosion and sediment control measures in accordance with the manufacturer's specifications and good engineering practices;
8. Prevent off-site transport of sediment including off-site vehicle tracking of sediment;
9. Protect and manage on- and off-site material storage areas (overburden and stockpiles of dirt, borrow areas, or other areas used solely by the permitted project are considered a part of the project);
10. Comply with applicable federal, state, and local laws and regulations, including waste disposal, sanitary sewer, or septic system regulations, and air quality requirements, including dust control;
11. Prevent adverse impact from the proposed activities to habitats mapped by the Massachusetts Natural Heritage and Endangered Species Program as habitats that contain species that are endangered, threatened, or of special concern; as estimated habitats of rare wildlife and certified vernal pools; and as priority habitats of rare species;
12. Institute interim and permanent stabilization measures. The measures shall be instituted on a disturbed area as soon as practicable, but no more than 14 days after construction activity has temporarily or permanently ceased on that portion of the site; and,
13. Properly manage on-site construction and waste materials.

E. Maintenance and Performance Guarantee

1. Operation, Maintenance and Inspection Agreement.
 - a. Prior to issuance of any building permit for which stormwater management is required, the permitting authority shall require the applicant or owner to execute an inspection, operation, and maintenance agreement binding on all subsequent owners of land served by the private stormwater management facility. The agreement shall be designed to ensure that water quality standards are met in all seasons and throughout the life of the system. Such agreement shall provide for access to the facility at reasonable times for regular inspections by the city or its authorized representative, and for regular or special assessments of property owners to ensure that the facility is maintained in proper working condition to meet design standards and any provision established.
 - b. The agreement shall be recorded by the applicant and/or owner in the land records of the _____ registry of deeds.
 - c. The agreement shall also provide that, if after notice by the Town/City to correct a violation requiring maintenance work, satisfactory corrections are not made by the owner(s) within thirty (30) days, the Town/City may perform all necessary work to place the facility in proper working condition. The owner(s) shall be required to reimburse the Town/City for any and all costs incurred to correct a violation under this ordinance within thirty (30) days from the time in which said work is performed.
2. Maintenance responsibility
 - a. The owner of the property on which work has been done pursuant to this division for private stormwater management facilities, or any other person or agent in control of such property, shall maintain in good condition and promptly repair and restore all grade surfaces, walls, drains, dams and structures, vegetation, erosion and sediment control measures, and other protective devices. Such repairs or restoration and maintenance shall be in accordance with approved plans.
 - b. A maintenance schedule shall be developed for the life of any stormwater management facility and shall state the maintenance to be completed, the time period for completion, and who shall be legally responsible to perform the maintenance. This maintenance schedule shall be printed on the Stormwater Management Plan.
 - c. Records of installation and maintenance shall be kept.

F. Inspections

No plan will be approved without adequate provision for inspection of the property before development activity commences. The applicant shall arrange with the [Building Inspector or other] scheduling of the following inspections:

1. Initial inspection: Prior to approval of any plan.
2. Erosion control inspection: To ensure erosion control practices are in accord with the plan.
3. Construction inspection: Prior to backfilling of any underground drainage or stormwater conveyance structures.
4. Final inspection: When all work including construction of stormwater management facilities has been completed.

The [Building Inspector or other] shall inspect the work and either approve it or notify the applicant in writing in what respects there has been a failure to comply with the requirements of

the approved plan. Any portion of the work that does not comply shall be promptly corrected by the applicant or the applicant will be subject to the bonding provisions or the penalty provisions set forth herein. The Town/City may conduct random inspections to ensure effective control of erosion and sedimentation during all phases of construction. Laboratory tests may be required at the owner's expense to verify adequacy of soil, material and/or compaction.

G. Performance Bond

Project performance bonds, as described in [some other part of this bylaw or local code], shall include a security not less than the total estimated construction cost of the stormwater management facility. The bond so required in this subsection shall include provisions relative to forfeiture for failure to complete work specified in the approved Stormwater Management Plan, compliance with all of the provisions of this division and other applicable laws and regulations, and any time limitations. The bond shall not be fully released without a final inspection of the completed work by the [Building Inspector, City Engineer, or other] submission of "as-built" plans, and certification of completion by the [building Inspector, City Engineer, or other] of the stormwater management facilities being in compliance with the approved plan and the provisions of this division.

H. Enforcement and penalties

1. Violations

Any development activity that has commenced or is conducted contrary to this division may be restrained by injunction or otherwise abated in a manner provided by law.

2. Notice of violation

When the [City Engineer or its designated agent] determines that an activity is not being carried out in accordance with the requirements of this division, it shall issue a written notice of violation to the owner of the property, subject to the notice of violation requirements in [some other part of this bylaw].

3. Stop work orders

Persons receiving a notice of violations will be required to halt all construction activities, subject to [some other part of this bylaw].

4. Criminal and civil penalties

Any person who violates any provision of this division, valid regulation, or the terms or conditions in any permit or order prescribed or issued thereunder, shall be subject to a fine not to exceed \$300.00 for each day such violation occurs or continues or subject to a civil penalty, which may be assessed in an action brought on behalf of the city in any court of competent jurisdiction.

5. Noncriminal disposition

As an alternative to criminal prosecution or civil action, the city may elect to utilize the noncriminal disposition procedure set forth in [Town/City Bylaw/Ordinance]. The [Department of Public Works] shall be the enforcing entity. The penalty for the first violation shall be up to \$100.00. The penalty for the second violation shall be up to \$200.00. The penalty for the third and subsequent violations

shall be \$300.00. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

COMMENT: Not all municipalities have adopted Noncriminal Disposition procedures. If your community has not done so, these procedures would need to be enacted separately as part of the General Bylaws/City Ordinance in order to utilize this alternative mode of enforcement.

Town of Palmer, Massachusetts
Chapter 171 – Zoning Ordinance
Proposed Amendments 2-27-09

Chapter XX
Transfer of Development Rights

§171-103. Reserved

§171-104. Reserved

§171-105. Transfer of Development Rights.

A. Purpose – The purposes of the Ordinance are:

- (1) To protect scenic and rural areas of the Town of Palmer;
- (2) To protect property values and provide a fair economic return to property owners;
- (3) To foster compact development in areas served by public services and infrastructure.
- (4) To promote compact development, both residential and commercial, in areas that have been identified as potential suitable sites for both future development and infrastructure improvements;
- (5) To promote the creation of traditional neighborhood developments with compact, pedestrian-friendly, predominantly residential areas on gridded streets;
- (6) To preserve the rural, historic, and agricultural character of the community by directing compact new development, both residential and commercial, to appropriate locations adjacent to existing urbanized centers.
- (7) To preserve the rural, historic, and agricultural character of the community by directing compact new commercial development to appropriate locations adjacent to major transit routes.
- (8) To protect water quality in Palmer’s aquifer recharge areas and reservoir watersheds for existing and potential public water supplies.***

§171-106. Definitions.

Sending District: The section of Palmer in which willing sellers will be able to sell the development rights to their land, while retaining all other rights, for a fair-market value.

Receiving District: A section of Palmer in which a purchased development right can be transferred, allowing for a greater density than what would normally be allowed through the underlying zoning.

Development Right: The legal ability to develop a parcel of land, a legal right that is distinguishable from the other rights of property ownership.

Conservation Restriction: A voluntary agreement between a private landowner and a municipal agency or qualified not-for-profit corporation to restrict development. A restriction is deeded to a qualified third party, which permanently limits certain activities on real property, in

order to protect conservation values such as biodiversity, water quality, wildlife habitat or carbon sequestration. The restriction stays with the property through all successive owners.

Agricultural Preservation Restriction: A voluntary agreement between an agricultural land owner and a municipality, the Commonwealth of Massachusetts or a not-for-profit entity to maintain land in agriculture. Landowners receive a payment for the difference between the agricultural value of their land and the full-market value, in exchange for which the land remains in agriculture in perpetuity.

§171-107. Transfer of Development Rights.

Transfer of Development Rights provides for increased density of residential and commercial development in the designated Receiving Area, when suitable open space land in the Sending Area is permanently preserved from development. The transfer of development rights is accomplished by the execution of a permanent Conservation Restriction/Agricultural Preservation Restriction, and the increased density is permitted by the issuance of a Special Permit, both as hereinafter provided.

§171-108. Eligibility.

All lots shown on a plan, or described in a deed, recorded at the Registry of Deeds in the Sending Area are eligible to apply for a Special Permit from the Planning Board to transfer all or part of the development rights on the lot to a lot in the Receiving Area.

§171-109. Establishment of Sending Area and Receiving Area.

A. The following districts are hereby established:

(1) Sending Area: Lands bounded by the following constraints: North of I-90, east of the eastern boundary of Stimson Street, river Street and State Route 32, south of the Ware Town Line, West of the Warren Town Line, *lands within the MA Department of Environmental Protection approved Zone Two water supply protection areas for the Palmer Galaxy Well and Thorndike wellfield, and lands within the watershed area for the Graves Brook Upper and Lower Reservoirs.*

(2) Receiving Areas: 1,500 foot buffer around the Depot Village (VCI), excluding DEP Zone II boundary; 1,500 foot buffer around the Three Rivers Village (VCII), excluding DEP Zone II boundary; 1,500 foot buffer zone around Bondsville Village (VCIII), including the adjacent Industrial B Zone, which is bounded on the North and West by the Belchertown town line; 1,500 foot buffer around Thorndike Village (VC IV), excluding the DEP Zone II boundary for Palmer's water resources; Highway Business Zones west of Calkins Road and south of I-90, in the region located in Palmer's southwestern corner; parcels in the southeastern section of Palmer with Mason street as the eastern border, the Monson town line as the southern boundary.

B. These districts are delineated on the Transfer of Development Rights Map of the Town of Palmer, which is incorporated by reference as part of the Zoning Bylaw.

§171-110. Special Permit Process for Transfer of Development Rights.

A. The applicant proposing to develop specified land in the Receiving Area at a density allowed by this bylaw with transfer of development rights shall make an application to the Planning Board for a Special Permit. The application shall clearly illustrate a land parcel or

parcels in the Sending Area and a parcel or parcels in the Receiving Area proposed for transfer of development rights, and the number of development rights proposed for transfer.

B. As part of the Special Permit application, the applicant shall determine the number of lots eligible for transfer from the parcel in the Sending Area, using the following process:

(1) After conferring with the Conservation Commission, subtracting all acreage which is identified as wetlands, 100-year floodplain, or riverfront area under the Massachusetts Rivers Protection Act. The Conservation Commission may require the applicant to complete wetlands delineation;

(2) Subtracting 5% of the total remaining parcel acreage, to account for land which would be used for roads if the parcel had been developed;

(3) After determining the remaining land area, determining the number of lots allowable in the Sending Area based on a conceptual development plan.

C. The Planning Board shall review the applicant's assessment of acreage eligible for transfer, and shall make a final determination of such acreage eligible for transfer.

D. The applicant shall also file with the Planning Board a preliminary development plan for the parcel in the Receiving Area, illustrating lots created using the transferred development rights, and illustrating all wetland and floodplain areas.

E. Approval of a Special Permit shall require the applicant to tender to the Planning Board a valid instrument granting to the Town a Conservation Restriction/Agricultural Preservation Restriction for eligible land in the Sending Area. The applicant shall furnish to the Planning Board a certificate of title by a duly licensed attorney and such other evidence or assurance of title as may be satisfactory to the Town Counsel.

F. Upon advice of the Town Counsel that a Conservation Restriction/Agricultural Preservation Restriction is valid and sufficient, there must be a vote by the Town Council authorizing Conservation Commission acceptance of the Conservation Restriction/Agricultural Preservation Restriction. If the Special Permit application is valid and sufficient, the Conservation Commission, acting on behalf of the Town, may exercise its right of first refusal and should the town decide to accept the conservation restriction, the Conservation Commission shall accept the Conservation Restriction/Agricultural Preservation Restriction, for signature of the Massachusetts Commissioner of Agriculture in the same manner as other APRs or the Commissioner of the Executive Office of Environmental Affairs in the same manner as other conservation restrictions, and for recording in the County Registry of Deeds. If the Town does not decide to accept the Conservation Restriction/Agricultural Preservation Restriction, the easement may be transferred to a qualified not-for-profit organization, and such an organization shall maintain, monitor and enforce the terms of the Conservation Restriction / Agricultural Preservation Restriction.

G. Upon final approval of site plans, the Planning Board shall make a decision to grant, deny, or grant with conditions, the Special Permit to increase the number and density of units in the Receiving Area, based on the table in Section X.8.

§171-111. Dimensional and Density Regulations Allowed By the Transfer of Development Rights.

A. Each residential building lot within the Sending Area is equivalent to one of the development rights in the Receiving Area shown in the Table of Exchange Standards for Transfer of Development Rights found below.

Table 1 - Exchange Standards for Transfer of Development Rights

Sending Area	Receiving Area	Notes
1 residential building lot equals	2000 s.f. of additional commercial or industrial floor area, plus a 5% increase in building coverage for a single commercial or industrial lot, or	1) “Additional commercial or industrial floor area” shall be defined as floor area above that which would normally be permitted in the underlying district, under Section 171.35 - Table of Dimensional and Density Regulations of the Palmer Zoning Bylaw. The Planning Board may allow an increase in building coverage from the maximum building coverage required under Section 171.35, up to a maximum 75% building coverage for commercial or industrial uses.
	1.2 residential building units, plus a 5% increase in building coverage, or	2) Fractions of building lots cannot be rounded up to the next whole number.
	1 neighborhood commercial building lot	3) See Section X.14.2 for commercial uses allowed on a neighborhood building lot within a Traditional Neighborhood Development. Only one “neighborhood commercial building lot” may be approved per ten residential building lots within a TND.

B. For development rights purchased for every one (1) lot meeting minimum dimensional requirements for the underlying district within the Sending Area, the developer can add one and two tenths (1.2) residential lots or one (1) neighborhood commercial lot in a Traditional Neighborhood Development in the Receiving Area above what could normally be built under zoning standards of the underlying district, provided the dimensional requirements indicated in Section X.7, Table 2, of this bylaw and other requirements of the bylaw are met. Fractions of building lots cannot be rounded up to the next whole number.

(1) For example, if a developer buys the development rights to fourteen (14) buildable lots in the Sending Area, the developer is entitled to: $14 \text{ lots} \times 1.2 = 16.8 \text{ lots}$ in addition to the underlying density in the Receiving Area. However, since fractional lots cannot be built on, the developer can construct only sixteen (16) units (above what could normally be built under zoning standards of the underlying district).

C. When a landowner wishes to sell less than the total number of development rights available to a tax parcel, the landowner may do so provided that the tax parcel is subdivided.

D. The maximum limits on density, building coverage, and parking reductions permitted to be developed by Special Permit in the Receiving Area shall be determined by reference to the Table of TDR Dimensional Standards for Receiving Areas found below.

Table 2 - TDR Dimensional Standards for Receiving Areas

Underlying Zoning District	Dimensional Requirements in Underlying Zone	Dimensional Requirements in Receiving Area (with TDR)
Town Residential (With Town Water & Sewer)	Lot Size: 20,000 s.f. Frontage: 100 ft. Front Setback: 30 ft. Side Setback: 15 ft. Rear Setback: 15ft. Building coverage: 50% Height: 2 ½ stories Maximum multi-family units in building: 6	Lot Size: 10,000 s.f. Frontage: 60 ft. Front Setback: 15 ft. Side Setback: 10 ft. Rear Setback: 10 ft. Building coverage: 60% Height: 2 ½ stories Maximum multi-family units in building: 9
Neighborhood Business	Lot Size: 40,000 s.f. Frontage: 200 ft. Front Setback: 50 ft. Side Setback: 30 ft. Rear Setback: 30 ft. Building coverage: 50% Height: 50 ft.	Lot Size: 15,000 s.f. Frontage: 80 ft. Front Setback: 25 ft. Side Setback: 15 ft. Rear Setback: 15 ft. Building coverage: 75% Height: 50 ft.
Industrial A	Lot Size: 43,560 s.f. Frontage: 200 ft. Front Setback: 50 ft. Side Setback: 50 ft. Rear Setback: 50 ft. Building coverage: 50% Height: 50 ft.	Lot Size: 15,000 s.f. Frontage: 100 ft. Front Setback: 25 ft. Side Setback: 25 ft. Rear Setback: 25 ft. Building coverage: 75% Height: 50 ft.
Industrial B	Lot Size: 43,560 s.f. Frontage: None Front Setback: 50 ft. Side Setback: 50 ft. Rear Setback: 50 ft. Building coverage: 50% Height: 50 ft.	Lot Size: 15,000 s.f. Frontage: 100 ft. Front Setback: 25 ft. Side Setback: 25 ft. Rear Setback: 25 ft. Building coverage: 75% Height: 50 ft.
Rural Residential	Lot Size: 60,000 s.f. Frontage: 150 ft. Front Setback: 50 ft Side Setback: 30 ft Rear Setback: 30 ft Building Coverage: 50 % Height 35 ft	Lot Size: 30,000 s.f. Frontage: 75 ft Front Setback: 25 ft Side Setback: 15 ft Rear Setback: 15 ft Building coverage: 75 % Height: 35 ft
Suburban Residential	Lot: 30,000 s.f. Frontage: 150 Front Setback: 30 ft Side Setback: 30 ft Rear Setback: 30 ft Building Coverage: 50 % Height: 35 ft	Lot Size: 15,000 s.f. Frontage: 75 ft Front Setback: 15 ft Side Setback: 15 ft Rear Setback: 15 ft Building coverage: 75 % Height: 35 ft
General Business	Lot: 40,000 s.f.	Lot Size: 15,000 s.f.

	Frontage: 200 ft Front Setback: 50 ft Side Setback: 30 ft Rear Setback: 30 ft Building Coverage: 50 % Height: 50 ft	Frontage: 100 ft. Front Setback: 25 ft. Side Setback: 15 ft. Rear Setback: 15 ft. Building coverage: 75% Height: 50 ft
Highway Business	Lot: 40,000 s.f. Frontage: 200 ft Front Setback: 50 ft Side Setback: 30 ft Rear Setback: 30 ft Building Coverage: 50 % Height 50	Lot Size: 20,000 s.f. Frontage: 100 ft Front Setback: 25 ft Side Setback: 15 ft Rear Setback: 15 ft Building coverage: 75 % Height: 50

§171-12. Design Standards for Business and Industrial Receiving Areas.

A. All business and industrial uses developed under this Bylaw must meet the following standards:

- (1) The height of buildings shall not exceed the maximum height allowed in the underlying district;
- (2) To the extent feasible, adjacent uses shall utilize shared parking areas and shared curb cuts to minimize vehicular safety impacts on roads;
- (3) Pedestrian and bicycle amenities, such as sidewalks, shall be provided.

B. The Planning Board may consider, in making its Special Permit decision, whether the project meets the following design standards:

- (1) Architectural design shall be compatible with the historic character and scale of buildings in the neighborhood and the Town through the use of appropriate building materials, screening, breaks in roof and wall lines, windows and other architectural techniques. Variation in detail, form and siting shall be used to provide visual interest and avoid monotony. Proposed buildings shall relate harmoniously to each other with adequate light, air circulation, and separation between buildings where appropriate.

§171-13. Special Permit Criteria.

A. In addition to the Special Permit criteria under Article XV of the Palmer Zoning Bylaw, the Planning Board shall grant a special permit for transfer of development rights if it finds the following criteria are met:

- (1) The proposed use is in harmony with the purposes of this Bylaw:
- (2) The proposed use meets all of the procedural, dimensional and density requirements, and design standards of this Bylaw.
- (3) All residential uses in the Receiving Area must meet the TND Design Standards in §171-118.
- (4) All business and industrial uses in the Receiving Area must meet the Design Standards for Business and Industrial Receiving Areas in §171-112.

§171-114. Reporting of TDR Transactions.

Buyers and sellers must report all TDR transactions (options, sales, gifts, donations) to the Planning Board within ten business days of a transaction's completion.

§171-115. Release of Agricultural Preservation Restriction or Conservation Restriction.

A. No Conservation Restriction/Agricultural Preservation Restriction, which has been conveyed under this bylaw, may be released unless the provisions for release in M.G.L. Chapter 184, §32 have been met, which include:

- (1) The restriction must be repurchased from the Town by the land owner at its then fair market value, and funds returned to the Town bank for development rights;
- (2) The restriction shall only be released by its holder only if the land is no longer deemed suitable for agricultural or horticultural purposes and unless approved by a two-thirds (2/3) vote of both branches of the Massachusetts general court.

§171-116. Alternate Method for TDR Transactions.

A. In lieu of transferring development rights using the process described §§171-110 – 171-112 above, an applicant for a Special Permit in §171-110. may make a cash contribution to the Town of Palmer to be used for the purpose of purchasing a Conservation Restriction/Agricultural Preservation Restriction. The contribution shall be of a value equal to the value of the required development rights, as determined in the Table of Exchange Standards for Transfer of Development Rights. This value shall be determined by multiplying the number of acres of developable land required by the average cost of a Conservation Restriction/Agricultural Preservation Restriction in the Town of Palmer over the past three years, as determined by the Conservation Commission.

B. The maximum number of development rights which may be purchased through a cash contribution to the Town of Palmer shall be one hundred (100) development rights in any calendar year.

§171-117. Registry of Willing Sellers.

The Town shall maintain a registry of landowners in the Sending Area that have expressed interest in selling development rights under this bylaw. Applicants for TDR must seek development rights from this registry first, before considering making a cash payment in lieu of transferring development rights, as permitted under §171-116.

§171-118. Traditional Neighborhood Development Regulations.

A. Minimum Standards Required for a Traditional Neighborhood Development

(1) Traditional Neighborhood Development permits greater densities than allowed in the Town Residential District, Neighborhood Business District, and Industrial A and B Districts. This greater density is only permitted when development rights from the Sending Area are transferred to the Receiving Area as described in this bylaw. The following standards are required for the approval of a Traditional Neighborhood Development:

- (a) All utility lines such as telephone, cable television, and electric are to be located underground.
- (b) The tract of land to be developed shall be in single ownership, or shall be the subject of an application filed jointly in accordance with an approved plan.

B. Uses Allowed by Special Permit in a Traditional Neighborhood Development

(1) Within a Traditional Neighborhood Development, the Planning Board may approve the following uses as part of the Special Permit:

- (a) Single family dwelling;
- (b) Neighborhood commercial uses, which may include: service oriented business, including bank, barber shop, beauty salon, medical or dental clinic, and automatic self-serving laundry;
- (c) Retail service store or custom store such as a bakery or confectionery, florist, food store (no booth or restaurant facilities) or grocery designed primarily to provide daily service to the residents of the immediately surrounding neighborhood, provided that the gross floor area of the store does not exceed seven hundred and fifty (750) square feet, and provided that only one neighborhood commercial lot shall be approved for every ten residential lots within a TND;
- (d) Home office;
- (e) Accessory uses, buildings, and structures customarily incidental to any primary use located on the same lot.

B. TND Design Standards

(1) Porches are encouraged for residential uses. Stoops, open colonnades, and open porches may encroach not more than ten feet into front setbacks as indicated in this bylaw, but not closer than ten (10) feet from the street right of way.

(2) Street and pedestrian way design shall minimize pedestrian crossings at through streets.

(3) Advance tactile warning of pedestrian street crossings shall be given to motorists by placing cobblestone or other similar materials across the street in a band of at least six (6) feet wide at the same surface elevation as the adjacent pavement. The warning bands shall be located between twenty (20) and sixty (60) feet from a pedestrian crossing.

(4) Streetlights shall be provided along all active pedestrian ways. Such streetlights shall consist of a pole or pedestal mounted luminary, ten (10) to twelve (12) feet in height, having a full-spectrum bulb of not more than one hundred seventy-five (175) watts.

(5) Architectural design shall be compatible with the historic character and scale of buildings in the neighborhood and the Town through the use of appropriate building materials, screening, breaks in roof and wall lines, windows and other architectural techniques. Variation in detail, form and siting shall be used to provide visual interest and avoid monotony. Proposed buildings shall relate harmoniously to each other with adequate light, air circulation, and separation between buildings where appropriate.

(6) All lots shall have an uninterrupted sidewalk at least five (5) feet wide the entire width of the lot frontage.

(7) The front of an attached garage shall be set back at least ten (10) feet from the front facade of the principal building of which the garage is a part.

C. TND Open Space and Landscape Standards

(1) All TNDs must include dedicated park or town common land, totaling a minimum of twenty percent (20%) of the total parcel to be subdivided, to provide centrally located park and common space which is readily accessible to all residences.

- (2) Street trees shall be planted within the right-of-ways parallel to the street along all streets.
- (3) Trees shall have a minimum height of six (6) feet and a minimum caliper of two and one half (2.5) inches at the time of planting. Where possible, a minimum of six (6) feet wide landscaped belt will be created to plant the street trees.
- (4) Tree spacing shall be determined by species type. Large maturing trees shall be planted a minimum of forty (40) feet and a maximum of fifty (50) feet on center. Small and medium maturing trees shall be planted a minimum of ten (10) feet and a maximum of thirty (30) feet on center.

D. Parking Standards

- (1) Parking for residential uses shall be provided in individual lots or in combined parking lots, provided each dwelling unit has at least one off-street parking space within five hundred (500) feet from its property boundary. Additional parking may be provided on streets or off-street.
- (2) Parking lots for any uses shall generally be located at the rear of or at the side of buildings, and shall be no closer than six (6) feet from a building.
- (3) When two (2) adjacent lots contain parking areas it is encouraged to develop them as one (1) parking area.
- (4) Parking lot layout, landscaping, buffering, and screening shall prevent direct views of parked vehicles from streets and sidewalks, avoid spill-over light, glare, noise, or exhaust fumes onto adjacent properties. In order to achieve these objectives, parking lots exposed to view shall be surrounded by a minimum of a five (5) foot-high screen, hedge, or wall visually impervious year-round.
- (5) The interior of all parking lots shall be landscaped to provide shade and visual relief. This is best achieved by protected planting islands or peninsulas within the perimeter of the parking lot. A minimum of one (1) deciduous shade tree shall be planted for every six (6) parking spaces. A six (6) foot planting diamond or equivalent planter is required.
- (6) Parking lot layout shall take into consideration pedestrian circulation. Pedestrian crosswalks shall be provided, where necessary and appropriate, shall be distinguished by textured paving, and shall be integrated into the wider network of pedestrian walkways.

Table 3 - Parking Requirements in the Traditional Neighborhood Development

Use	Minimum Parking Spaces Required
a) Residential	One (1) space per dwelling unit
b) Other Uses	As per Article XVIII of the Zoning Bylaw

§171-119. Conflict with Other Laws.

All development activities with the TND shall comply with applicable laws, regulations, and standards of the Town of Palmer, except that in the event of a conflict between this TND Bylaw and any such laws and regulations, the provisions of this TND shall control, provided that they are consistent with state and federal law.