

PIONEER VALLEY SUSTAINABILITY TOOLKIT



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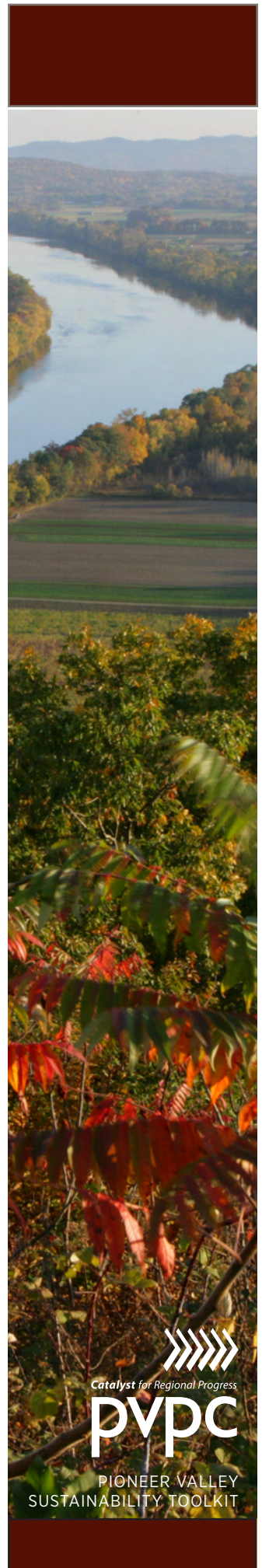
The Pioneer Valley Planning Commission has produced this new Sustainability Toolkit with several goals in mind:

- » To assist communities, by providing technical assistance and resources, to help them in adopting strategies to take action on climate change, promote use of clean energy sources, grow smarter, protect their environments, promote food security, and encourage use of green infrastructure.
- » To promote the implementation of the region's key plan: *Our Next Future: An Action Plan for Building a Smart, Sustainable and Resilient Pioneer Valley*;
- » To encourage sustainability in all aspects of life in the Pioneer Valley region.
- » This overall Sustainability Toolkit consists of five topic-specific toolkits, which include:
 - » Smart Growth
 - » Environment
 - » Climate Action and Clean Energy
 - » Food Security
 - » Green Infrastructure

The 852-page Toolkit includes a total of 116 fact sheets, plus 49 model bylaws, policies and strategies.

HOW TO USE THIS TOOLKIT

1. Explore the Strategies. Communities are encouraged to explore the wide range of sustainability strategies included in the Toolkit, and select strategies that are appropriate to their needs, their community size and character, and their municipal capabilities.
2. Study the Fact Sheets. Read the fact sheets carefully to gain a better understanding of each strategy, their goals, and how they work.
3. Use the Model Bylaw, Ordinances and Policies. The model bylaws, ordinances and policies provided in the toolkit can provide a helpful starting point for developing your own community strategy. But they are intended to be a starting point, and each community must craft its own bylaw or ordinance language that fits the community, and is melded to the existing community Zoning Bylaw/Ordinance or other existing policies.
4. Ask for More Help, If needed



To complement this toolkit, the Pioneer Valley Planning Commission also offers a number of technical assistance programs, where communities can request help in implementing a strategy from this toolkit, and receive targeted assistance from a professional planner.

FOR MORE INFORMATION, PLEASE CONTACT

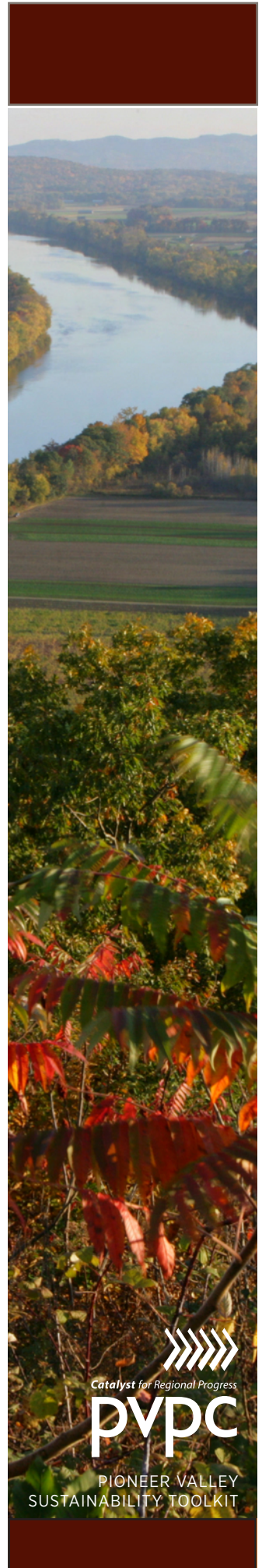
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Acknowledgments

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The substance and findings of the work are dedicated to the public. The author and publisher are solely responsible for the accuracy of the statements and interpretations contained in this publication. Such interpretations do not necessarily reflect the views of the Government.

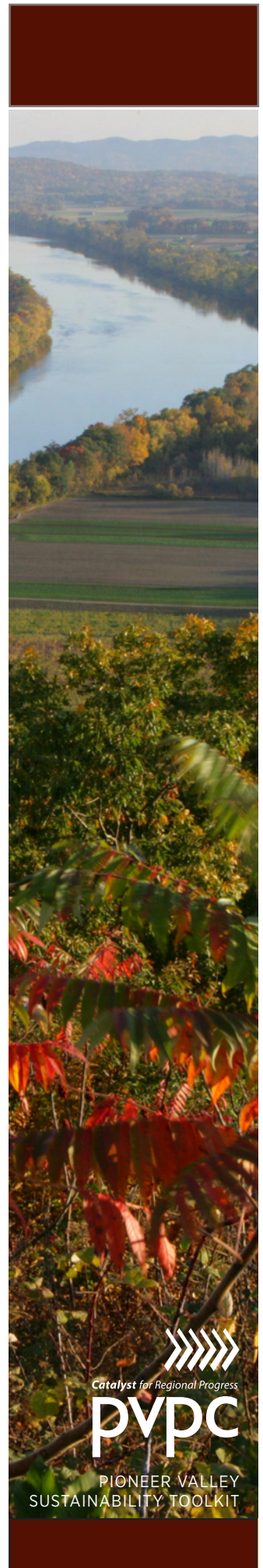
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TOOLKIT FOR

Climate Change and Clean Energy



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SUSTAINABILITY TOOLKIT

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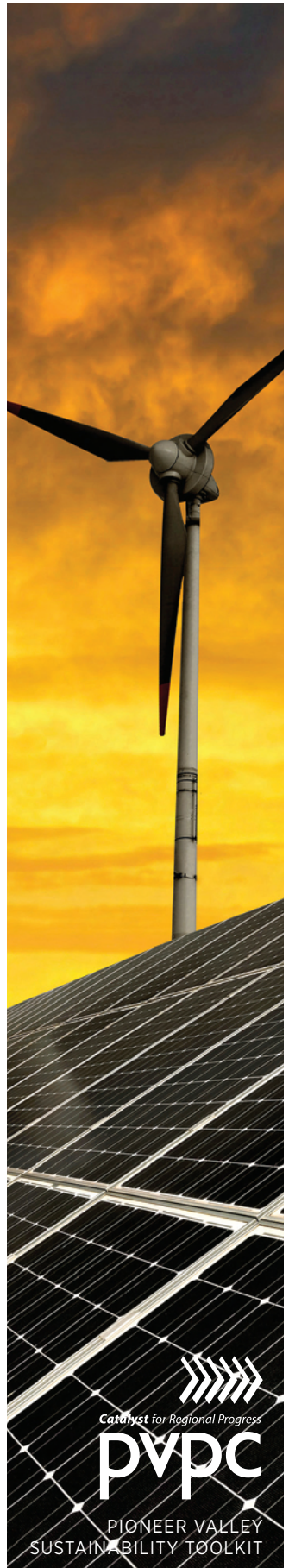
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Bike Access Standards

PURPOSE

To reduce vehicle trips and resulting greenhouse gas emissions by requiring bike racks and other bike amenities as part of development projects.

HOW IT WORKS

Communities can require, through either a general bylaw or a bylaw directed at a specified overlay district, that new buildings set aside indoor or outdoor parking for a set number of bicycles based on building square footage or number of tenants.

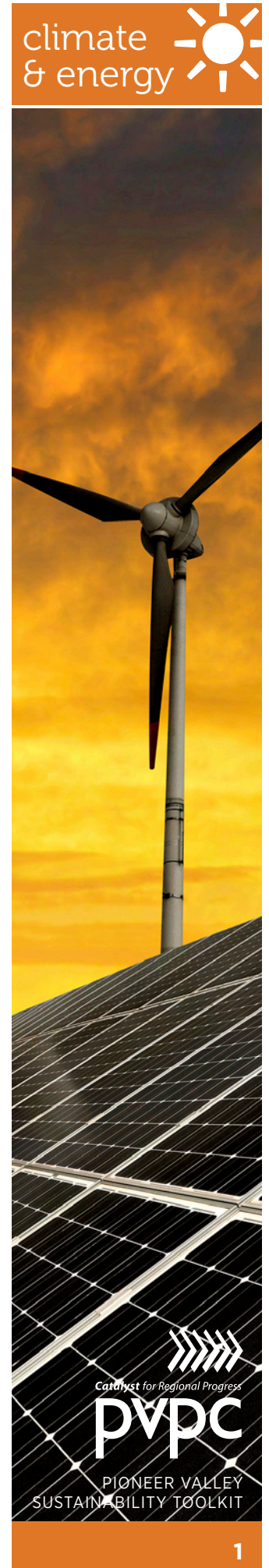
EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED

New York City: BABs: Bicycle Access to Buildings Law

In 2009, New York City approved a Department of City Planning (DCP) initiative which requires secure parking for bicycles in new multi-family residential, commercial and institutional buildings throughout the city. It also applies to building projects where the structure is enlarged by 50 percent or more, and to building conversions to residential use.

This zoning ordinance requires bicycle parking spaces to be enclosed, secure, and accessible to designated users, such as residents, employees. To ensure that the new requirements do not encumber new development, required bicycle parking does not count against the permitted floor area. The following is a brief outline of NYC's bicycle parking requirements as they are illustrative of bicycle parking requirements in general:

- » Residential buildings with more than 10 units must provide secure bike parking for 50% of the units, or one space for every two units.
- » Commercial office buildings must provide one space for every 7,500 square feet.
- » Retail and most other commercial uses, as well as most community facility uses, are required to provide one space for every 10,000 square feet of floor area. Smaller buildings, where three or fewer bicycle spaces are required, can waive the requirement.



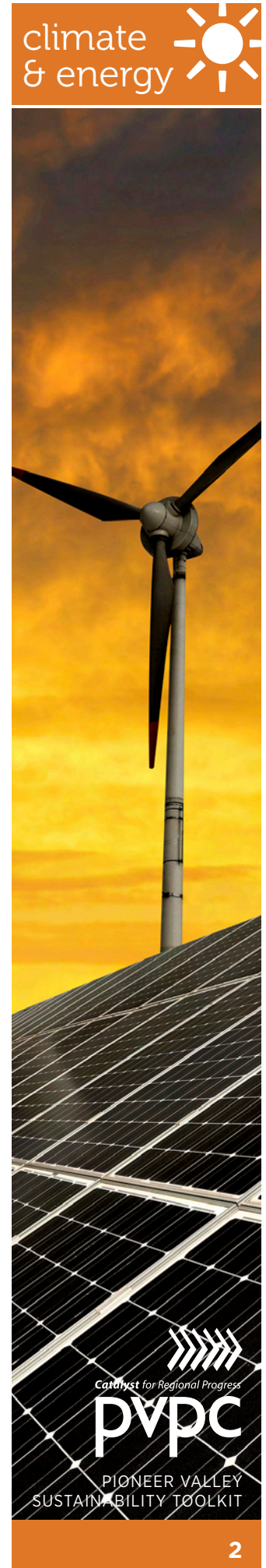
- » Universities and hospitals must provide secure bike parking but special provisions would allow these institutions to locate spaces more flexibly in a campus setting.
- » For industrial and semi-industrial uses, religious institutions, and certain other facilities with varied employment densities or unusual space demands, bicycle parking is required but would not count against permitted floor area.
- » Public parking garages are required to provide one (1) bicycle parking space for every ten (10) automobile parking spaces.

New York City: BAOB: Bicycle Access to Office Buildings Law

New York City also passed a law that requires commercial office buildings to allow cyclists to bring bicycles into their offices by elevator, upon request. The law only applies to commercial office buildings with at least one freight elevator. It does not apply to residential buildings.

Cambridge, Massachusetts:

Requires bicycle parking for new development and redevelopment projects through its zoning. Locations and types of bike parking must be shown in building site plans and approved by the Traffic, Parking and Transportation Department and the Community Development Department. The City created user-friendly guidelines to provide clear direction to developers on how to meet the parking requirements.



LINKS TO MODEL BYLAWS OR MORE INFORMATION:

NEW YORK'S BICYCLE ACCESS TO BUILDINGS LAW:

The New York City Council - File #: Int 0871-2008

CAMBRIDGE, MASSACHUSETTS'S BICYCLE PARKING GUIDELINES:

http://www.cambridgema.gov/CityOfCambridge_Content/documents/tpat_BikeParkingBrochure.pdf

BICYCLE PARKING ONLINE, A BICYCLE PARKING BEST PRACTICES RESOURCE FROM THE CAPITAL BIKE & WALK ORGANIZATION IN VICTORIA, BRITISH COLUMBIA (BC), PROVIDES THE MOST COMPREHENSIVE COLLECTION OF MUNICIPAL LEGISLATION REQUIRING BICYCLE PARKING

<http://www.bicycleparkingonline.org/Legislation>

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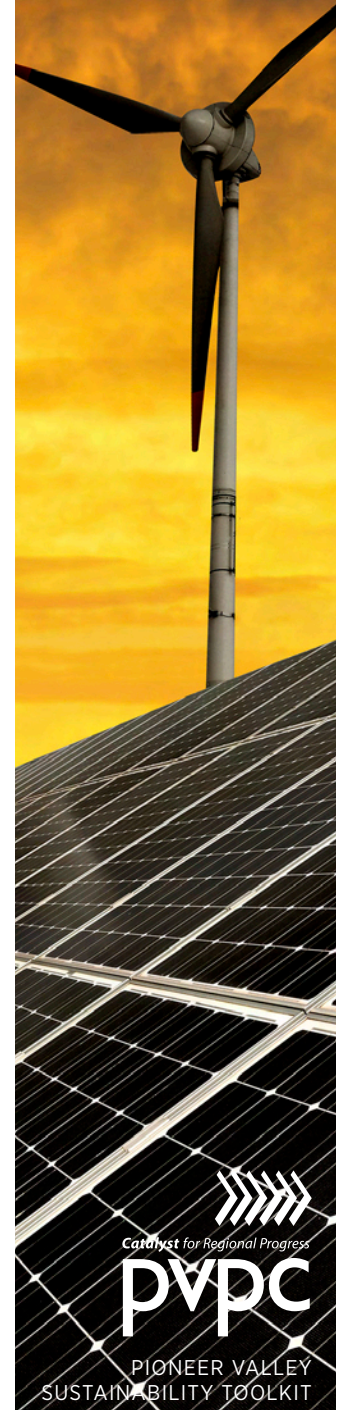
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Carbon Offset & Impact Fee

PURPOSE

New development can burden a city or town with the responsibility for providing new facilities, infrastructure, and services to support the development. To reduce their financial burden, some communities assess impact fees to large developments. Impact fees can be used by the community to pay for necessary improvements, like roads or schools. Likewise, new development can increase a community's carbon footprint. Communities can gather carbon offset fees to pay for projects that will mitigate greenhouse gas emissions or help the community adapt to climate change impacts.

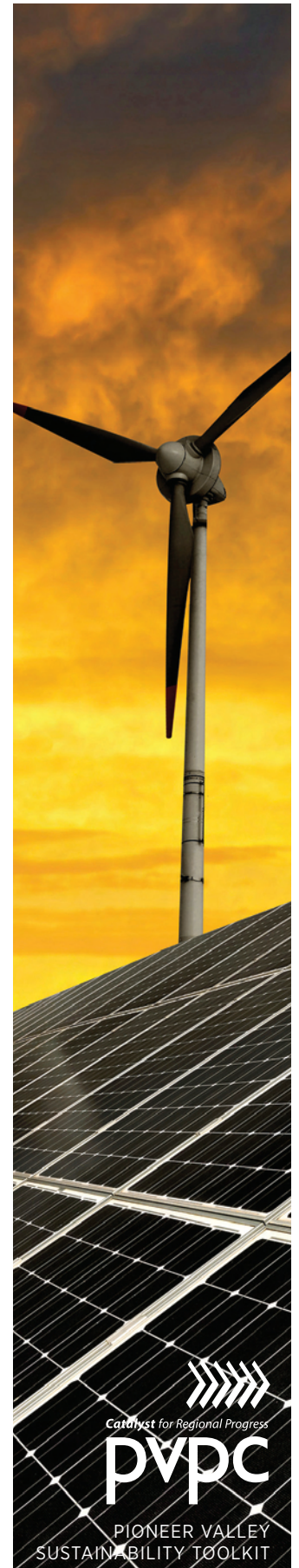
Note: Impact fees are not expressly permitted in Massachusetts currently. Zoning reform legislation currently before the Legislature would enable municipal impact fees.

HOW IT WORKS

Impact fees are an increasingly common way to shift some of the burden of growth back on the developer. Impact fees are financial responsibilities that a municipality places upon a developer to provide some or all of the physical improvements (from sewers and streets to parks and schools) necessitated by development and its impacts. Under this system, the developer pays a share that is reasonably proportional to the size of the development. There must be a justifiable connection between the new development and the need for new facilities. These physical improvements include improving transportation systems, updating storm water and sewage systems, upgrades to schools and libraries, or the provision of parks.

In addition to the strain on infrastructure within a community, development can result in greenhouse gases (GHGs) emissions that can greatly increase a community's overall carbon footprint (a carbon footprint quantifies the total amount of greenhouse gases emitted by a person, project, or activity). A development directly and indirectly emits GHGs during construction. Sources include producing materials, transporting materials and workers to the site, powering equipment, and the loss of carbon absorbing agriculture or forest land. After construction is complete, a development continues to have GHG emission impacts. Buildings consume electricity and heat—primary sources of GHG emissions. Development also generates traffic—another major source of GHG emissions.

Similar to using money from an impact fee to pay for a new school, the money from a Carbon Offset Fee goes towards mitigating GHG emissions within the community. The long term goal of applying a cost to greenhouse gas emissions is to provide incentives to developers to release as little emissions as possible. For example, a developer could



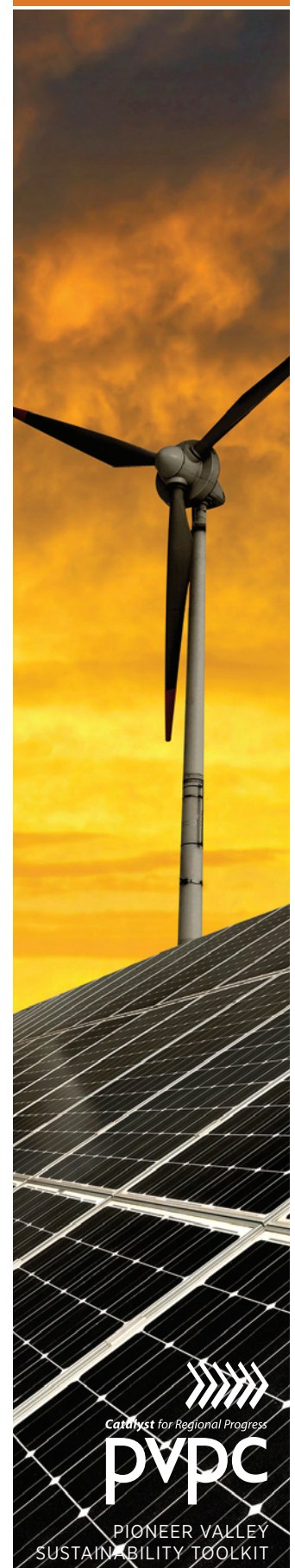


reduce their project’s carbon footprint by minimizing land clearing, constructing energy efficient buildings, and choosing development sites that minimize traffic impacts.

The money generated by carbon offset fees can be used to reduce carbon emissions elsewhere within the community by planting trees, installing bike lanes, insulating houses or installing solar panels. Companies such as the American Carbon Registry, Verified Carbon Standard, or Carbon Trust Standard (to name a few) produce third-party documentation of a development meeting the rules set by a municipality and ensure that carbon offsets meet quality standards. Implementing impact or carbon offset fees can have lasting effects on the sustainability of a community.

EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED

United Kingdom: Implementing carbon offset fees is an innovative development in mitigating climate change. In Europe, England’s Magna Park Distribution Center is the leading example of a large development using fees to go carbon neutral. The growing town of Milton Keynes where the park is located has established a carbon offset fund that receives money from developments to the park. Developers pay into the fund according to the quantity of carbon emissions generated by their buildings. Since its introduction in 2008, developers have paid over £400,000. These funds have been used to help pay for energy efficiency improvements to 2,500 existing homes. The fund helps residents benefit directly from development in the area by increasing home values while



mitigating the communities overall impact on climate change.

LINKS TO MODEL BYLAWS OR MORE INFORMATION

WATSONVILLE, CALIFORNIA, PROPOSED CARBON IMPACT FEE:

<http://cityofwatsonville.org/permits-plans/climate-action-plan/carbon-fund-ordinance>

AMERICAN CARBON REGISTRY:

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

CARBON TRUST STANDARD:

<http://www.carbontruststandard.com/pages/home>

INFORMATION ON IMPACT FEES BY STATE:

<http://www.impactfees.com/state-local/state.php>

MILTON KEYNES COUNCIL:

<http://www.milton-keynes.gov.uk/mklowcarbonliving/>

VERIFIED CARBON STANDARD:

<http://www.v-c-s.org/>

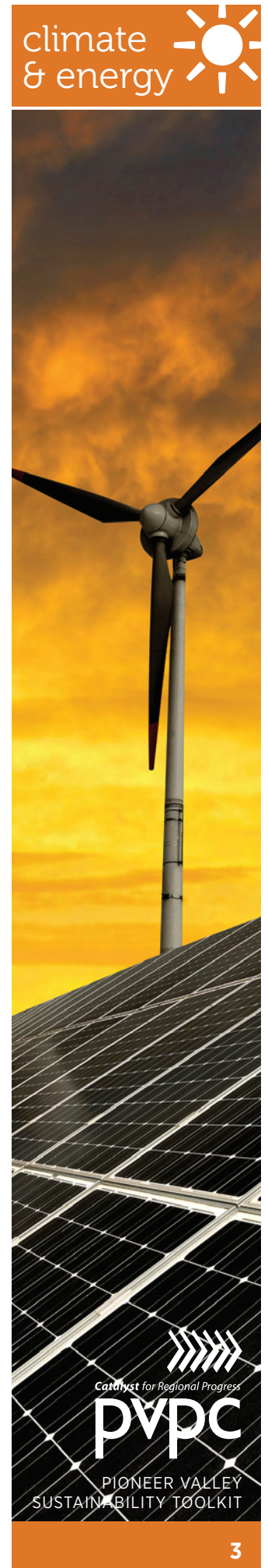
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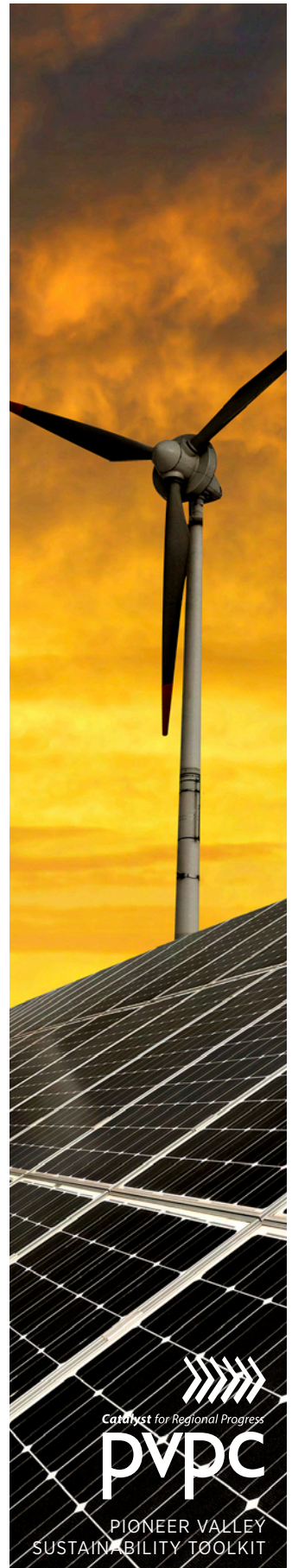
Complete Streets Policy

PURPOSE

To encourage low-carbon modes of transportation, including bicycling and walking, by ensuring that road design accommodates all users and all modes of transportation.

Transportation is one of the biggest contributors of greenhouse gas (GHG) emissions that cause climate change. In the Pioneer Valley, transportation accounts for about 31.8% of GHG—more than any other sector. Well designed roads can encourage low carbon transportation options like bicycling, walking, or use of mass transit.

Complete Streets Policies encourage, or require, road design and construction that adequately accommodates all users, including pedestrians, bicyclists, users of mass transit, people with disabilities, the elderly, motorists, freight providers, emergency responders, and adjacent land users. When correctly implemented, a complete street creates a safe, vibrant, engaging public space for everyone using it. Complete streets also contribute to the mitigation of climate change and the reduction of greenhouse gasses, through the promotion of transportation modes that generate little or no emissions.



HOW IT WORKS

Complete Streets policies can be adopted in a variety of ways. For example, a Complete Street policy can be an administratively issued directive that guides a Department of Public Works (D.P.W.) to consider all users in their projects. A Complete Streets Policy can be adopted as a standalone bylaw or ordinance. Complete Streets principles can be incorporated into zoning codes—particularly form-based codes. Complete Streets policies can also be part of a comprehensive transportation plan. Some communities choose to adopt detailed guidelines for design, construction, maintenance and repair of roads. These guidelines can include recommended street type classifications, recommended lane widths, intersection configurations, sidewalk requirements, where and what type of bike lanes to use, street furniture requirements, approval processes, etc.

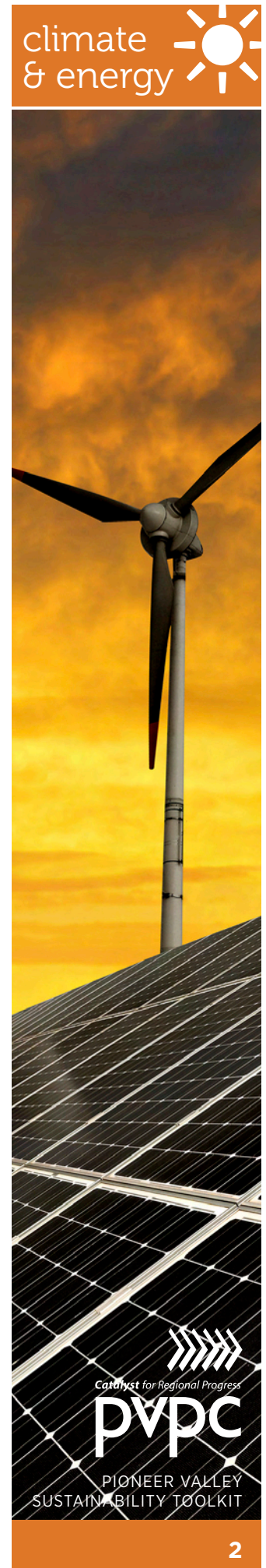
Successful complete streets policies result in projects that reflect a wide variety of community values, such as aesthetics, history, safety, mobility, and the environment.

Because the primary goal of a complete street is to accommodate all users, the first step in creating one is a thorough public outreach effort. The outreach should target various groups, including pedestrians, bicyclists, motorists, senior citizens, families, and users of public transit. Additionally, public safety officials should be consulted to ensure adequate accommodation for emergency vehicles.

Best practices to consider as part of a complete street design include:

- » Bike lanes that provide safe, free-flowing movement for bicyclists
- » Continuous sidewalks with adequate widths and minimal tripping hazards
- » Traffic calming devices (speed bumps, reduced lane widths, medians, etc.)
- » Pedestrian features (crosswalks, crossing signals, street lights, etc.)
- » Street furniture (bus shelters, bike racks, trees, trash cans, public art, newspaper boxes, etc.)
- » Visually attractive methods for distinguishing space for different modes of transportation
- » A well connected street grid with minimal use of cul-de-sacs or dead ends
- » Helpful signage for pedestrians, bicyclists, and motorists (wayfinding, warnings, etc.)

A municipality can use this list of best practices as a starting point for community discussion and to develop street designs that fits its unique context. Illustrations and case studies of best practices can be a useful component of the discussion and preliminary design. Regardless of the particular best practices selected, the chosen features should be designed as a cohesive vision, with various elements complementing each other.

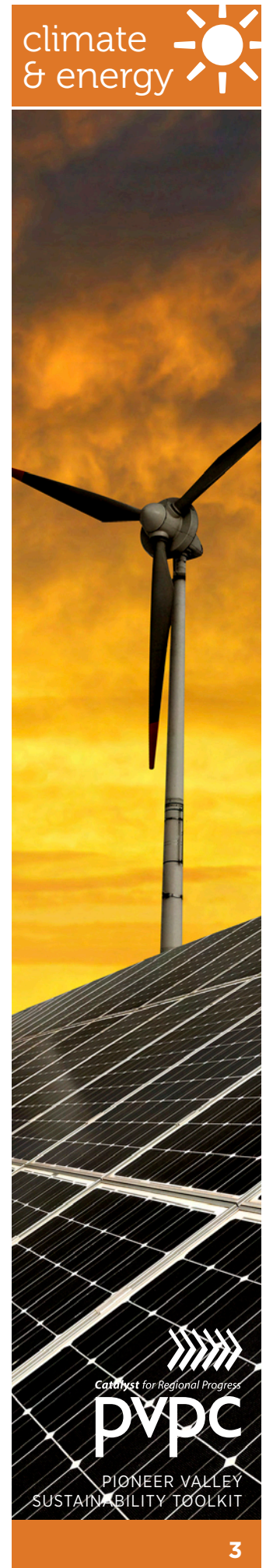


Examples that can be part of a cohesive vision include:

- » Coordinating the locations of bike racks, bike lanes, and signage indicating to motorists the presence of cyclists
- » Incorporating individual bike lanes into an interconnected network
- » Providing multiple features for pedestrians on the same road (traffic calming devices, benches, sidewalks, and pedestrian crossings located near each other)

In addition to being part of a vision, design features should be examined for different road types, including local streets, collectors, and arterials. The design of complete streets for different roads will vary – for example, bicycles and cars may safely share a lane on low speed local roads, whereas major roads with heavy automobile traffic may require dedicated—even protected—bike lanes.

The examples in the next section include examples of several of the various types of documents that can be used for implementation. In addition, because the complete streets concept pertains to a wide variety of aspects of the built environment, officials from a variety of municipal departments should be consulted.



EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED

Northampton, MA

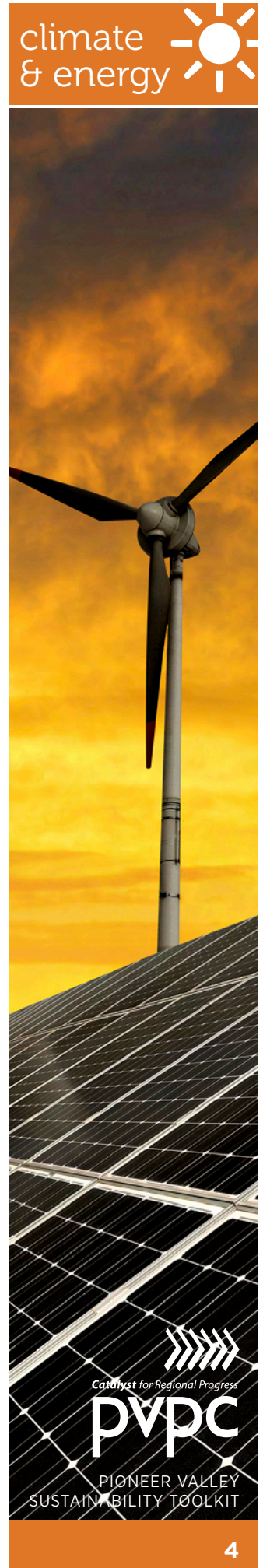
Northampton developed a Comprehensive Municipal Transportation Plan in 2005 which outlines a vision for all modes of transportation. The Plan’s focus is the listing of 55 action policy actions, grouped by categories including core transportation policies, roadway and intersection policies, traffic calming, sidewalks, bicycle and multi-use travel and facilities, public transit, parking, enforcement, and transportation demand management. In addition, each policy action is assigned a set of municipal departments responsible for its implementation.

Bethlehem, NY

Bethlehem passed a resolution in 2009 to “recognize bicyclists and pedestrians as equally important as motorists in the planning and design of all new street construction and reconstruction.” The resolution cites the goal of the Town’s Comprehensive Plan to improve mobility of all residents, and lists the benefits of bicycle and pedestrian transportation. The resolution calls for the Highway Superintendent to enforce the resolution.

New York City, NY

The NYC Street Design Manual was published in 2009 and addresses all design components of a street, including suggested materials to use in construction, lighting, and the design of the right of way. The document’s comprehensive focus includes the subjects of transportation, community, and environment. It has a variety of recommendations for different stakeholders, including design professionals, property owners, municipal officials, and citizens.



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LINKS TO MODEL BYLAWS OR MORE INFORMATION

COMPLETE STREETS MODEL GUIDELINES DEVELOPED BY THE NATIONAL COMPLETE STREETS COALITION:

<http://www.completestreets.org/changing-policy/model-policy/model-state-legislation-options>

MASSACHUSETTS LAW REGARDING ACCOMMODATION FOR BICYCLES AND PEDESTRIAN TRAFFIC:

<http://www.malegislature.gov/Laws/GeneralLaws/PartI/TitleXIV/Chapter90e/Section2a>

NORTHAMPTON MUNICIPAL TRANSPORTATION PLAN:

<http://www.northamptonma.gov/opd/uploads/listWidget/2552/Northampton%20Transportation%20Plan-policies.pdf>

BETHLEHEM RESOLUTION FOR COMPLETE STREETS:

<http://www.townofbethlehem.org/images/pagelimages/Paths4Bethlehem/CompleteStreetsResolution20090812.pdf>

NEW YORK CITY STREET DESIGN MANUAL:

<http://www.nyc.gov/html/dot/html/about/streetdesignmanual.shtml>

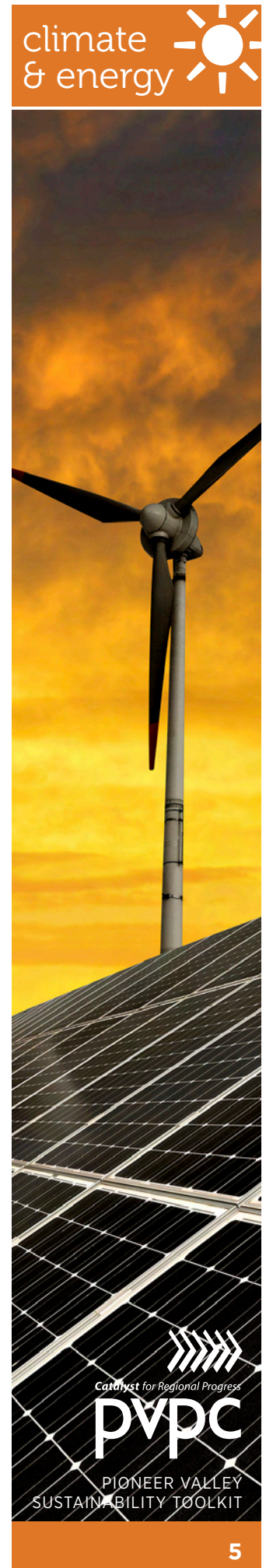
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Energy Performance Scoring

PURPOSE

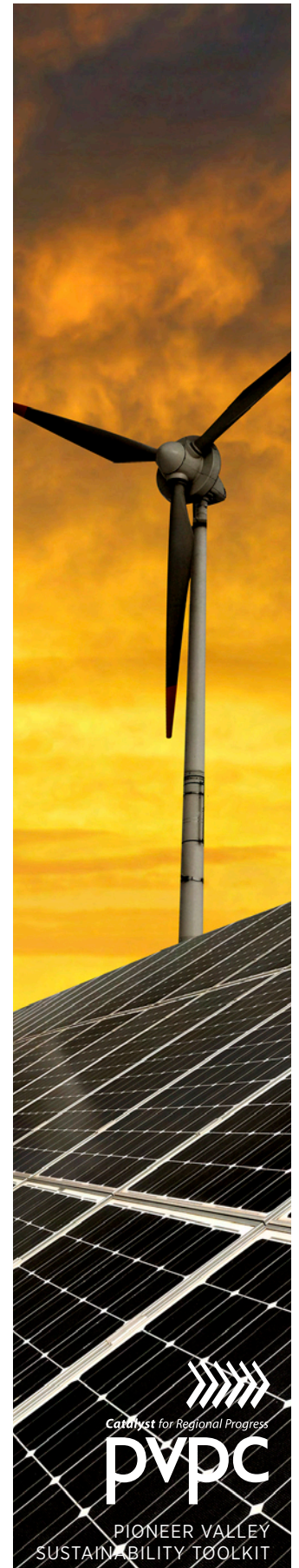
To reduce the use, impact and expenses of energy in homes and businesses by measuring the performance of buildings.

HOW IT WORKS

Energy performance scores are based on inspections from qualified professionals which test or audit the expected performance of a buildings' energy use. The score serves as a benchmark for home and building owners to compare how their property is performing, and how it could perform with improvements to the structure.

One common energy performance score used by municipalities in Massachusetts is the Home Energy Rating System (HERS), developed by the Residential Energy Services Network (RESNET), which is a national organization of energy-efficiency industries that set national standards for energy efficiency rating systems.

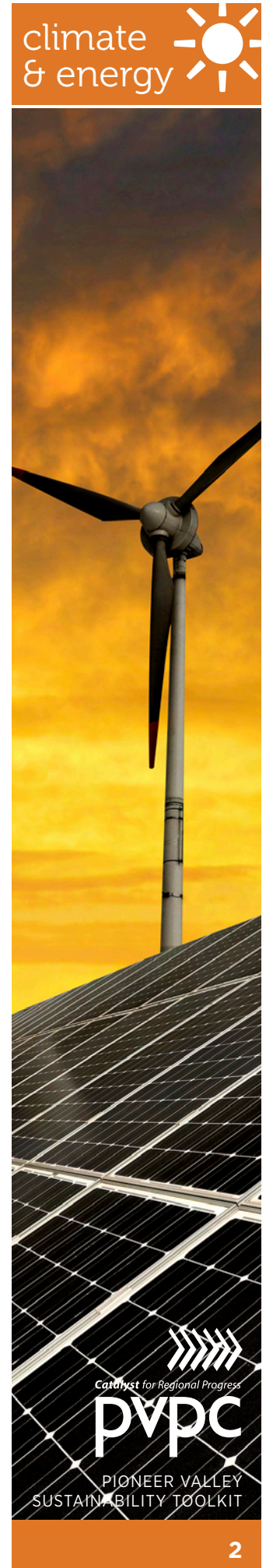
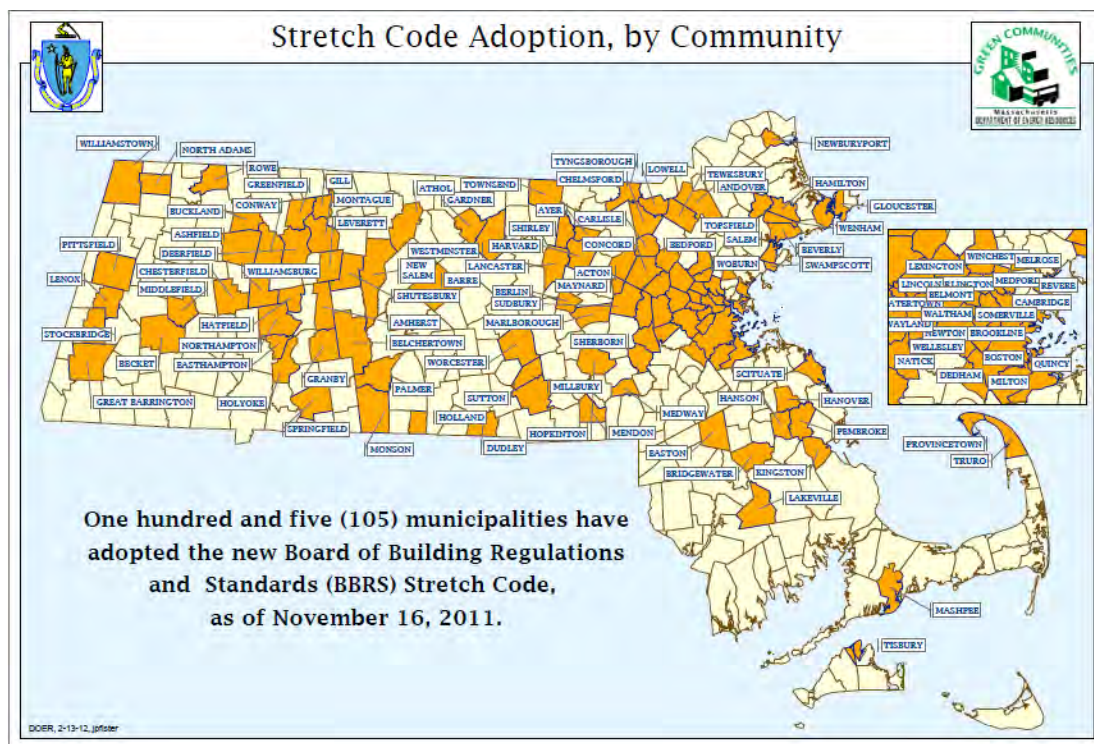
Through a home energy inspection and computer modeling, the HERS rating system compares the energy efficiency of the scored home with the efficiency of that home, had it been built to the standards set in the 2006 state building code. The hypothetical 2006 home score equals 100, and every point difference between the "standard" 2006 home and the scored home represents a percentage change in efficiency. For example, a home that scored 110 is 10% less efficient than the standard, while a home that scores 90 is 10% more efficient than the standard.



EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED

The HERS performance score is being used in one hundred and five municipalities, about a third of all cities and towns across Massachusetts, to gauge compliance with the state “Stretch” Building Code, an amendment to the state building code that municipalities can voluntarily adopt as an ordinance or general bylaw. The Stretch Code requires all new homes under 2,000 square feet to have a HERS score of 70, while new homes over 2,000 square feet must have a score of 65. In other words, new homes in towns where the Stretch code has been adopted are 30% to 35% more efficient than the standard.

The stretch code is different from the basic building code because, instead of focusing on prescriptive measures – that is to say, government mandated materials and construction techniques – it relies on homes achieving specific performance scores. Homeowners therefore have more flexibility on what measures they pursue in order to achieve greater energy efficiency.



The Massachusetts Department of Energy Resources (DOER), in collaboration with the US Department of Energy and the Pioneer Valley Planning Commission, has also begun a pilot program called “Home MPG”, where residents of eight communities in the Pioneer Valley will be able to receive an energy performance score for their homes similar to a “Miles Per Gallon” score for vehicles. The Home MPG score is then used to show residents how their homes compare to state energy efficiency trends and targets, and what retrofits they can make in order to improve their score. Towns included in the pilot are Belchertown, East Longmeadow, Hampden, Longmeadow, Monson, Palmer, Springfield and Wilbraham.

LINKS TO MORE INFORMATION

STRETCH CODE:

<http://www.mass.gov/?pageID=eoeeahomepage&L=1&LO=Home&sid=Eoeea> and search for “stretch code”

RESNET:

<http://www.resnet.us/home-energy-ratings>

HOME MPG:

http://www1.eere.energy.gov/buildings/betterbuildings/neighborhoods/massachusetts_sep_profile.html

FOR MORE INFORMATION, PLEASE CONTACT

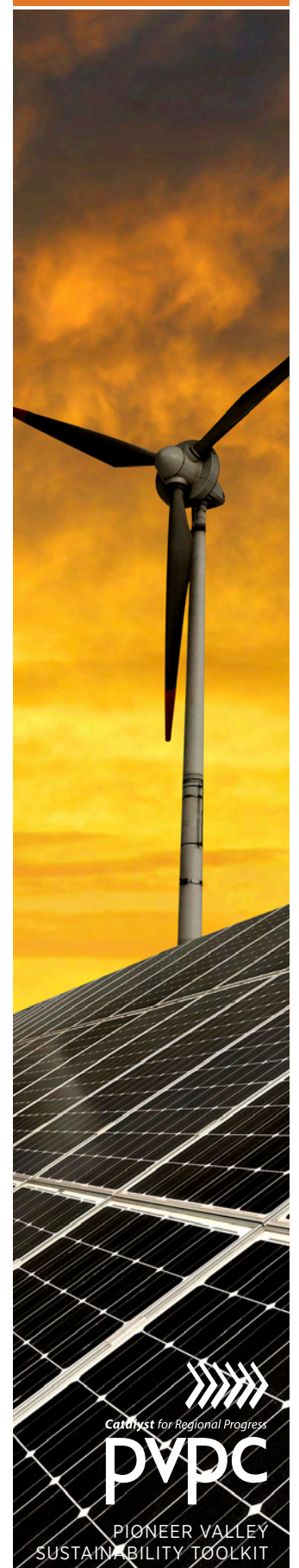
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Fuel Efficient Vehicles Program

PURPOSE

To reduce carbon dioxide emissions from municipal vehicles by purchasing fuel efficient vehicles, which has a positive impact on the environment and saves the municipality money.

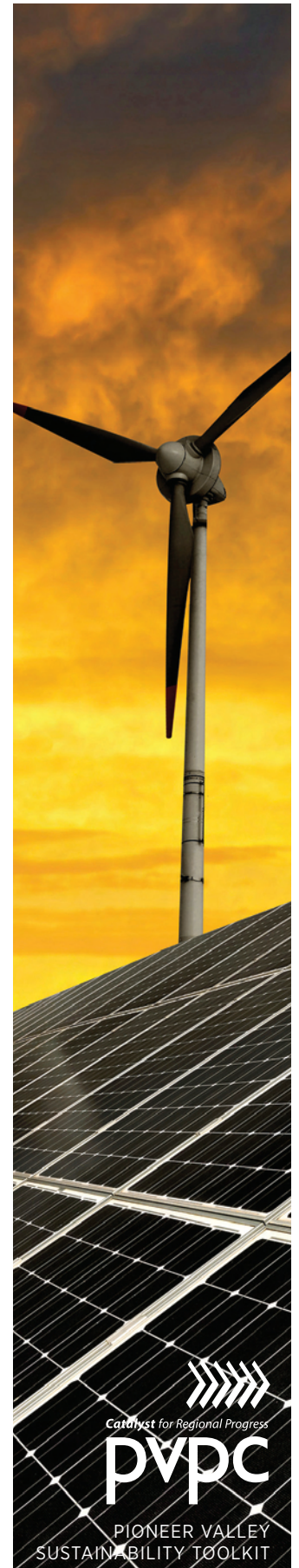
HOW IT WORKS

Local governments can adopt a policy that requires the purchasing of fuel efficient vehicles for municipal/school use when new vehicles are needed, and when such vehicles are commercially available and practicable. Local governments can develop and maintain an annual vehicle inventory of fuel inefficient vehicles and a plan for replacing these vehicles with vehicles that meet the fuel efficiency ratings below.

The US Environmental Protection Agency (EPA) maintains a database on vehicle fuel efficiency that is updated occasionally throughout the year, as new models are released. Municipalities that adopt a fuel efficient policy can reference the Massachusetts Department of Energy Resources Green Communities Program for the latest fuel efficiency MPG rating requirements.

Public and quasi-public agencies as well as private companies who offer transportation to consumers or maintain operation fleets—such as public transit authorities, airports, aircraft carriers, shuttle service companies, long-haul trucking companies, car rental agencies—are encouraged to adopt similar pledges and policies in an effort to reduce carbon emissions. An agency or company strategic plan should pledge the following considerations when opting to purchase new vehicles:

- » To purchase vehicles with fuel efficiency ratings;
- » To purchase vehicles equipped with the most advanced emissions control systems available;
- » To purchase vehicles equipped with devices that minimize idling and warm up time automatically; and,
- » When feasible, to purchase vehicles that run on cleaner fuels like compressed natural gas.



EXAMPLES OF ADOPTION

The University of Massachusetts adopted a policy in 2010 to consider the most economical, most fuel efficient, and lowest emission vehicles available in a particular model year that meet the operational needs and policy requirements when purchasing new vehicles. Previous policy language did not include discussion of fuel efficiency and low emission vehicles.

LINKS TO MORE INFORMATION

Massachusetts Fuel Efficient Model Policy

The Massachusetts Department of Energy Resources developed a model Fuel Efficient Vehicle Policy to encourage municipalities to reduce fuel consumption and energy costs. By adopting this policy, the municipality commits to purchasing only fuel efficient vehicles for municipal/school use whenever such vehicles are commercially available and practicable. This model policy was developed as part of the state's Green Communities Program, and adoption of this policy is one of the five requirements to be considered a "green community." Links to the model policy and guidance for complying with the policy are below. Over 70 Massachusetts municipalities adopted and implemented a version of this fuel efficient vehicles policy since 2012.

Massachusetts Model Fuel Efficient Municipal Fleet Policy

A LINK TO THE "GUIDANCE FOR COMPLIANCE WITH GREEN COMMUNITIES ACT CRITERIA 4"

http://www.mass.gov/Eoeea/docs/doer/green_communities/grant_program/GC-Guide-Criterion4-Feb22-2011.pdf

University of Massachusetts Policy

A LINK TO THE UNIVERSITY'S DEPARTMENT VEHICLE PURCHASING GUIDELINES IS PROVIDED BELOW.

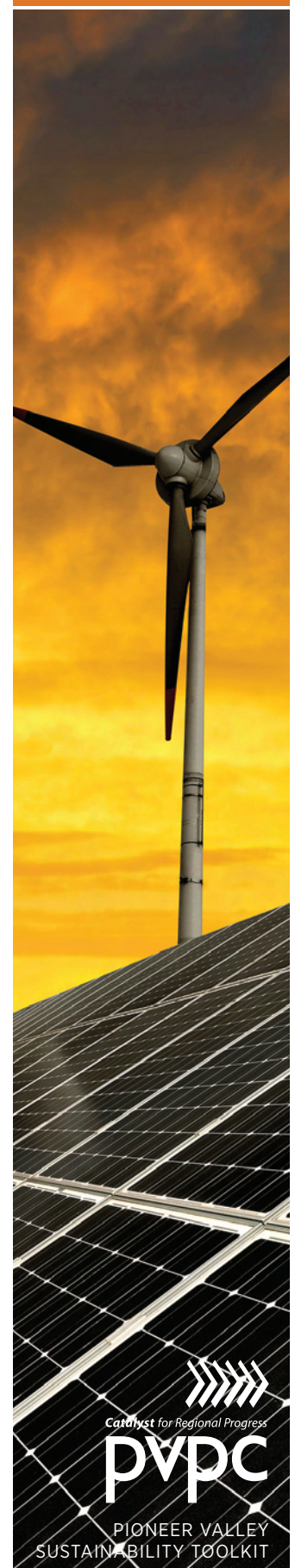
<http://www.umass.edu/procurement/policies/motorvehicles.htm>

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Green Builder Programs

PURPOSE

To promote voluntary compliance by homebuilders with green building standards.

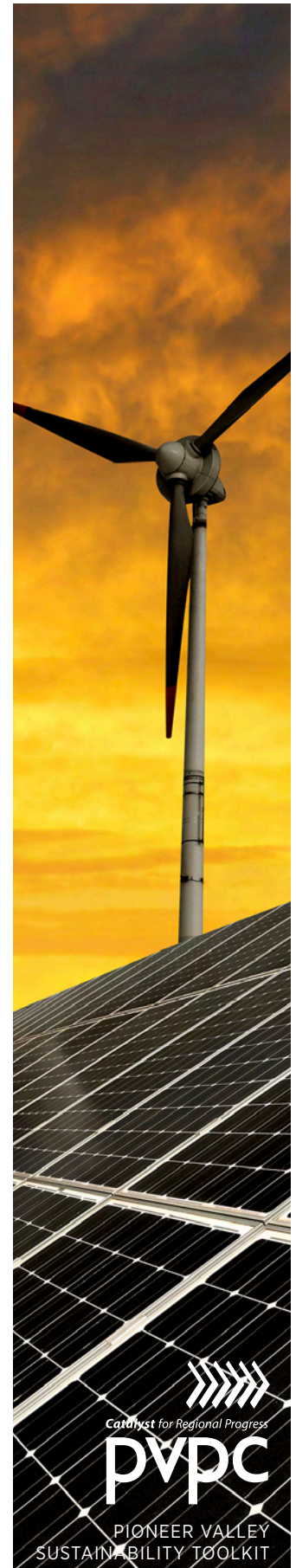
HOW IT WORKS

Communities can create voluntary builder certification programs offering incentives – such as priority plan review and guaranteed permitting timelines – to homebuilders who follow green building practices in new residential construction.

EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED

Nearby in the Northeast region, the Town of Acton, Massachusetts adopted a zoning by-law (section 5.5B.2.2.d) allowing for a density bonus for buildings achieving LEED certification in their East Acton Village District. The Township of Cranford, NJ adopted a similar measure (Ordinance No. 2005-46), establishing a Green Building Density Incentive program, whereby redevelopers who achieve LEED certification and comply with the specific program requirements may earn a development density bonus from the Township. The Town of Babylon, New York went farther by adopting a local law that requires LEED certification for any new construction of commercial buildings, office buildings, industrial buildings, multiple residence, or senior citizen multiple residence over 4,000 square feet. If certification is achieved, the Town refunds the certification fees paid to USGBC by the developer.

Further away, the City of Austin, Texas created what is now the Austin Energy Green Building program in 1985. The city-run program helps new and established contractors to design and build homes with the health of the occupant, the environment, and energy efficiency at the center of the process. The city provides information, resources, education, and consulting services related to green building to homeowners and developers in the voluntary program. The program is free and benefits the city, developers, and residents in different ways. The city gets a better designed, longer lasting, more energy efficient housing stock and thus a higher assessed value on the housing stock. The developer's project and the developer's company become part of Austin's searchable online directory of green building professionals, and are featured in bimonthly newsletters. The



homeowners benefit from owning a healthy, easy to maintain, and energy efficient home as well as qualifying for rebates, loans, and energy efficiency improvements.

Also, the City of Mill Valley, California, just north of San Francisco, has developed an incentive system for builders and developers who surpass the minimum environmental and ecological requirements for new construction. The rating system, which all new residential and commercial development must meet, is based on the LEED score, “Build it Green” checklist or “Green Point” checklist depending on size and type of development. All three systems are independent guides to assist in ranking a building’s efficiency. The city provides some incentives to developments that exceed these requirements. The incentives include the presentation of a plaque from the city to the developer, allowing the contractor to use the City Green Building logo on promotional material, and featuring the business or project on the city’s website.

LINKS TO MODEL BYLAWS OR MORE INFORMATION:

LEED BUILDING CODE INCENTIVES:

<http://www.usgbc.org/ShowFile.aspx?DocumentID=2021>

AUSTIN ENERGY GREEN BUILDING:

<http://www.austinenergy.com/energy%20efficiency/Programs/Green%20Building/index.htm>

MILL VALLEY GREEN BUILDING:

www.millvalleylibrary.org/Index.aspx?page=948

US GREEN BUILDING COUNCIL:

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

BUILT GREEN:

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

GLOBAL GREEN USA:

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

US ENVIRONMENTAL PROTECTION AGENCY:

<http://www.epa.gov/greenbuilding/>

FOR MORE INFORMATION, PLEASE CONTACT

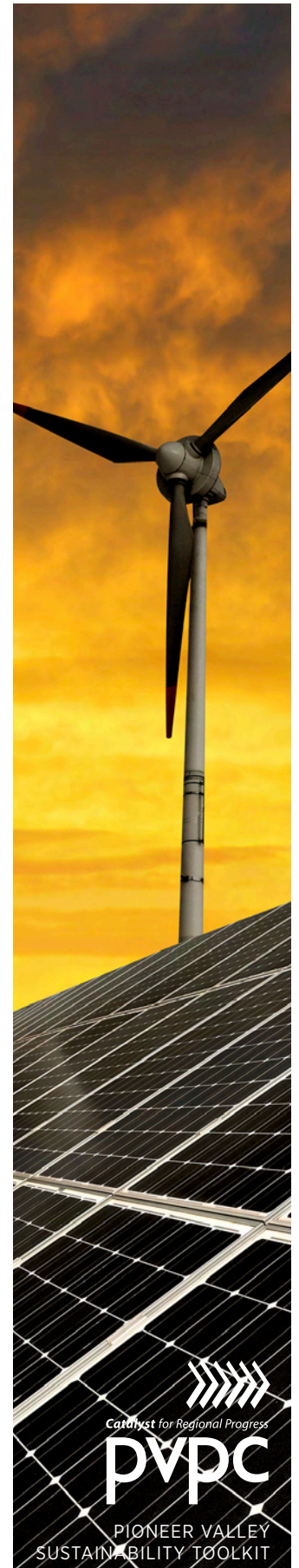
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Greenhouse Gas Environmental Impact Statements

PURPOSE

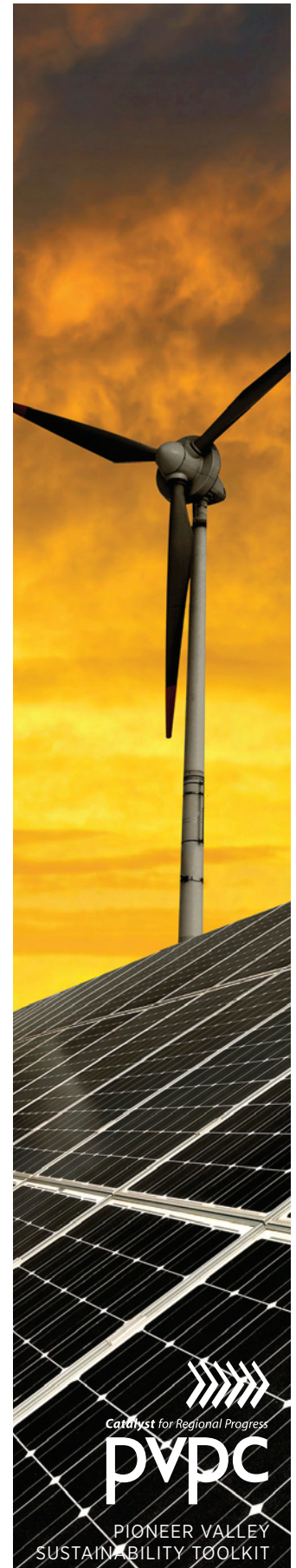
To require new, large-scale developments to identify and evaluate measures to mitigate greenhouse gas emissions, including traffic reduction strategies, carpooling and transit access as part of Site Plan Review process.

HOW IT WORKS

Communities can adopt zoning regulations to require applicants of large developments to calculate, model, or estimate the amount of CO₂ and other Greenhouse Gas (GHG) emissions from a project, including the emissions associated with vehicular traffic, energy consumption, water usage and construction activities. Developers would present the findings to the Planning Board or other similar permit granting authority for review. The permit granting authority either accepts the estimates or makes recommendations for how to reduce the GHG emissions as a requirement for receiving a special permit or building permit.

EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED

State regulation enacted through the Massachusetts Environmental Protection Act (MEPA) requires large projects, such as those that are required to submit an Environmental Impact Report (EIR) or Environmental Notification Form (ENR) to the Executive Office of Energy and Environmental Affairs (EOEEA), to also include information on the projects' mobile- and stationary-source greenhouse gas emissions. This applies to emissions associated primarily with energy consumption, vehicle trip generation, and consumption of large quantities of water or wastewater generation. The regulation, known as the "Massachusetts GHG Emission Policy and Protocol" does not require quantification of other emissions categories, such as emissions associated with waste generation, materials consumption, conversion of biomass associated with land clearing, or construction period emissions.



Some Massachusetts communities already require some form of environmental reporting as part of the permitting process, and communities could require developers to submit the state GHG report for review by the local permitting authority. Communities could also require additional reporting requirements to cover land uses not addressed by state policy.

Further away from the region, San Francisco, California provides an example of where this concept has been implemented. The City has a policy to require the Planning Board to consider a development project’s “impact on the San Francisco greenhouse gas emissions limits” as part of the City’s review under California’s GHG emissions policy. The City must determine whether a given project’s climate change-related impacts are significant and recommend mitigation of significant effects.

LINKS TO MODEL BYLAWS OR MORE INFORMATION

» **San Francisco GHG Reduction Ordinance**

http://www.sf-planning.org/ftp/files/MEA/GHG-Reduction_ApxB.pdf

» **California Governor’s Office of Planning and Research. 2008. “CEQA AND CLIMATE CHANGE: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review.” Technical Advisory:**

http://www.fire.ca.gov/resource_mgt/resource_mgt_EPRP_Climate/OPR_Technical_Advisory_Publication%20Ready_June%2019%202008%5B1%5D.pdf .

- a. Interim guidance regarding the steps agencies should take to address climate change in CEQA documents.

» **Massachusetts Environmental Protection Agency. 2009. “(Revised) MEPA Greenhouse Gas Emissions Policy and Protocol.” PDF available at**

<http://www.env.state.ma.us/mepa/ghg.aspx> .

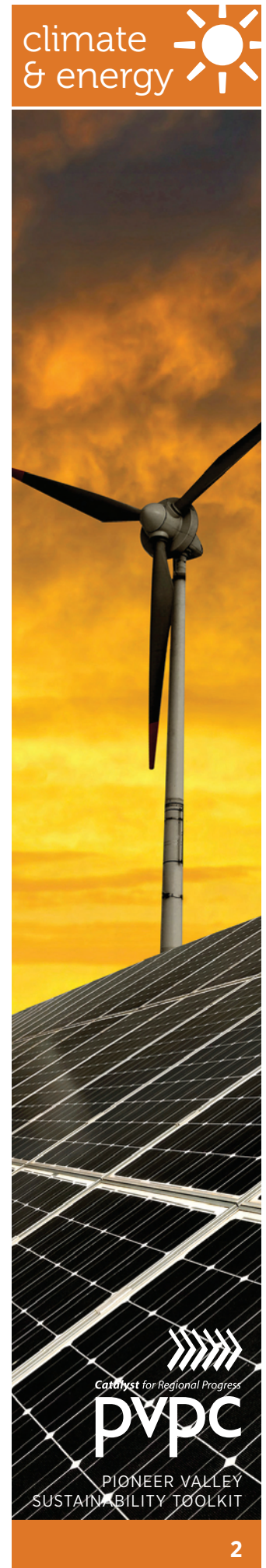
- b. Revised protocol for MEPA review’s requirement for GHG quantification; includes mitigation suggestions.

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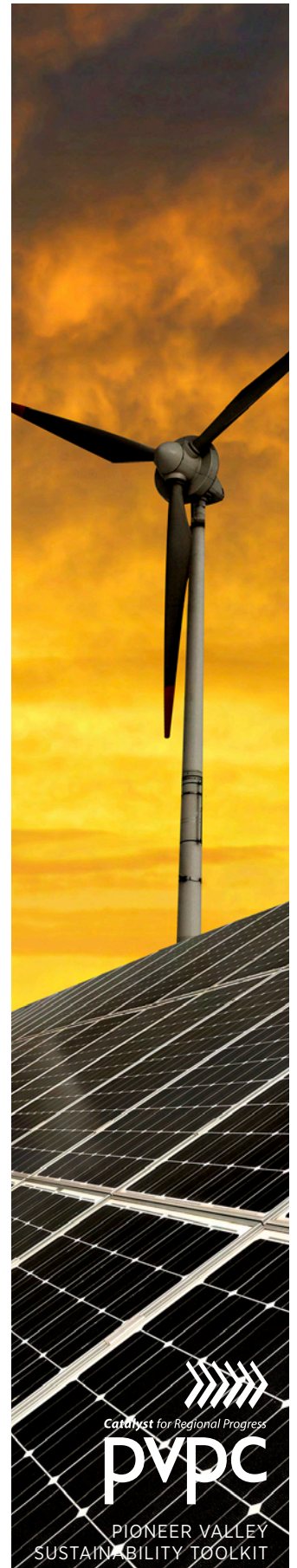
Idling Reduction Campaign & Program

PURPOSE

To educate citizens about air pollution resulting from vehicle idling and to reduce idling behavior.

Exhaust from motor vehicles can cause serious health effects on top of being a key factor of ground-level ozone or smog and a contributor to global warming. Fine particles emitted from diesel and gas engines are lung irritants and can trigger asthma attacks and more serious health conditions. All of these contaminants are produced when motor vehicles idle.

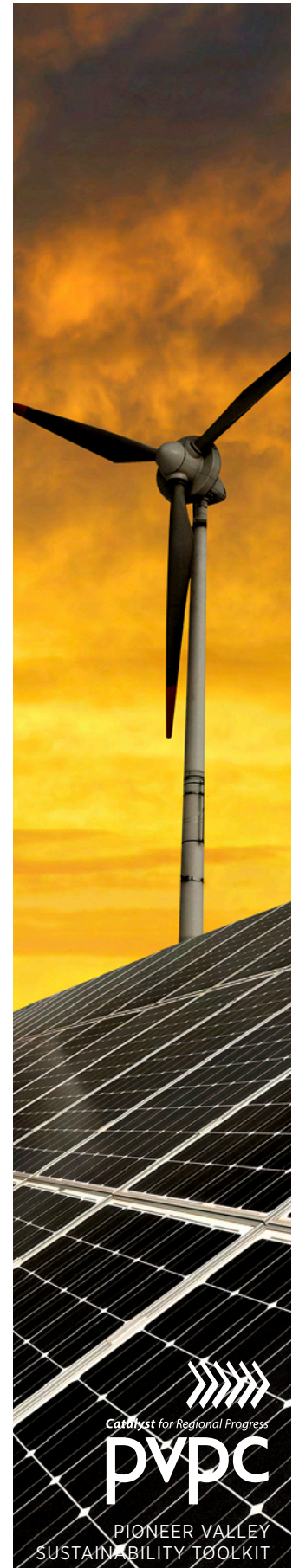
Massachusetts state law (M.G.L. Chapter 90, Section 16A) actually limits vehicle idling to five minutes, but many residents are unaware of this law, as are many local boards of health and local police who are charged with enforcing the state anti-idling law. Federal guidelines recommend that people turn their engines off after 10 seconds of waiting, except in traffic.



HOW IT WORKS

Local governments can take the following steps to implement an anti-idling educational campaign and program using parents of school-age children as a target population. Municipal and school district officials should re-launch the idling reduction campaign every three to five years to account for new populations cycling through the community.

1. The Board of Selectmen or City Council adopts a pledge to reduce unnecessary vehicle idling and/or adopts a municipal anti-idling policy. The Board of Selectmen or City Council then works with town/city staff to publicize local government adoption of pledge or policy through written notices such as emails and flyers to municipal staff and through newspaper articles, community access television, and temporary signs for the general public.
2. The Board of Selectmen or City Council contacts the school superintendent about idling reduction campaign and works with the superintendent to establish an anti-idling implementation committee made up parents, school staff, and municipal officials.
3. The implementation committee develops the program and gathers materials for an anti-idling education campaign and works with municipal or school communications staff to create a contact list for distribution of materials.
 - » **Sample materials are provided through the links below.**
 - » **Consider making this public anti-idling campaign as part of a complete “green team” or “green community” program.**
4. The implementation committee contacts local media to ensure widespread local coverage of this important initiative and asks the media to be a partner in the effort.
5. The implementation committee launches an anti-idling education campaign and distributes educational materials to its target audience.
6. Use town/city resources such as inserts in tax bills, and displays at municipal buildings, libraries, and schools to raise awareness of climate change and energy-saving opportunities available to local residents.
7. The implementation committee organizes training sessions for school bus drivers who have not yet received MassDEP’s training.
8. The implementation committee works with school or municipal staff as well as elected officials to evaluate the results of the campaign. A final report is created after year one of campaign.



EXAMPLES OF COMMUNITY ADOPTION

The City of Northampton, City of Easthampton, and Town of Amherst banded together to create a model multi-community Idling Reduction campaign. This pilot project focused on changing the idling behavior of parents, municipal staff and bus drivers. The primary focus of this campaign was the school-aged children in the three participating elementary schools. The goal was to educate elementary school children and the children’s parents/ care-givers, about the negative effects that idling has on air quality and to encourage the children to try to change their parent’s idling behavior. Secondary goals included educating municipal officials and their staff about the ill effects of idling and recruiting them as role models for appropriate idling behavior.

The projects in all three communities were resounding successes. They showed that targeted education and outreach efforts delivered to school-aged children and their families via their elementary schools can result in actual behavioral change to reduce unnecessary vehicle idling. The project organizers also believe the emphasis on children combined with the joint environmental and health-related message made the campaign more prominent as it captured both local and statewide media attention.

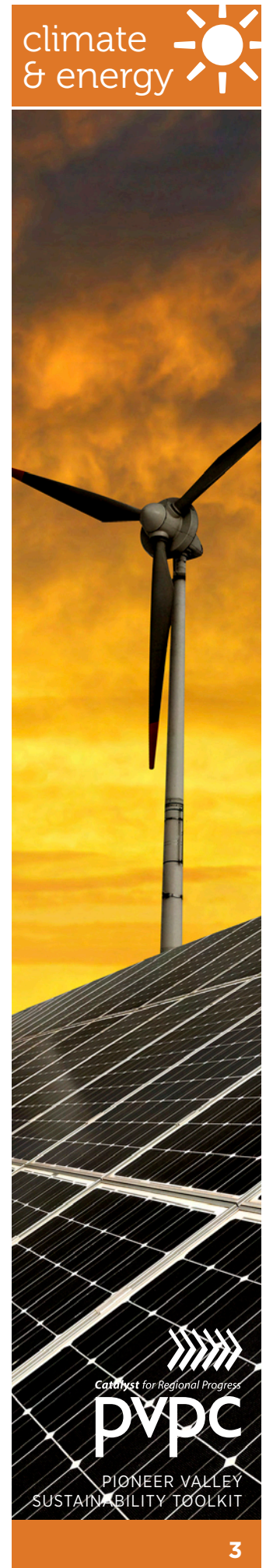
LINKS TO MORE INFORMATION

The Department of Environmental Protection (MassDEP) created an “Idling Reduction Toolkit” to help municipalities develop and implement idling reduction campaigns. Below are links to some of the toolkit items. If you have questions, need assistance with your idling reduction program, or would like a CD with the toolkit materials, contact MassDEP at 617-292-5648. <http://www.mass.gov/dep/air/>

- Model Municipal Fleet Idling Reduction Policy
- Model Municipal Resolution for Vehicle Idling Reduction Committee
- “Do Your Share For Clean Air” Idling Reduction Fact Sheet
- Massachusetts Fact Sheet on Idling Reduction
- “Organizing Your Idling Reduction Campaign” Suggested Steps
- Sample Pledge Form for Idling Reduction
- Sample Letter to Parents (from school) about idling and health effects

FOR MORE INFORMATION, PLEASE CONTACT

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Infill Development & Adaptive Reuse

PURPOSE

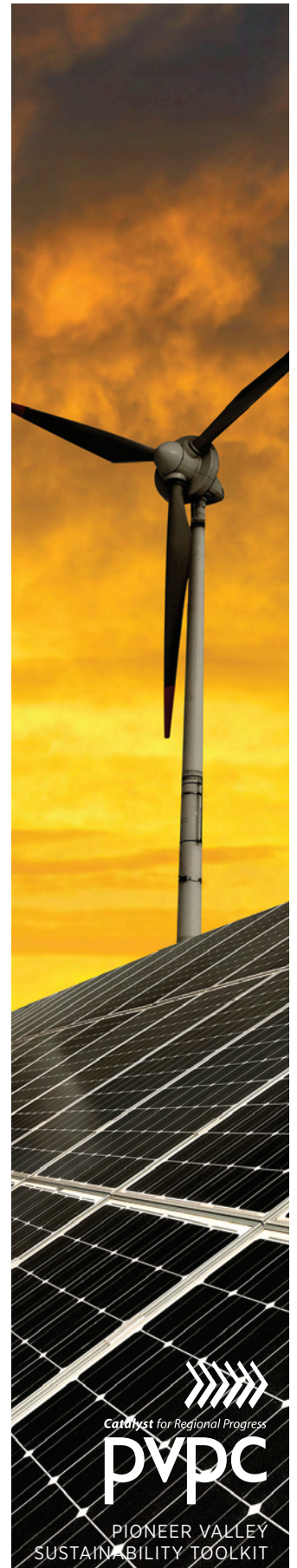
To promote more compact growth and development in city and town centers and expand economic development opportunities.

Infill development and adaptive reuse reduces commercial and residential sprawl by redirecting investment back to already established urbanized community centers. It is more efficient and environmentally responsible to redevelop older buildings or to develop on existing lots where infrastructure such as water, sewer, and roads already exist, rather than build new construction on outlying greenfield sites.



HOW IT WORKS

To encourage property owners to bring underutilized or vacant parcels of land back into productive use or to discourage demolition or long-term vacancy of obsolete or underutilized buildings, many Massachusetts municipalities have amended the zoning in these areas to allow a wider array of uses, densities, and dimensional requirements.



Some municipalities even renamed these rezoned areas with market-appelling terms to encourage the revitalization of these areas.

A municipality has two zoning options to encourage development or redevelopment.

1. Amend zoning in a designated area to allow for a wider range of uses, higher densities, and reduced setbacks.
2. Establish an overlay district with by-right or special permit approval for compatible residential, commercial uses, or mixed uses.

EXAMPLES OF COMMUNITY IMPLEMENTATION

Palmer— Adaptive Reuse & Infill Development

As part of its overhaul of municipal zoning bylaws, the Town of Palmer created a distinct set of development standards tailored to each of the four village centers in the community. In so doing, Palmer set the stage for new development and redevelopment that is sensitive to the historic layout of the villages and builds upon centuries of vernacular town-building experience. The layout of the Village District Bylaws is unique in the region. The entire bylaw for each village is presented on a single 11x17 page including an intuitive and graphical format detailing standards for land use, dimensions, yards, landscape, and parking. An illustrative photo and map of each village also helps to clearly identify the purpose and extent of the village regulations.



Amherst—Infill Development

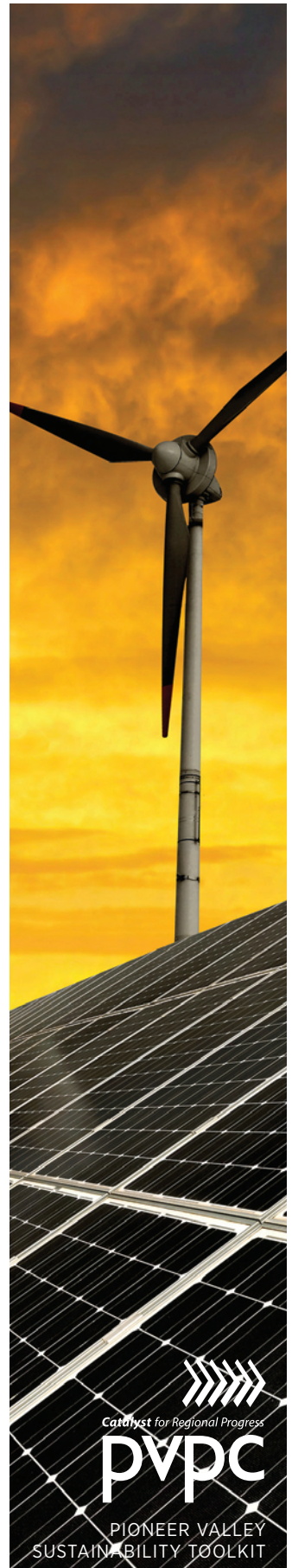
Since the early 1970s, Amherst’s zoning regulations have reflected the Town’s growth management strategy of promoting development within its existing village centers while preserving outlying critical resource areas. Pomeroy Commons, a two-and-a-half story residential project that includes a mix of affordable and market rate units, was developed soon after Amherst re-zoned Pomeroy Village Center in the early 1990s to encourage a denser mix of retail, commercial, office, and residential uses. In Amherst Town Center,

the Boltwood Place mixed use project is currently under construction on the rear of a property already occupied by Judie's, a popular downtown restaurant. This project was made possible by two zoning amendments to the General Business District adopted in 2008-2009 that increased allowable residential density and relaxed the dimensional requirements for mixed use buildings.



Easthampton—Adaptive Reuse & Infill Development

By the end of the 20th century, most of the city's historic manufacturing companies had downsized, closed or relocated leaving ten large vacant or underutilized buildings in the city center with 1.5 million square feet of vacant space. These relics of a traditional manufacturing economy would not be easily reused for the demands of 21st century industry and that the sheer size of the buildings would be hard to fill with just industrial uses. To bring these buildings back to productive use, the City rezoned this 110 acre district from 'Industrial' to 'Mixed-Use/ Mill Industrial' in 1995. One year later, two men expressed interest in redeveloping a vacant industrial building within the Mixed-Use/ Mill Industrial District and successfully obtained special permit approval from the Planning Board. Known as Eastworks, this mill redevelopment project was the first of several redevelopment projects that has brought new jobs, retail and commercial space and housing to Easthampton.



Ware—Infill Development

The Town of Ware established an Infill Development Overlay District in 2006 to encourage development on parcels of land in the downtown area that did not meet minimum dimensional requirements of the Ware Zoning Bylaw. Within the boundaries of the Infill Development Overlay District, a lot with at least 5,000 square feet of area and fifty (50) feet of frontage may serve as the location for a single-family dwelling, two-family dwelling, or mixed use development. The new bylaw established that the lot must be served by town water and sewer and that the proposed building be consistent in architectural style, scale, setbacks, and frontage with abutting structures, and those in the immediate neighborhood.

LINKS TO MORE INFORMATION

TOWN OF AMHERST GENERAL BUSINESS ZONING DISTRICT

<https://www.amherstma.gov/index.aspx?NID=476>

TOWN OF PALMER VILLAGE CENTER ZONING DISTRICTS

http://www.townofpalmer.com/pages/PalmerMA_Planning/Chapter%20171.pdf

TOWN OF WARE INFILL DEVELOPMENT OVERLAY DISTRICT

http://www.townofware.com/Pages/WareMA_Planning/zoningbylaws.doc

CITY OF EASTHAMPTON CHAPTER 40R SMART GROWTH OVERLAY DISTRICT

<http://www.easthampton.org/downloads/Smart%20Growth%20Zoning%20FINAL%202007-09-09.doc>

CITY OF EASTHAMPTON MIXED USE / MILL INDUSTRIAL DISTRICT

<http://www.easthampton.org/downloads/ZONING008102010.pdf>

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Local Climate Neutral Pledges

PURPOSE

To reduce the amount of greenhouse gases (GHG) produced in a community as much as possible and capture or offset the GHGs that are still emitted.

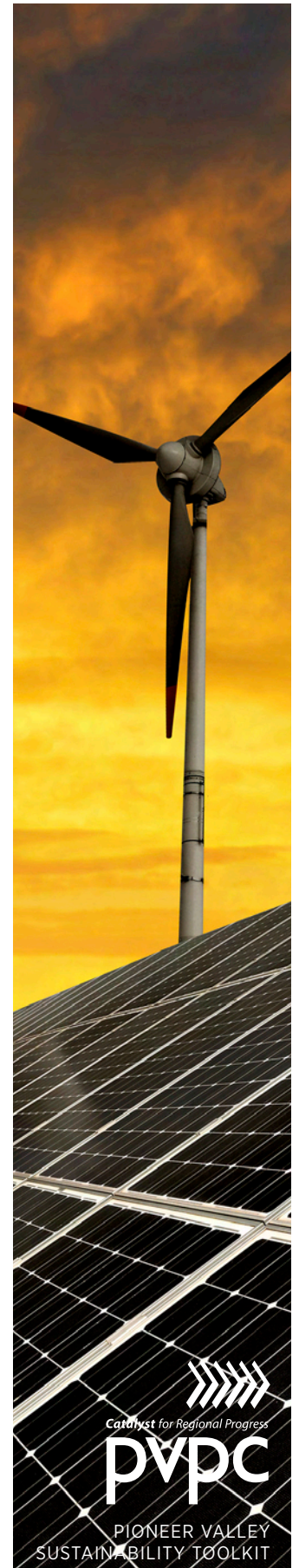
HOW IT WORKS

Greenhouse gasses (GHG) trap solar radiation which gradually increases the overall temperature in the earth's atmosphere in an effect known as "global warming". Carbon dioxide, methane and nitrous oxide are some of the main GHGs that our activities produce. Climate neutral pledges promote greater accountability on GHG emissions in a community and can lead to reductions of these emissions.

A climate neutral pledge works best when it is adopted as one step in a series of actions that cities and towns can choose follow in order to reduce their GHG emissions:

1. Identify and quantify all sources of greenhouse gas emissions.
2. **Adopt a Climate Neutral Pledge** that states emissions reduction goals.
3. Create an action plan that the community can implement to reduce or offset emissions and meet its goals
4. Implement the emission reduction plan through energy efficiency, renewable energy and other change as needed.
5. Review community successes, failures and lessons learned

In neighboring New York State, municipalities join the "Climate Smart Communities" program, where each participating community adopts a model pledge as a resolution of the governing body, and can add their own elements. Communities also agree to: set goals to reduce GHGs; establish a task force; gather data about local GHG emissions and sources; develop a local action plan for reducing GHG emissions; adopt the state's goal of reducing electricity use by 15% by 2015; maximize use of public energy generated from renewable sources; and adopt land use regulations to reduce sprawl and plan for climate changes, amongst other possible steps.



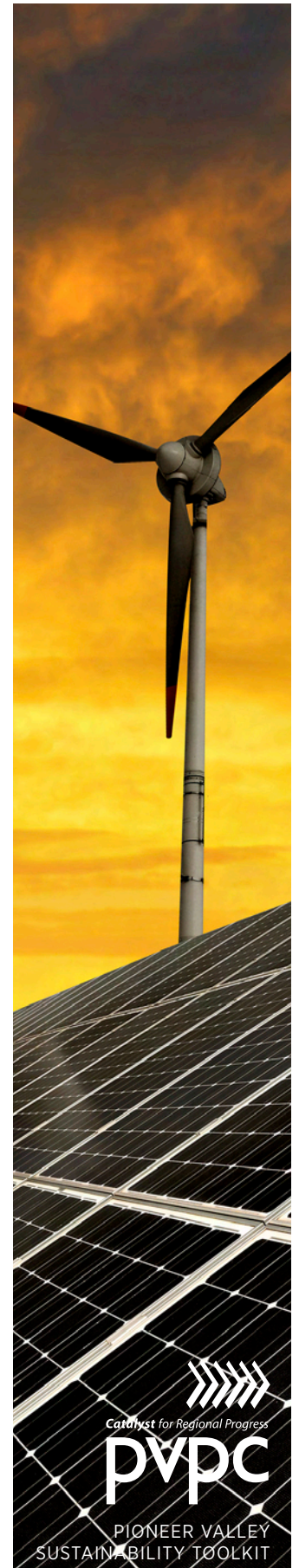
EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED

In the United States, the city of Chapel Hill, South Carolina has long strived to reduce its impact on the environment, both within its municipal operations and more generally throughout the community. In 2006 the Town signed onto the Community Carbon Reduction (CRed) pledge, through which they aim to reduce the total carbon emissions attributed to Town municipal operations by at least 60% by 2050.

In New York state, Schenectady, Red Hook and more than 40 other municipalities recently adopted the “Climate Smart Communities Pledge”, a commitment to systematically cut emissions of carbon dioxide and other GHGs. Schenectady has implemented several ambitious green initiatives, including an aggressive energy efficiency performance contract that has prevented emissions of more than 1 million pounds of carbon dioxide, an updated heating system for City Hall, energy conservation LED traffic lights, and a first-of-its-kind Green Homes program.

In Massachusetts, 86 municipalities, 12 of them from the Pioneer Valley, have already pledged to reduce their municipal government energy use by at least 20% in five years through the Green Communities program. These communities usually begin acting on that pledge like Schenectady, by aggressively implementing energy efficiency measures in public buildings, which creates savings both on emissions and on utility bills.

Over 270 American colleges and universities have adopted carbon neutral pledges, as well as a growing list of foreign countries, such as Costa Rica, Ethiopia, Iceland, The Maldives, Monaco, New Zealand, Niue, Norway, Pakistan, and Portugal.



LINKS TO MODEL BYLAWS OR MORE INFORMATION

CLIMATE NEUTRAL NETWORK:

<http://www.unep.org/climateneutral/About/tabid/95/Default.aspx>

NEW YORK STATE SMART COMMUNITIES CLIMATE NEUTRALITY RESOLUTION TEXT:

<http://www.dec.ny.gov/energy/65494.html>

COMMUNITY CARBON REDUCTION (CRED) PLEDGE OF CHAPEL HILL:

<http://sustainability.unc.edu/Initiatives/ClimateChange.aspx>

AMERICAN COLLEGE & UNIVERSITY PRESIDENT'S CLIMATE COMMITMENT:

<http://presidentsclimatecommitment.org/about/commitment>

FOR MORE INFORMATION, PLEASE CONTACT

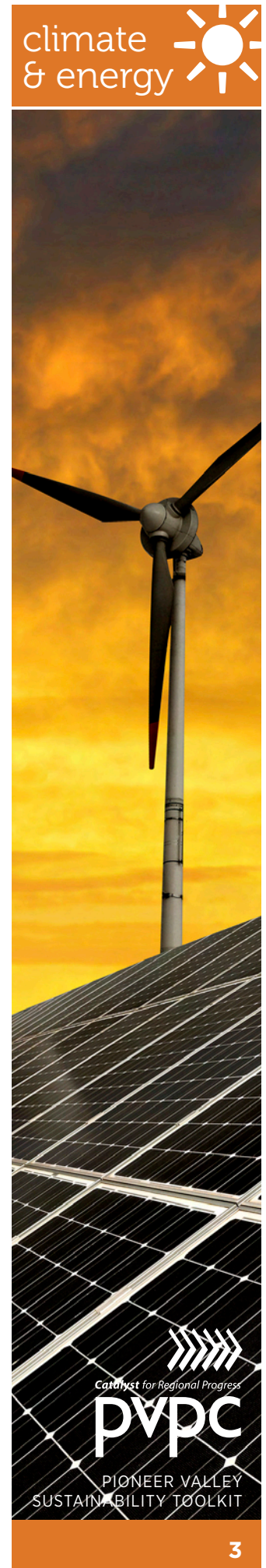
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PIONEER VALLEY
SUSTAINABILITY TOOLKIT

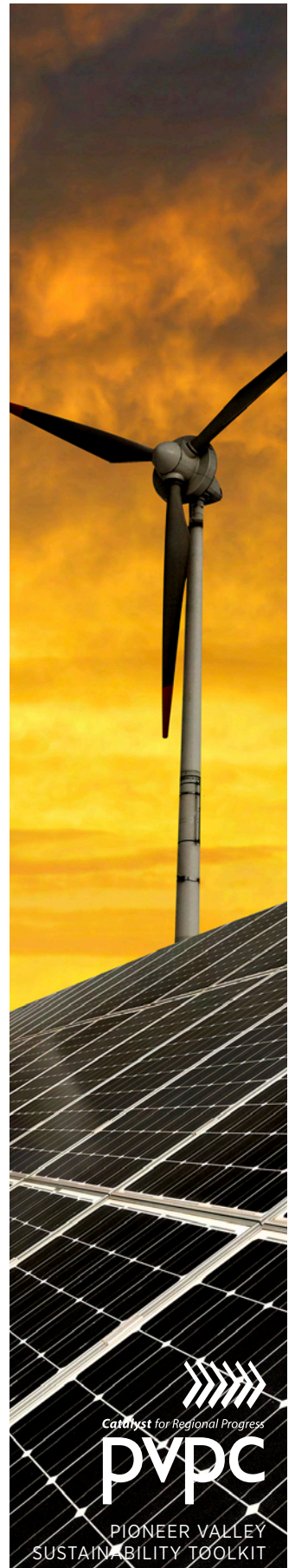
Methane Capture From Landfills

PURPOSE

To reduce the amount of harmful methane emissions that escape from decaying organic matter in landfills by capturing the methane and processing it for an alternative fuel resource.



Each day millions of tons of solid municipal waste are disposed of in sanitary landfills around the world. Many landfills produce methane gas as a byproduct of decaying organic matter, such as food and paper. When methane escapes from landfills and enters into the atmosphere it contributes to global climate change. Methane gas is the primary component of natural gas, which can be used for cooking, heating and generating electricity. Capturing methane from landfills can limit global climate change and be used for human needs.



HOW IT WORKS

Methane recovery systems can be installed to reduce the release of methane into the atmosphere from landfills by more than half. A series of vertical wells that are drilled down through layers of decaying matter, horizontal well connectors, and a vacuum system which directs the collected gas to the surface can be used to collect and pipe the methane to a central location.

The gas can be used in two ways. The landfill gas can be processed and made available as an alternative fuel. The quality of the power source is lower than pure methane or natural gas, but the cost to process the product is much lower and needs only minimal processing and minor modifications to be used in most modern combustion equipment. Another option is to create pipeline-quality gas from the landfill gas by processing and purifying the product, since only about one half of the landfill gas can be expected to be useable methane.

EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED

North Country, New York

The Development Authority of the North Country (DANC), which receives around 1,000 tons of waste a day from three New York state counties, has a recovery system in place that captures excess methane and pipes it out of the landfill. The Authority has entered into a public-private partnership with Innovative Energy Systems to generate electricity from the captured methane. IES, which owns a total of nine power plants in New York, produces 4.8 megawatts of electricity from the landfill and sells it to the grid. The New York State Energy Research and Development Authority is providing a subsidy to the DANC at a rate of approximately \$22 per megawatt. The Climate Action Reserve also awarded the DANC carbon credits, which are now being sold.

Vancouver, British Columbia

Vancouver has reduced GHG emissions from municipal operations 33% below 1990 levels. The most significant reductions have come from the Vancouver Landfill where the city captures methane gas and burns it to generate enough electricity for 7000 homes. The landfill gas collection system includes 200 vertical extraction wells and 10 horizontal extraction laterals, built at a cost of \$1,750,000. The City selected Maxim Power Corporation to build a power station to burn the gases, and Maxim in turn sells electricity as “green power” at a premium price to B.C. Hydro.

Dartmouth, Massachusetts

The methane from the Crapo Hill Landfill in Dartmouth supplies fuel to a power plant that produces an estimated 3.3 million megawatts of electricity. Greater New Bedford Regional Refuse Management District owns and operates the landfill, which has 41 vertical wells and 20 horizontal extraction wells. The project also receives carbon credits.

LINKS TO MODEL BYLAWS OR MORE INFORMATION

GREEN HOUSE GAS ONLINE HAS A RESOURCE PAGE DEVOTED TO EXPANDING KNOWLEDGE OF METHANE SOURCES, SINKS AND SOLUTIONS, PARTICULARLY LANDFILL PRODUCED METHANE. THE PAGE CAN BE FOUND AT:

<http://www.ghgonline.org/methanelandfill.htm>

THE EPA HAS A VOLUNTARY ASSISTANCE PROGRAM FOR PUBLIC AND PRIVATE ENTITIES TO BECOME ACTIVE IN LANDFILL METHANE GAS CAPTURE. MORE INFORMATION ABOUT THE PROGRAM CAN BE FOUND AT:

<http://www.epa.gov/lmop/>

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Municipal Climate Action Plans

PURPOSE

A municipal climate action plan is an important tool for engaging communities in the work of reducing GHG emissions and adapting to unavoidable local impacts of climate change.

HOW IT WORKS

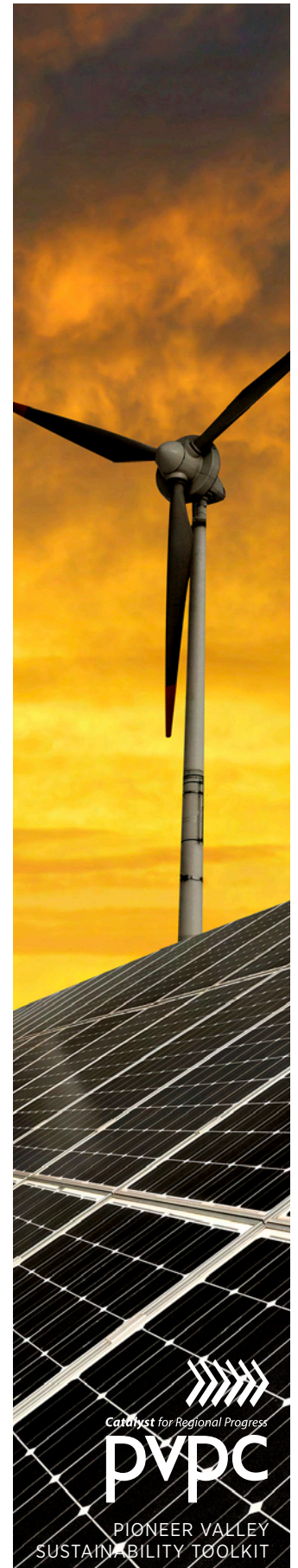
A municipal climate action plan is an effective tool for guiding local actions to: 1) reduce greenhouse gas (GHG) emissions, and 2) improve a community's ability to withstand the effects of climate change that are now unavoidable, such as more floods, excessive and prolonged heat, and power outages. A good municipal climate plan typically includes:

- » An inventory of existing GHG emissions produced within the community.
- » GHG reduction targets and timeframes.
- » Strategies to reduce, or mitigate, GHG emissions.
- » Strategies to improve the strength and resiliency of local infrastructure, roads, power systems and social services for heat-vulnerable residents.
- » A prioritized schedule for implementing selected strategies and monitoring progress.

Critical to any municipal climate action plan is the convening and ongoing participation of a task force or advisory committee of stakeholders that includes elected officials, citizens, and business owners. The participation of municipal staff, especially public works and facilities personnel, is especially helpful. You may also wish to include members of regional and state agencies that are involved in climate action planning and have resources to share. If your budget allows, the assistance of an engineering or technical consultant with experience producing climate action plans will be important. Lastly, it is important that the plan have a clear rationale and mission statement. Why is it important for your community to respond to climate change and its related impacts? What will be the consequences if you don't?

GHG EMISSIONS INVENTORIES

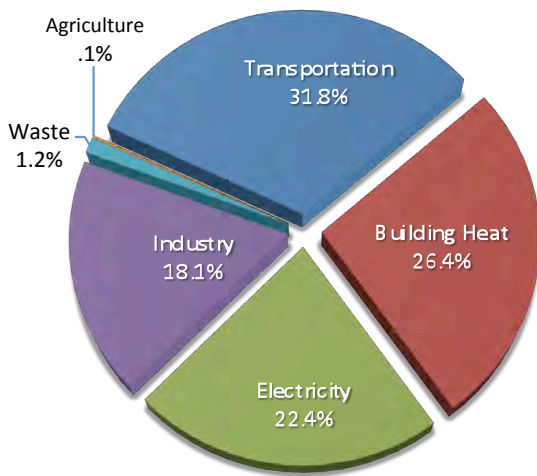
Greenhouse gas (GHG) emissions inventories estimate the quantities of these gases that are emitted within a city or town, as well as by power plants outside the municipality that supply electric power to customers within it. A typical GHG inventory lists energy



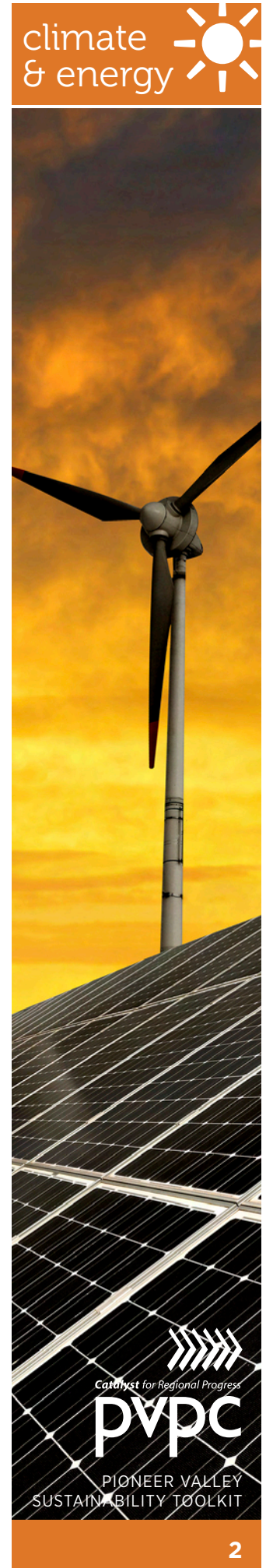
consumption from the municipality itself, as well as that of local businesses and households (if that information is available). Energy use is usually summarized in the following categories: electricity, building heat (oil, natural gas or wood/biomass), transportation (gasoline and diesel), agriculture (methane from livestock flatulence), and industry. Municipalities can help “lead by example” by tracking the energy use and emissions of public infrastructure, including water treatment plants, landfill methane off-gassing, power for street lights, and other typical public facilities.

Based on the type and quantities of fuels consumed, as well as the presence (or not) of other GHG-emitting activities, it is possible to estimate the quantities of GHGs that are released within the municipality.

Example GHG Inventory by Sector: Pioneer Valley



Above is the 2010 GHG inventory for the 9.2 million tons of carbon dioxide and equivalent GHG gases emitted in the 43 cities and towns of the Pioneer Valley that year. Similar GHG inventories can be produced for a municipality using data from utility companies, state transportation agencies and other sources.

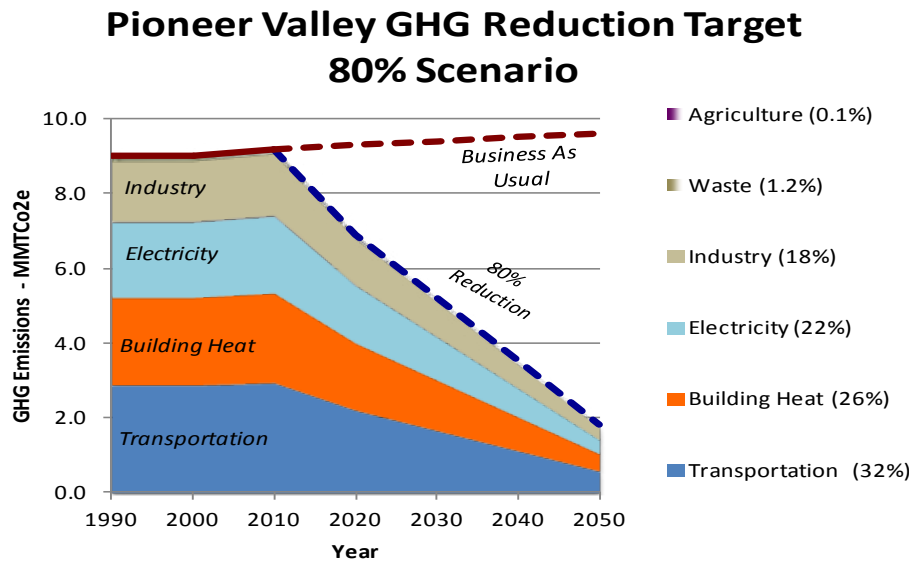


SETTING GHG REDUCTION TARGETS

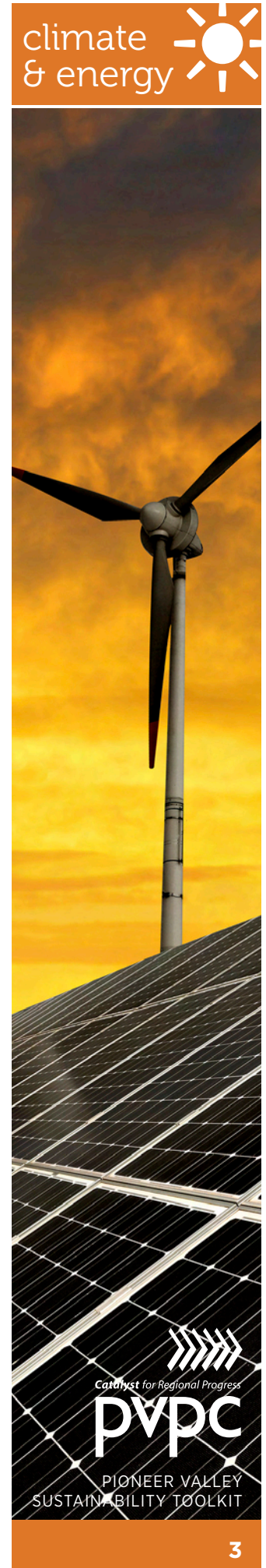
Setting GHG reduction targets means deciding the amounts by which your municipality wishes to reduce its GHG emissions and by when. It's helpful to imagine more than one scenario for doing this. For example, the [Massachusetts Climate Action Plan](#) sets two incremental target scenarios: a 20% reduction of GHGs (from 1990 emissions levels) by 2020, and an 80% reduction of GHGs by 2050. The [Pioneer Valley Climate Action Plan](#) has adopted this statewide 80% reduction goal for 2050 (see below) and also contemplates a “carbon neutral” scenario of a 100% GHG reduction (no net GHG emissions) by 2050.

Your community may wish to consider the feasibility of these targets, depending on the amount of GHG-emitting activities within your town boundaries, as they are consistent with established statewide goals. However, it may be easier for a small town that is largely residential to make short-term progress toward these goals than an urban area that depends on a heavily GHG-emitting industry for employment. Thus, the stakeholder discussion about setting feasible GHG reduction targets is a critical plan activity; achievable yet inspirational goals are essential to obtain the necessary “buy-in” of leaders and key participants for the long-term success of the plan.

Example GHG Reduction Targets: Pioneer Valley 80% GHG Reduction by 2050



This is an example of a GHG reduction scenario that assumes equal reductions in all sectors by the horizon year (2050). Your community may wish to set other targets and horizon years, based on the amount of commuting by residents, age and size of buildings, and the nature of local industrial facilities (if any).



STRATEGIES TO REDUCE GHG EMISSIONS

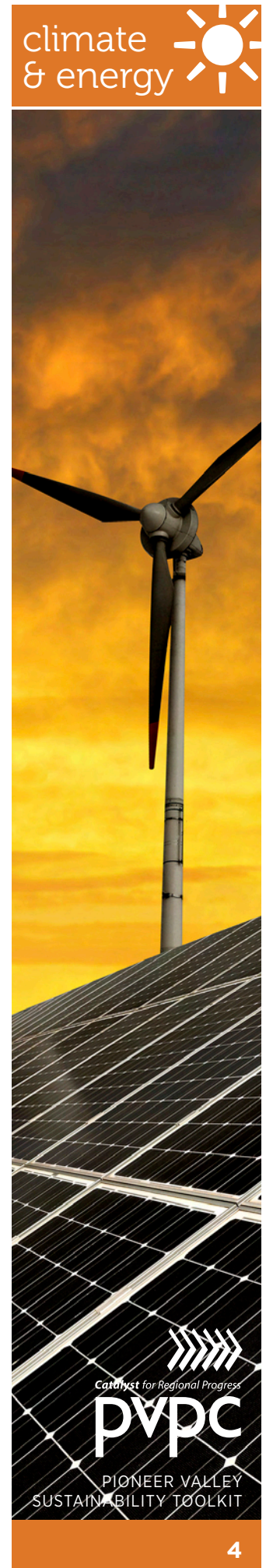
There are dozens of ways to reduce GHG emissions. Many are as simple as carpooling; others can require years of engineering work and financing. So it's important not to try to do them all at once, but rather to choose a few to start with on which your community can make some real progress—and get results. Chapter 8 of the [Pioneer Valley Climate Action and Clean Energy Plan](#) offers dozens of possible strategies for reducing GHG emissions that are tailored to communities in Western Massachusetts. Some highlights are offered below.

Short-term GHG reduction strategies

- » Use car sharing (i.e., Zip Car) and carpools
- » Bike, walk and/or ride the bus instead of driving whenever possible
- » Incentives to switch to a more fuel-efficient personal vehicle
- » Install solar photovoltaic and/or solar hot water panels
- » Get a no-cost Mass Save home energy assessment to receive free weather-stripping, LED and compact fluorescent light bulb replacement
- » Plant trees to shade your house and soak up carbon dioxide

Longer-term GHG reduction strategies

- » Promote zoning that allows a greater mix of uses to help reduce distances and the need to drive
- » Encourage green building practices and investments in energy efficiency in homes, commercial buildings and industrial facilities
- » Establish and improve recycling and composting programs
- » Support the production and consumption of local and organic foods to help reduce long distance shipping and the use of petroleum-based fertilizers



STRATEGIES TO IMPROVE RESILIENCY TO UNAVOIDABLE CLIMATE IMPACTS

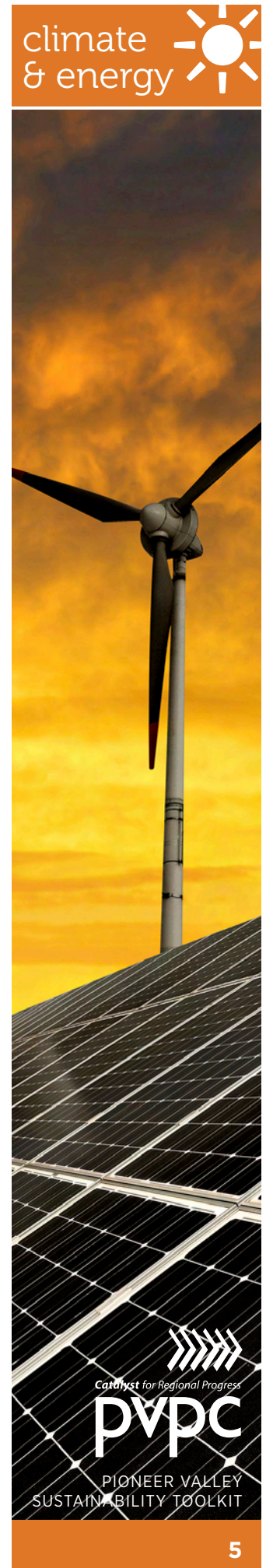
While GHG mitigation can reduce the future effects of climate change, it will not eliminate the effects of climate-related changes that are already happening. These include severe weather, early winter storms, more frequent flooding and record breaking heat. A Climate Action Plan can help your community decide which strategies are most needed to adapt to these and other climate-related impacts. Chapter 8 of the [Pioneer Valley Climate Action and Clean Energy Plan](#) offers dozens of possible strategies for adapting to climate impacts that are tailored to communities in Western Massachusetts. Example climate adaptation strategies include:

1. Update municipal emergency response and communication plans
2. Change agriculture practices to use less water and help prevent soil degradation and erosion
3. Reduce impervious surfaces and encourage on-site stormwater infiltration
4. Encourage efficient water use and establish back-up municipal water sources
5. Upgrade stormwater systems, inspect dams for safety, and keep buildings out of floodplains and stream channels
6. Use low impact development (LID) and “green infrastructure” landscape management

MONITORING PROGRESS

A climate action plan is never “done.” But once you begin, it’s important to track the progress you’ve made from your starting point. For GHG mitigation, the ongoing monitoring of energy use and GHG emissions is essential, as well as the cost of energy. Monitoring the progress of adaption measures is not as simple, but can be tracked by recording indicators such as the cost and square footage of flood damage, number and severity of road repairs, the number of people using cooling centers, admissions to local hospitals for heat-related illness and injuries, changes in property insurance rates (usually flood insurance), the number of households affected by power outages and their durations, and so on. Collecting all this information is essential to gauging the value of the plan.

A climate action plan should be updated at least every five years – or sooner if needed. Your community may experience a severe weather event that could affect your choice of strategies. Or new information may become available about energy use that will suggest new opportunities for improving efficiency. And so it’s important to be flexible; you can also add new monitoring indicators as you go along.

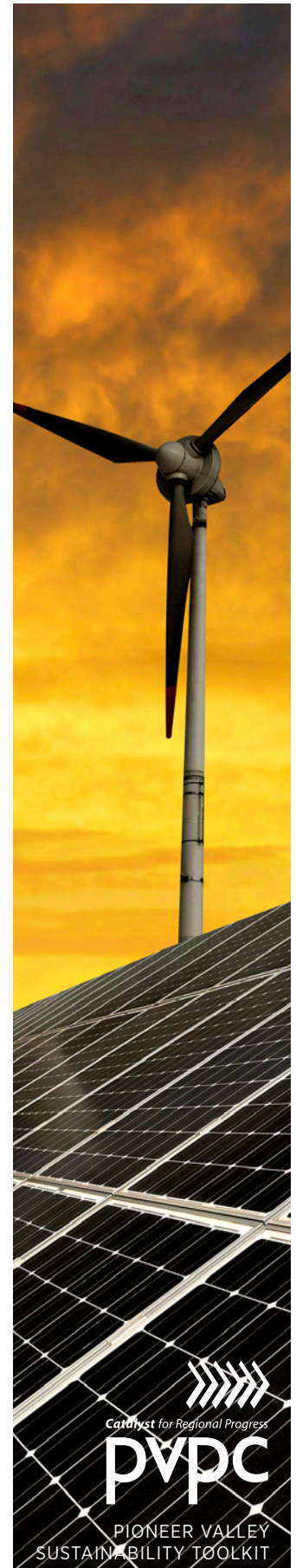


EXAMPLES OF SUCCESSFUL CLIMATE ACTION PLANS

In Massachusetts, the communities of [Amherst](#), [Northampton](#), [Falmouth](#) and [Marshfield](#) have produced notable municipal climate action planning documents and GHG inventories. Some of these are stand-alone plans; others are supplemental chapters to local comprehensive plans.

Marshfield first created a GHG emissions inventory in 2008 by gathering community energy use data through billing records obtained from the local utility providers NSTAR electric and Bay State Gas. This information included residential, commercial, solid waste and transportation energy usage. Data about the energy use of municipal buildings, vehicles, waste, water treatment, street and traffic lights, as well as solid waste, was collected from the Department of Public Works. Additional information was estimated from national energy surveys, as well as transportation estimates from the Massachusetts Department of Transportation Highway Division. Marshfield then used Clean Air and Climate Protection software provided by ICLEI to estimate existing GHGs and future emissions. The inventory provided the baseline information necessary to [set a municipal GHG reduction target of 20%](#) within five years of the plan's adoption date (2009).

The City of Boston in 2009 adopted a comprehensive [Climate Action Plan](#) with the goal of reducing GHG emissions by 25% by 2020, developing green businesses and workforce skills, engaging all parts of the community in climate leadership, and integrating climate change considerations into all planning decisions. Boston's plan estimates the adverse effects of climate change on the community including: more urban air pollution, longer summer heat waves, rising sea levels, unreliable water quality, loss of revenue from seasonal activities, and changes in agricultural production. The Boston plan presents many strategies to improve energy efficiency in buildings, transportation, and waste management. The plan also proposes new ways to generate more clean energy within the city.



LINKS TO MORE INFORMATION AND EXAMPLES

AMHERST, MASSACHUSETTS CLIMATE ACTION PLAN:

<https://www.amherstma.gov/DocumentCenter/Home/View/612>

CITY OF BOSTON, MASSACHUSETTS CLIMATE ACTION PLAN:

<http://www.cityofboston.gov/climate/bostonsplan/>

INTERNATIONAL COUNCIL FOR LOCAL ENVIRONMENTAL INITIATIVES:

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

MARSHFIELD, MASSACHUSETTS GREENHOUSE GAS INVENTORY

<http://marshfieldenergy.org/wordpress/wp-content/uploads/2013/03/GHGInventory-MarshfieldMA.doc>

MARSHFIELD, MASSACHUSETTS ENERGY MANAGEMENT PROJECT

<http://marshfieldenergy.org/projects/>

MASSACHUSETTS CLIMATE CHANGE ADAPTATION REPORT:

<http://www.mass.gov/eea/waste-mgmt-recycling/air-quality/green-house-gas-and-climate-change/climate-change-adaptation/climate-change-adaptation-report.html>

MASSACHUSETTS STATE CLEAN AIR ACT EMISSIONS INVENTORY:

<http://www.mass.gov/eea/agencies/massdep/air/reports/emissions-inventories.html>

PIONEER VALLEY CLIMATE ACTION AND CLEAN ENERGY PLAN

<http://www.pvpc.org/plans/climate-action-and-clean-energy-plan>

U.S. ENVIRONMENTAL PROTECTION AGENCY—HOW TO CREATE A GHG EMISSIONS INVENTORY:

http://www.epa.gov/air/aqportal/management/emissions_inventory/

FOR MORE INFORMATION, PLEASE CONTACT

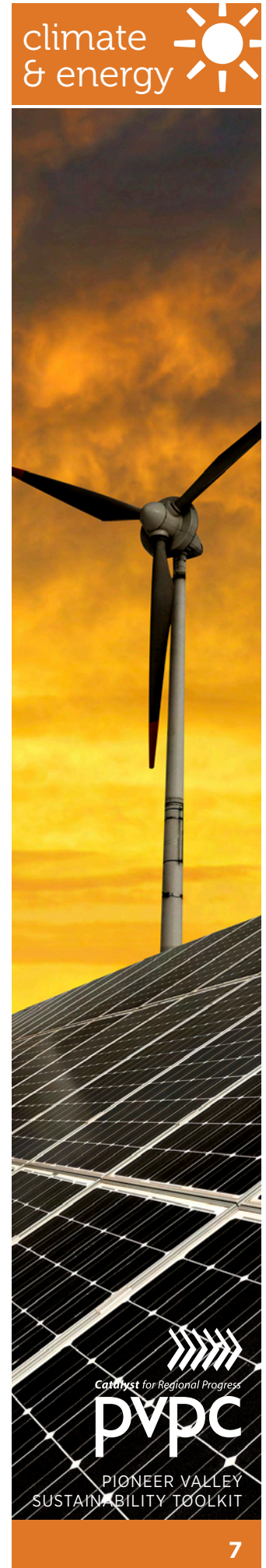
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Municipal Renewable Energy Purchase Programs

PURPOSE

To help municipalities buy more power that is generated by solar, wind and other renewable energy sources.

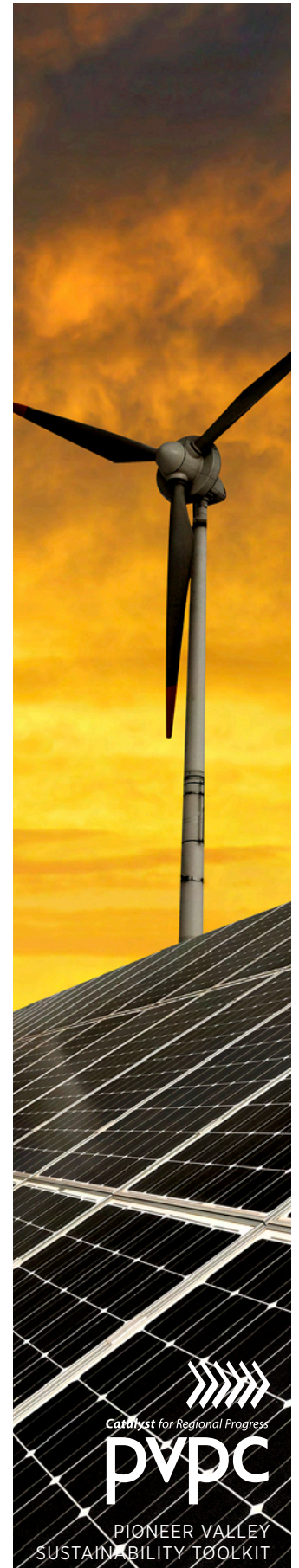
As large energy consumers, municipalities can influence demand for renewable energy by simply buying more of it. Even small communities may spend millions of dollars per year on energy, wielding considerable market influence. Increasing the demand for renewable sources of power is a crucial step toward increasing the energy industry's overall capacity to generate and distribute clean energy to all users—not just municipalities. The eventual benefits for all power users will be lower clean energy costs, decreased greenhouse gas (GHG) pollution, and more jobs in the clean energy economy.

HOW IT WORKS

First, municipal leaders must decide that a certain portion of the energy that their municipality buys should be purchased from renewable generating sources, including wind, solar and hydro power. This decision can be formalized in a resolution, ordinance or bylaw—or it can be a simple administrative action. After this fundamental decision is made, the municipality can solicit requests for competitive proposals from power distributors, electric power aggregators and/or energy service companies (ESCOs). The municipality may benefit from using an experienced energy service consultant to help with the review process, as there are many technical variables and financial incentives involved in deciding what the best deal for an individual town or city may be.

Typically, electric power is where most municipalities will be able to shift to buying more renewable energy.

There are currently very few incentives and technologies available that will help shift away from use of fossil fuels for heating, including the use of natural gas, heating oil, gasoline and diesel fuels. Energy conservation incentives that are available for these





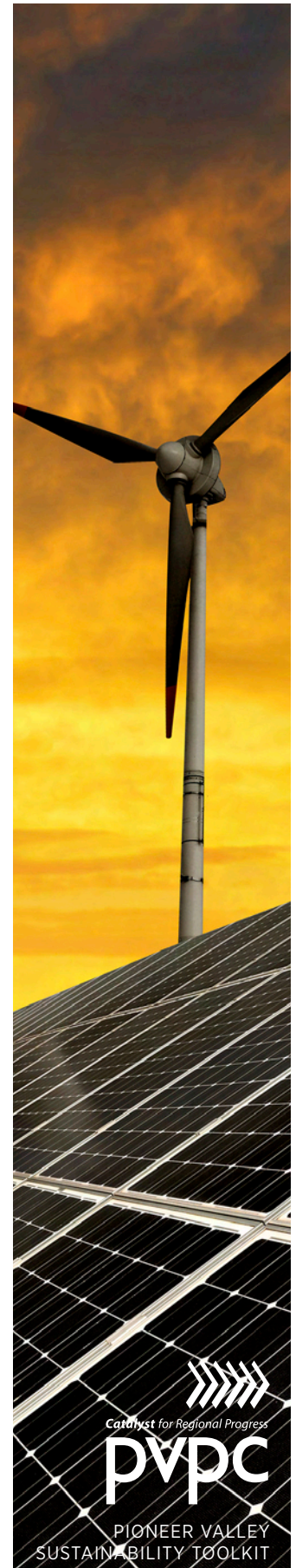
fuel types (see MASS SAVE) and improving the thermal performance of buildings, and/or upgrading heat systems, can have a significant impact on the amount of fuel used. Significantly, if a building becomes tight enough, alternative heating and cooling sources become more viable, including air-source heat pumps (also known as mini-splits).

Once a renewable electricity provider has been selected, the municipality may sign a contract to purchase electric power from the new source of green energy. As demand for renewable electricity has increased in recent years, its cost has become competitive with electricity that is generated using fossil fuels. Further, many electric power aggregation companies now offer price guarantees that ensure that a municipality does not see a disproportionate increase in the cost of renewably generated electricity versus that generated with fossil fuels.

WHERE IS MUNICIPAL RENEWABLE PURCHASING WORKING?

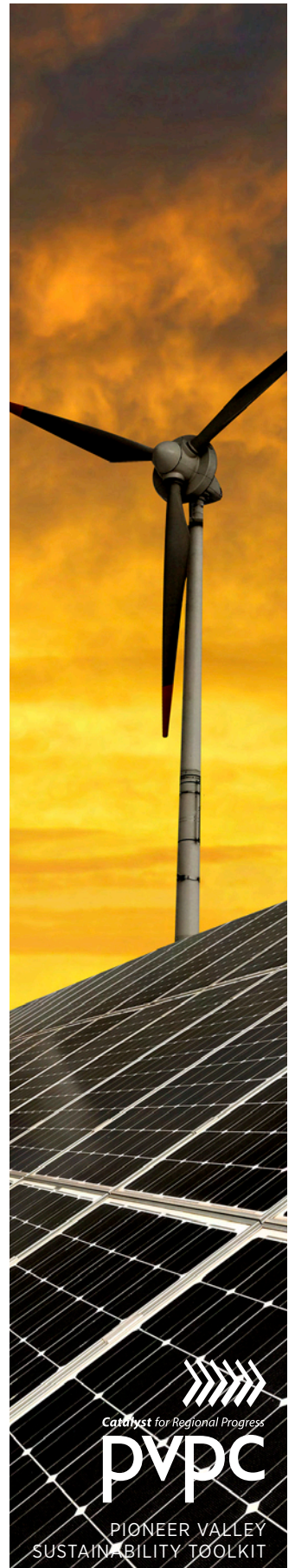
The Commonwealth of Massachusetts Green Power Purchase programs for public buildings has set goals of a 15% total renewable power purchased by 2020 and 30% by 2030. Massachusetts spends about 80% of its annual energy expenditures on procuring energy from outside of the state, but it is steadily replacing imported fossil fuels with renewables.

In 2005, the City of Aspen, Colorado set a goal to purchase 75% of the City government's energy from renewable sources by 2010. The City met this goal in December, 2006, and so set a new goal of powering 100% of city-owned building with renewable sources by 2020. One source of renewable energy is wind power from Holy Cross Energy, and a new wind farm in Nebraska.



The City of Santa Monica, California has also adopted a green power purchase strategy that saved more than 13,000 tons of carbon dioxide from entering the atmosphere. By shifting electricity generation from fossil fuels to renewable energy, Santa Monica led by example and encouraged business and home owners to switch, as well.

Anoka, Minnesota offers a “Green Power Choice” voluntary program to customers of the Anoka Municipal Utility. By participating in the program, customers can support increased reliance on renewable energy sources by purchasing blocks of energy from hydroelectric and wind power sources. Green Power is offered in blocks of 100 kilowatt hours (kWh) for a charge of \$1.75 per block. The cost of green power purchased is added to customers’ regular electric bill every month. For example, if a customer chooses to buy four blocks (400 kWh) of hydropower, an additional \$7.00 is added to their monthly electric bill.



LINKS TO MORE INFORMATION AND MODEL REGULATIONS

MUNICIPAL CLEAN ENERGY TOOL KIT:

<http://www.icleiusa.org/action-center/tools/municipal-clean-energy-toolkit>

MUNICIPAL GREEN POWER PURCHASING PROGRAMS:

<http://www.icleiusa.org/action-center/tools/municipal-clean-energy-toolkit/purchasing>

NATIONAL GRID “GREEN UP” PROVIDERS:

http://www.nationalgridus.com/niagaramohawk/home/energychoice/4_greenup_provider.asp

ASPEN, COLORADO GREEN POWER PROGRAM:

<http://www.aspenitkin.com/Living-in-the-Valley/Green-Initiatives/Renewable-Energy/>

BOSTON, MASSACHUSETTS GREEN BUILDING STANDARDS:

http://www.cityofboston.gov/images_documents/Article%2037%20Green%20Buildings%20LEED_tcm3-2760.pdf

MASSACHUSETTS GREEN POWER PROGRAM:

http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=MA15R&re=1&ee=1

BELLINGHAM, WASHINGTON GREEN POWER PROGRAM:

<http://www.piersystem.com/go/doc/1264/180215/>

ANOKA, MINNESOTA UTILITY GREEN POWER PROGRAM:

http://anokaelectric.govoffice3.com/index.asp?Type=B_BASIC&SEC=%7B384DB703-5584-499A-AA3C-B102143D31B8%7D

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Neighborhood Solarize Programs

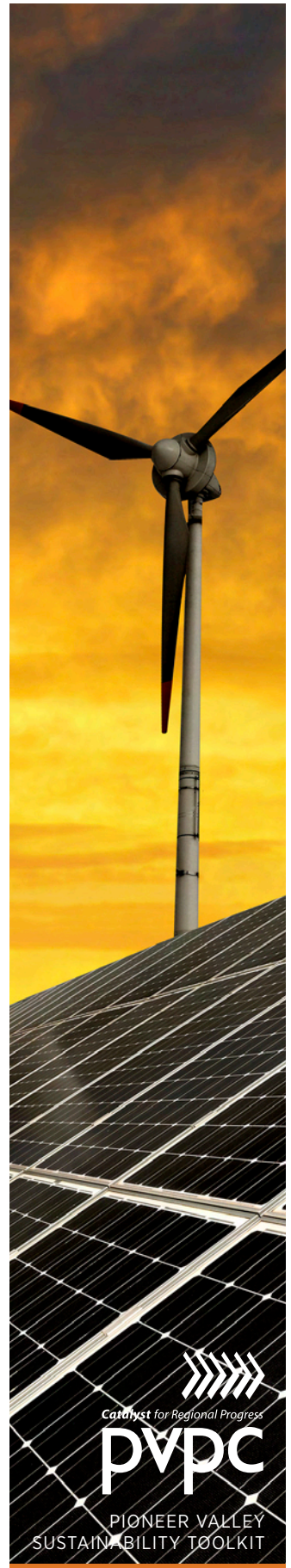
PURPOSE

Reduce the start-up costs of installing solar energy systems for residents and small businesses by organizing group purchases to achieve bulk purchase discount pricing.

HOW IT WORKS

As members of Sam’s Club and Costco know: buying in bulk saves money. The same is true for installing solar energy systems on your home or business. One important tool for achieving this kind of group purchasing discount power for solar energy is group purchase discount, sometimes known as “solarize,” programs. A solarize program encourages property owners to sign up to have a pre-qualified solar vendor install a solar energy system on their building. And the more property owners who sign up, the greater the discount the vendor agrees to give—which can be as much as 20% less than the cost of individual installation.

Solar group purchase discount programs depend on a strong public education and outreach effort to reach potential customers. With numerous state and federal financial and tax incentives available, property owners need time to ask questions and work the numbers to understand how to get the best deal. Programs may focus on a single neighborhood, or on a large city or region. The key is to make the outreach fun! By talking with neighbors and other property owners to learn about the potential benefits of solar energy, people also make social connections within their community.

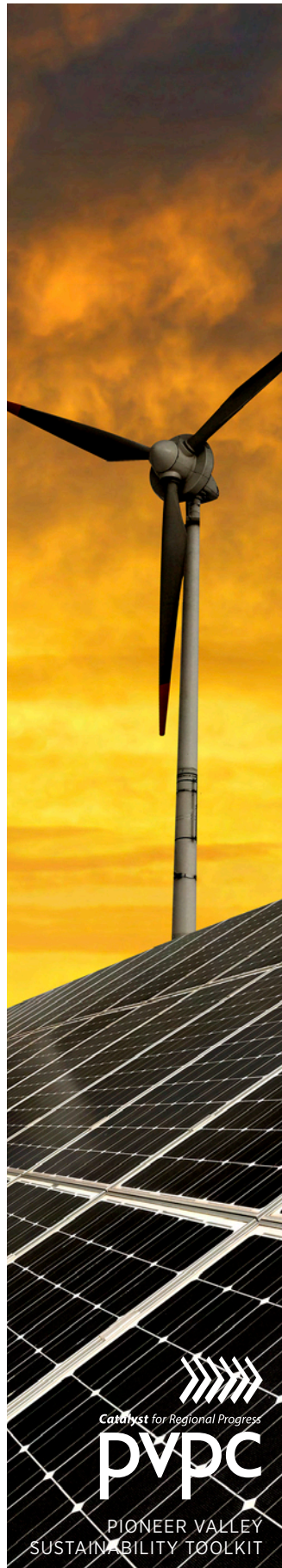


EXAMPLES OF SUCCESSFUL "SOLARIZE" PROGRAMS

Solarize Mass, Massachusetts

The Solarize Mass program of the Massachusetts Clean Energy Center is one of the most successful solar energy group purchase programs in the county. Solarize Mass kicked off in 2011, and as of 2014 has yielded nearly 1,000 new solar energy systems being installed on homes and businesses in 25 communities.

The Solarize Mass program depends on local grassroots outreach that is led by local volunteers. It features a tiered pricing structure that increases the savings as more home and business owners in a community sign up. This further encourages neighbor-to-neighbor outreach to increase sign-ups. Property owners can choose to own their own system, or opt for a power-purchase agreement arrangement that requires little or no up-front costs (the installer owns the panels and installment payments are paid from the revenue that they generate by feeding electricity back into the grid).



Portland, Oregon

Oregon has also been a “Solarize” leader, supporting group purchase discount programs throughout the state. Solar Oregon assists through solar education outreach and data management.

In the City of Portland, the “Solarize Portland” program run by several Portland neighborhood associations. Photovoltaic systems are purchased in bulk, and are then installed by a single solar contractor to reduce costs. The program’s first round achieved 120 new residential installations in just six months. This unexpected success spurred more projects in other neighborhoods of Portland and other Oregon cities.

LINKS TO MORE INFORMATION

SOLARIZE MASS:

<http://www.masscec.com/solarizemass>

SOLAR OREGON:

<http://solaroregon.org/residential-solar/solarize-communities>

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Organic Waste Composting & Material Reuse

PURPOSE

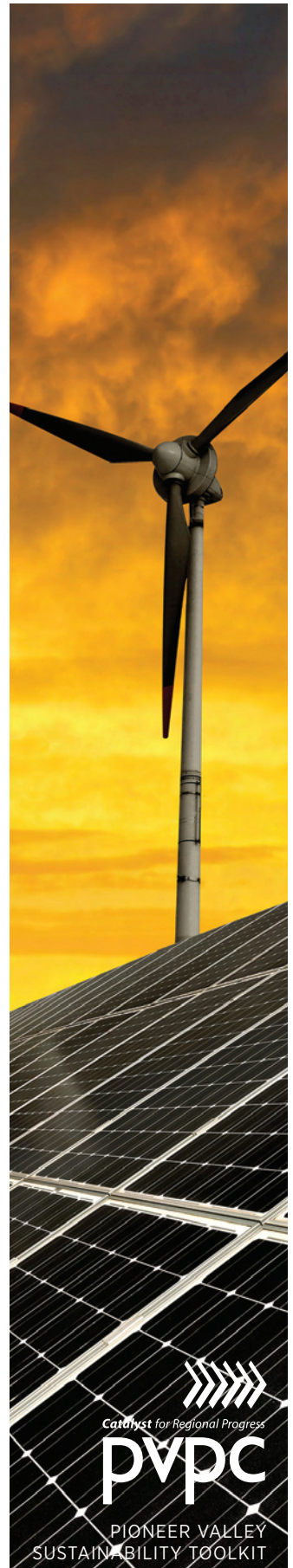
To reduce energy usage by encouraging composting of organic waste and re-use of building materials.



Commercial composting programs and building material re-use programs are waste diversion strategies that save valuable landfill space, conserve energy, and reduce the emission of greenhouse gas.

Through composting, organic waste is transformed into natural fertilizers for farming and gardening. This process decreases the energy demands of farming by offering a natural alternative to petroleum-based chemical fertilizers. Compost also retains more moisture in soil, reducing the need for irrigation. Additionally, the greenhouse gas produced from composting is completely captured and used for energy, rather than released into the atmosphere as occurs in a landfill.

In a building material re-use program, unwanted but reusable building materials from remodeling projects--including lumber, doors, kitchen appliances, and cabinets--are made available to non-profit organizations, businesses, and individuals for construction projects. Material re-use requires less energy and natural resources than the creation of new products and can minimize the fuel consumption necessary for transporting new products to the marketplace.

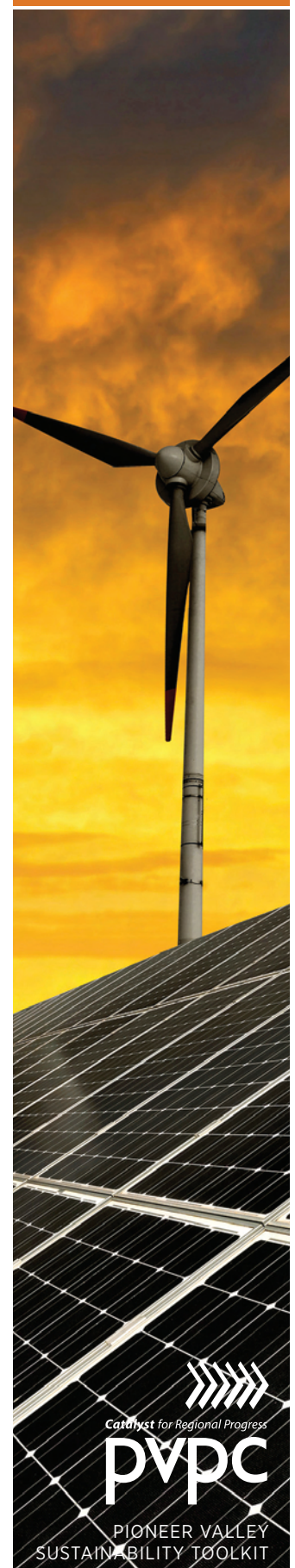


HOW IT WORKS

Implementing a Commercial Composting Program

The primary activities that form a commercial composting program are the collection of organic waste from commercial generators (restaurants, school cafeterias, hospitals, and supermarkets), composting the waste at a waste facility, and transporting the finished compost to farms and gardens. Municipalities can assist in these activities through the following actions:

- » Identifying and permitting composting facilities - Assisting in the permitting process can make it easier to recruit organizations to invest in and operate the facility. The permitting process is controlled by the Massachusetts Department of Environmental Protection (DEP). The DEP recommends that new composting facilities be established on active or inactive landfill or transfer station sites, because these facilities already have a “site assignment” permit. Facilities that compost brush do not have a current DEP site assignment. While these sites represent potential sites for a composting facility, they would require the full permitting process to accept food wastes. Any local Board of Health regulations should also be reviewed to ensure that the composting facility meets these requirements.
- » Facilitating participation from waste generators and farmers - Outreach to businesses in order to educate them about the benefits of composting is an important first step to creating a commercial compost program. Outreach should be directed to managers and owners of restaurants and operations managers of schools and hospitals. As per a state ban that started on October 1st, 2014, large food waste producers can no longer send discarded food to the landfill, so these are excellent candidates for participation in the program. Overreliance on a specific large waste generator or compost user can make the program fragile, but working with other communities to expand the system can reduce this risk.
- » Encourage haulers to provide separate organic waste collection - municipalities can encourage and train local commercial waste haulers about organic waste source separation. They can also make haulers aware of waste generators who are interested in participating in a commercial composting program, in order to facilitate the creation of new organic waste hauling routes. Municipalities can also implement bylaws that require businesses to separate organic waste and give haulers a financial incentive to compost by increasing municipal landfill tipping fees.

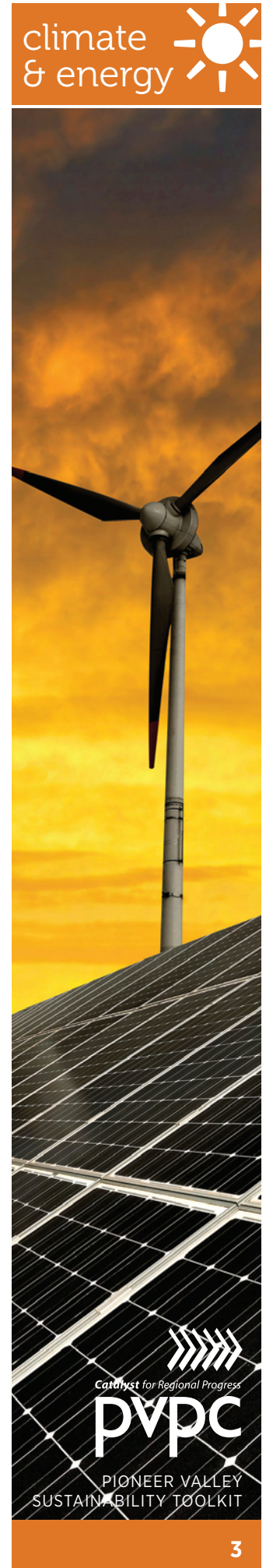


- » Recruit compost facility investors and owner-operators - In addition to facilitating permitting for composting facilities, municipalities can release requests for proposal to identify potential investor-operators, corporations, or others that may have an interest in operating a composting site. Municipalities can also reach out to existing organizations in the region, such as Amend Organics in Amherst, which operates a full commercial composting program and are involved in collection, composting, and delivery of compost. Municipalities can also help secure funding for a composting program by applying for grant funding from the Massachusetts DEP's Sustainable Materials Recovery Program (SMRP).

Implementing a Building Material Re-Use Program

Most building materials re-use programs maintain a storage facility of used items, where individuals, businesses, and institutions who are involved in building construction can deliver and purchase materials. Items that are commonly part of a re-use program are: windows, hardware, cabinets, fixtures, doors, paint, furniture, computers, office equipment, carpet, and wood. Ways in which municipalities can assist with a re-use program are:

- » Provide a building materials storage facility - finding a physical structure for a re-use program is often the largest challenge and expense to its implementation. Providing municipally-owned space for this purpose, even if only small, can provide a solution to this challenge.
- » Partner with non-profit organizations to run the program - Re-use programs can be run as a joint effort between municipalities and non-profit organizations. Partnering allows the program to tap into an existing volunteer network that can help operate and staff the program.
- » Promote existing re-use programs in the Pioneer Valley - The non-profit Center for EcoTechnology runs the EcoBuilding Bargains store in Springfield, which is the largest program in New England. Encouraging residents, businesses, and non-profits to utilize this existing program is an excellent alternative to starting a new program.



EXAMPLES OF COMMUNITY IMPLEMENTATION

Northampton, MA

The Pioneer Valley's largest commercial composting effort to date, called the Northampton Source Separated Organics (SSO) Program, ran between 1991 and 2002. The program was a collaboration between the City of Northampton and the Center for EcoTechnology, a local non-profit organization. For the first seven years of the program, Smith Vocational High School Farm in Northampton operated a food waste composting facility at their school farm. The program was expanded in 1998 through a CET-provided grant to include large supermarkets (Stop & Shop and Big Y), food processors (e.g. Hot Mama's), small markets (e.g. Serio's and Coopers), restaurants (e.g. La Cazuela and Northampton Brewery), institutions (e.g. Smith College and the Hampshire County Jail), health care facilities (e.g. Cooley Dickinson Hospital), and public schools (e.g. JFK Middle School). Most of the compost was used by the Smith Vocational High School Farm (25-30 tons of food per week), with other area farmers accepting some as well. In 2004, composting at the high school's farm ceased due to changes in school administration, and the program ended without an identifiable backup composting facility. The program was successful while in operation, but also demonstrates the need to have more than one composting facility in order to ensure the resiliency of a composting program.

Amend Organics, Amherst, MA

Amend Organics is an agriculture-based non-profit that offers composting to farmers, commercial food generators, and municipalities in western Massachusetts. The company collects leaves, cow manure, horse bedding, and food scraps to create compost for agricultural use. Beginning its composting operations in 2012, the company has a lease with the New England Small Farming Institute to use the composting facility at the NESFI-operated Book & Plow Farm located on land owned by Amherst College. Amend Organics also runs a food scraps collection program at the Town of Amherst Transfer Station. The program is funded through compostable bags sold through the Amherst Transfer Station for collection of food scraps.

EcoBuilding Bargains, Springfield, MA

EcoBuilding Bargains, located in Springfield, Massachusetts, offers reused and surplus building materials, including cabinets, furniture, doors, tile, lighting fixtures, appliances, and lumber. The 30,000 square foot facility accepts donations from homeowners, contractors, manufacturers, retailers and municipal collection centers. The program,

which is the largest in New England, was created by the Center for EcoTechnology, a non-profit community-based environmental organization started in 1976. The revenue from reselling the donated building materials provides the program enough funding to cover its operational costs. The program started in 2001 in a much smaller facility in Springfield, and was started with just under \$200,000 in grant money from sources including the Massachusetts DEP, US Department of Commerce Economic Development Administration, and private foundations.

LINKS TO MORE INFORMATION

CONSTRUCTING A REGIONAL ORGANIC WASTE MANAGEMENT PROGRAM FOR THE CENTRAL PIONEER VALLEY, CREATED BY THE PIONEER VALLEY PLANNING COMMISSION:

<http://www.northamptonma.gov/DocumentCenter/View/333>

STRATEGIES FOR STARTING A MATERIALS RE-USE PROGRAM, CREATED BY THE UNIVERSITY OF WISCONSIN:

<http://infohouse.p2ric.org/ref/21/20193.pdf>

CENTER FOR ECOTECHNOLOGY'S ECOBUILDING BARGAINS WEBSITE:

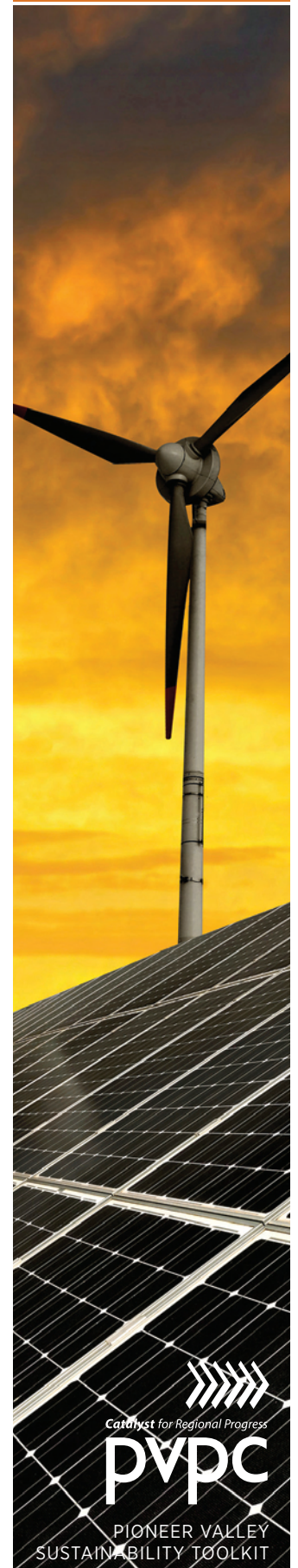
<http://ecobuildingbargains.org>

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Pedestrian Access

PURPOSE

To reduce greenhouse gas emissions by increasing walking and reducing driving.

Transportation is one of the largest contributors to greenhouse gas (GHG) emissions. In the Pioneer Valley, transportation accounts for about 31.8% of GHG—more than any other sector. Creating a transportation network that provides local residents with safe, convenient access to destinations by walking will reduce these emissions by replacing car trips with increased walking.

Promoting pedestrian access also provide residents with a low-cost alternative to driving, saving them money and reducing traffic congestion. As an easy way to exercise, walking also promotes mental and physical health. Regardless of the destination, every trip begins and ends by walking, meaning that promoting pedestrian access provides benefits to everyone.

HOW IT WORKS

Municipalities can require private development to promote pedestrian access through the use of zoning and subdivision bylaws. In order to encourage walking, the following elements should be included in these regulatory documents. These elements can be included as a new, separate section of the bylaws, or integrated into existing text:

- » Requiring sidewalks as part of all new development, on both sides of the street, so that pedestrians have safe places to walk. Sidewalks should be at least five feet wide with smooth, high-grip surfaces.
- » Limiting the number and width of driveways and curb cuts, in order to minimize the number of locations where pedestrians are at risk of getting struck by cars crossing the sidewalk.
- » Requiring appropriate streetscape design, including guidance about appropriate sidewalk design, street trees, benches, light fixtures, outdoor dining areas, signs, etc.
 - a. Using design guidelines and/or form-based codes to require building development that contributes to a high-quality pedestrian realm. The regulations can encourage or require appropriate building massing, setbacks, and architectural detail including the use of awnings, windows, and varied building materials.

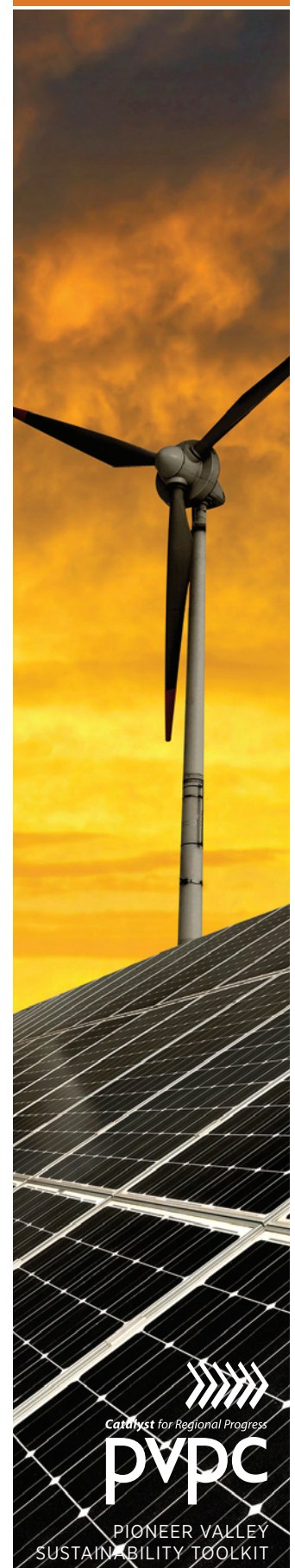
- b. Allowing for close proximity of different land uses, or mixed-use development, to enable travel between uses that only requires a short, easy walk.
- » Ensuring parking lots are safe for walking, by requiring clearly designated, raised sidewalks from the street to all building entrances, installing speed bumps or other traffic calming measures to reduce motorist speeds, requiring adequate tree cover to shade the parking lot, and providing bike parking.

Designing new subdivisions to encourage pedestrians, including providing a well-connected street grid with short blocks, rather than cul-de-sacs or dead ends, to minimize walking distances, providing sidewalks, requiring street trees, appropriate lighting, minimizing the width of new roads to slow car traffic, and providing traffic calming measures, where appropriate.

- » Specifying that the above items will be reviewed as part of the municipality’s site plan review process for new development projects.

Integrating pedestrian features into a municipality’s regular construction and maintenance of roads is another effective way to promote pedestrian access. Specific pedestrian features to be included are:

- » Installing traffic signaling at intersections that have pedestrian countdown timers and signals that allow pedestrians a chance to enter the street before motorists, so they are more visible to turning cars.
- » Providing designated mid-block pedestrian street crossings that have clear signage and prominent pavement markings.
- » Installing sidewalk bump outs at pedestrian crossings. Bump outs extend the sidewalk area and reduce the width of crossings, which increases safety and comfort for pedestrians.
- » Providing wayfinding signage that provides pedestrians with the direction, distance and time between popular destinations.
- » Installing traffic calming devices, such as speed bumps, reduced lane widths, and medians, that encourage motorists to drive more slowly.
- » Installing street lights that provide adequate street and sidewalk lighting. Adequate lighting is particularly important at locations with grade changes, potential obstacles in a pedestrian’s path, and where auto traffic crosses pedestrian paths. Lighting should minimize glare.
- » Installing street furniture, including bus shelters, bike racks, trees, trash cans, public art, and newspaper boxes that make the street visually interesting, provide opportunities for rest, and provide a sense of separation between roads and sidewalks.



Municipalities can also pass a Complete Streets policy, which promotes design and maintenance of streets and sidewalks that balances the needs of all users, including pedestrians, bicyclists, users of mass transit, people with disabilities, the elderly, motorists, freight providers, emergency responders, and adjacent land users. A Complete Streets policy would be passed by the City Council or Select Board and take one of two forms:

- » A resolution, which is a non-binding, official statement of support for approaching community transportation projects as a way to improve access, public health, and quality of life.
- » An ordinance, which legally changes the municipal code to require the needs of all users to be addressed in new transportation projects.

Both resolutions and ordinances help promote pedestrian access. However, because resolutions do not require action, they are more likely to be neglected than a legally-binding ordinance.

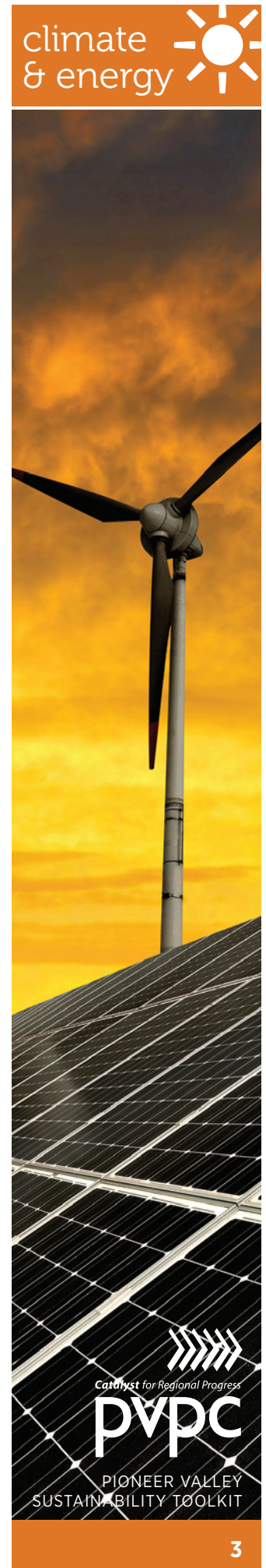
EXAMPLES OF COMMUNITY IMPLEMENTATION

Springfield, MA

In 2014, the City of Springfield completed its first Complete Streets Plan, which recommends a network of roadways throughout the city to receive upgraded accommodations for bicyclists and pedestrians. The plan emphasizes pedestrian access improvements that can have the most impact for the least cost, such as pedestrian crossing pavement markings and wayfinding signage. The plan, developed for the City by the Pioneer Valley Planning Commission and MassBike, was funded through a grant from the Centers for Disease Control. As part of the plan, a sidewalk inventory was conducted that identified all existing sidewalks. The City is currently considering passing a Complete Streets policy in conjunction with completion of the plan. The City has also undertaken various pedestrian access improvements in recent years, such as installing new sidewalk ramps and pedestrian crossing markings on Main Street in downtown.

Northampton, MA

The City of Northampton's zoning ordinance requires all new development to prepare an interior traffic and pedestrian circulation plan that is designed to minimize conflicts and safety problems with motorists, as well as provide safe and adequate pedestrian access through the construction of sidewalks. The ordinance also requires that sidewalks connecting "from the building to the street be clearly delineated through materials and/or markings to distinguish the vehicular route from the non-vehicular route." Sidewalk construction specifications are also included that require sidewalks to be a minimum of six feet in width and located on both sides of the street. In addition to these zoning



requirements, the City incorporated pedestrian access into the street design of Elm Street near Smith College, where there are multiple pedestrian crossings with medians, signage alerting motorists to the crossing, and prominently visible pavement markings. The City is also currently considering adding additional design specifications, such as sidewalk and crosswalk widths in parking lots, for internal pedestrian circulation within new developments.

LINKS TO MODEL BYLAWS OR MORE INFORMATION

THE FEDERAL HIGHWAY ADMINISTRATION'S GUIDE TO DESIGNING SIDEWALKS AND TRAILS FOR ACCESS:

http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalks/

MODEL SIDEWALK REGULATIONS - PIONEER VALLEY PLANNING COMMISSION AND OTHERS:

http://walkbikecny.org/wp-content/uploads/2014/06/20140617_Final_Reference_Manual_a_C.pdf

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION INITIATIVES TO PROMOTE PEDESTRIAN TRANSPORTATION:

<http://www.massdot.state.ma.us/GreenDOT/PedestrianTransportation.aspx>

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION PEDESTRIAN PLAN:

<https://www.massdot.state.ma.us/planning/Main/StatewidePlans/PedestrianPlan.aspx>

FOR MORE INFORMATION, PLEASE CONTACT

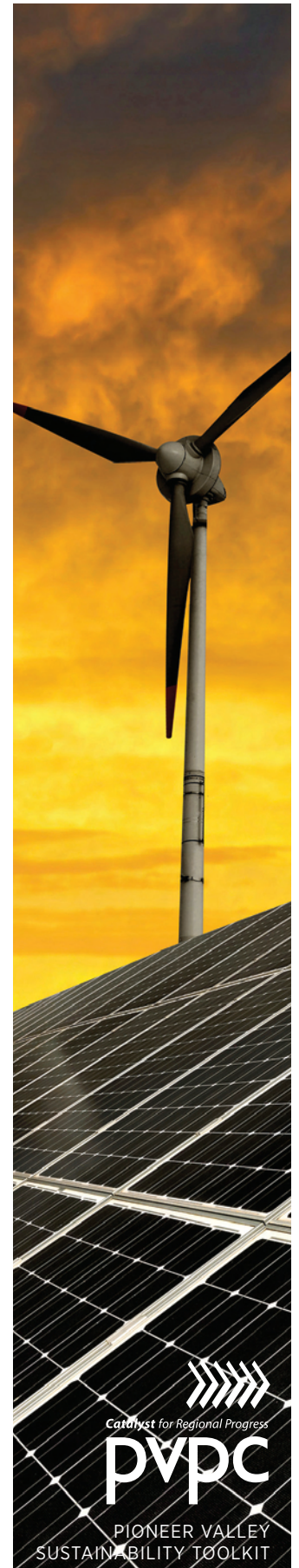
Pioneer Valley Planning Commission

413-781-6045

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www.pvpc.org



Retrofit Municipal Buildings

PURPOSE

To increase energy efficiency and reduce energy waste in municipal buildings.

Public buildings lose significant amounts of energy through poor insulation of walls, windows, ducts and pipes, as well as poor monitoring and maintenance of building structures. When municipalities improve energy efficiency by retrofitting public buildings, they use less energy over the long-term, reduce pollution, lower the amount of greenhouse gas emissions from their operations, and reduce energy spending.

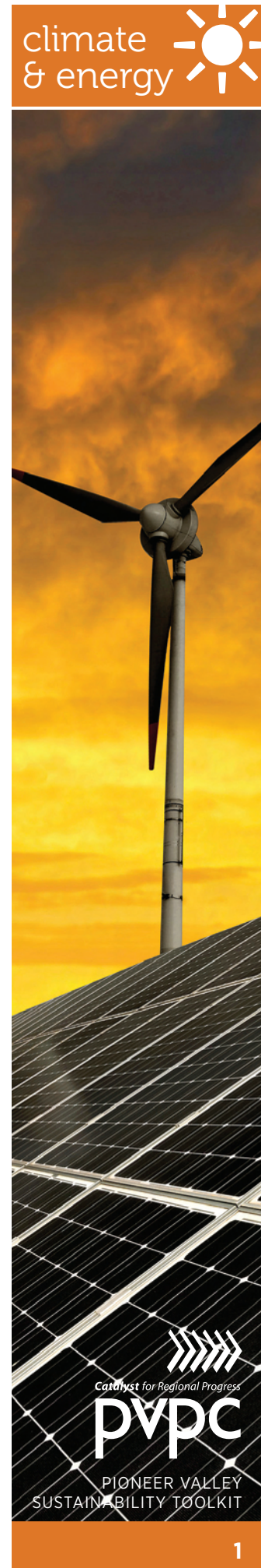
HOW IT WORKS

Older public buildings are often energy inefficient. They can quickly lose heat in the winter and prove difficult to keep cool in the summer because of a compromised building envelope that allows a large volume of air exchange between the outside and inside of the building. Securing this building envelope with better insulation, window glazing, as well as updating the mechanical systems of a building, such as the boiler, air conditioners, lighting and plumbing will help reduce energy use, cost, carbon dioxide emissions and other pollutants.

A municipality can partner with an Energy Service Company or the local utility company to complete energy audits of buildings. The steps in this process are to agree upon:

- » proposed improvements;
- » timeline for improvements;
- » payback period on improvements; and
- » financing for the work to be completed.

Often the Energy Service Company will guarantee that the energy savings from proposed improvements will at least equal the cost of the proposed improvements, thus allowing the improvements to move forward without any out of pocket expenses for the municipality.





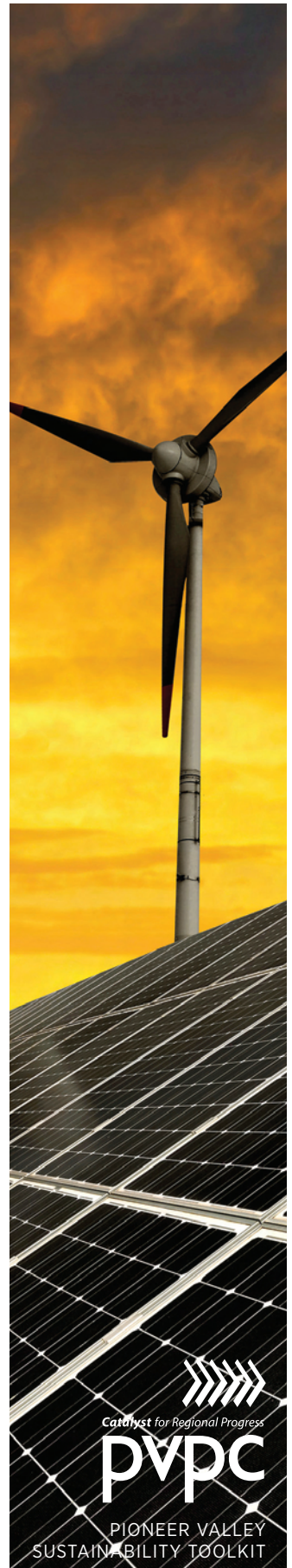
Belchertown Town Hall received energy efficiency upgrades in 2011

EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED

Belchertown, Massachusetts authorized the use of either traditional tax-exempt bonds or qualified energy conservation bonds to pay for the installation of roughly \$3.3 million worth of energy upgrades for town and school buildings. The energy services company predicted that the upgrades will save the town \$256,000 annually for a period of 17 years. These savings are based on fuel and electricity prices for 2010.

West Springfield, Massachusetts approved bonding \$3.8 million to fund energy-saving projects for various municipal buildings such as boiler replacements for several of the town's schools. The energy service company guaranteed that the improvements would generate savings, and the contract with the City states that the company will pay the city the difference if it does not.

Toledo, Ohio sold bonds to finance a project with a systems controls company to complete energy efficiency improvements in municipal buildings. The contract with the city's systems control company guaranteed that financial savings from improved efficiency



would pay back the bonds—any shortfalls were covered by the controls company and any savings accrued to the city. This financing system has paid for building improvements of over \$10 million.

Portland, Oregon completed comprehensive retrofits of city buildings that included installing energy efficient lighting and windows. These energy efficiency measures resulted in cost-savings through lower utility bills. Portland has saved over ten percent on annual utility bills, or approximately \$1 million per year, since implementing the program.

LINKS TO MORE INFORMATION:

INFORMATION ON ENERGY SERVICE COMPANIES PROVIDED BY THE NATIONAL ASSOCIATION OF ENERGY SERVICE COMPANIES:

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

INFORMATION ON THE FUNDING OPPORTUNITIES THROUGH THE MASSACHUSETTS GREEN COMMUNITIES PROGRAM:

<http://www.mass.gov/?pageID=eoeesubtopic&L=3&L0=Home&L1=Energy%2c+Utilities+%26+Clean+Technologies&L2=Green+Communities&sid=Eoeaa>

INFORMATION ON PORTLAND OREGON'S CITY ENERGY CHALLENGE:

http://www.smartcommunities.ncat.org/success/city_energy.shtml

FOR MORE INFORMATION, PLEASE CONTACT

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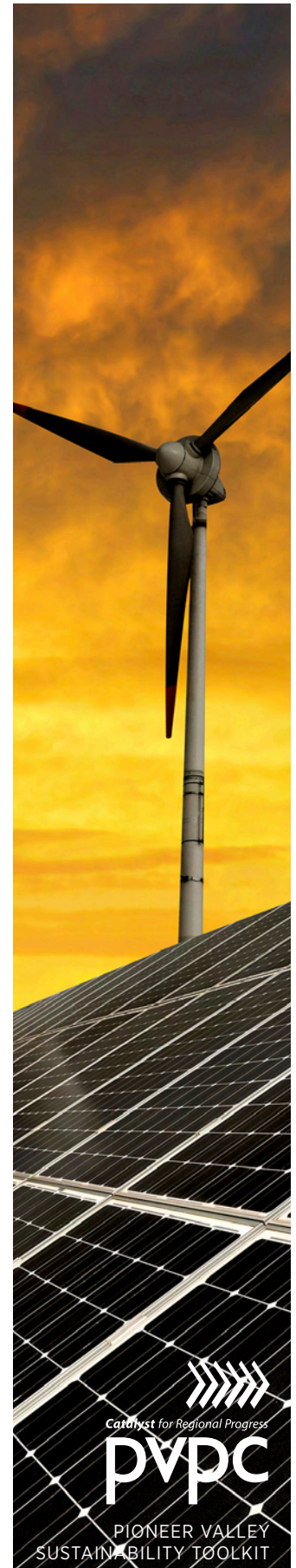
Solar Energy Incentives

PURPOSE

To promote installation of more solar energy capacity in Massachusetts by providing financial and tax incentives.

INCENTIVES FOR SOLAR PV AND SOLAR THERMAL SYSTEMS

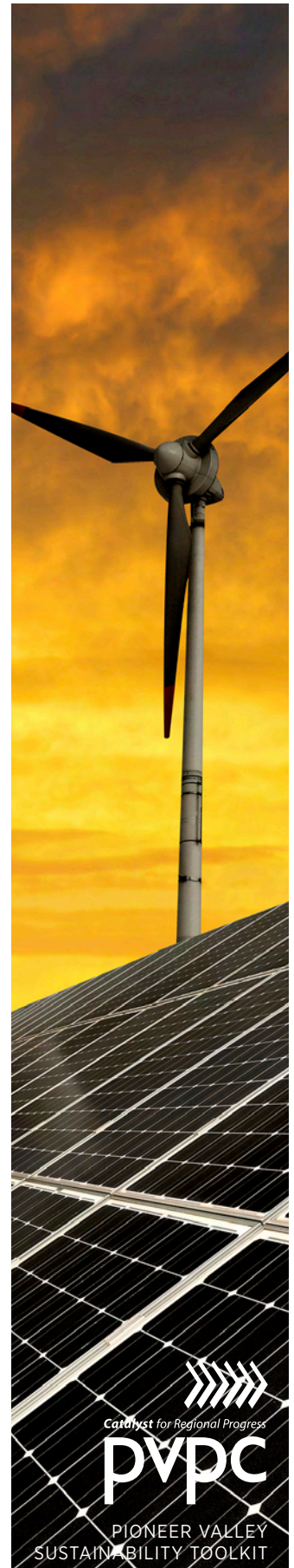
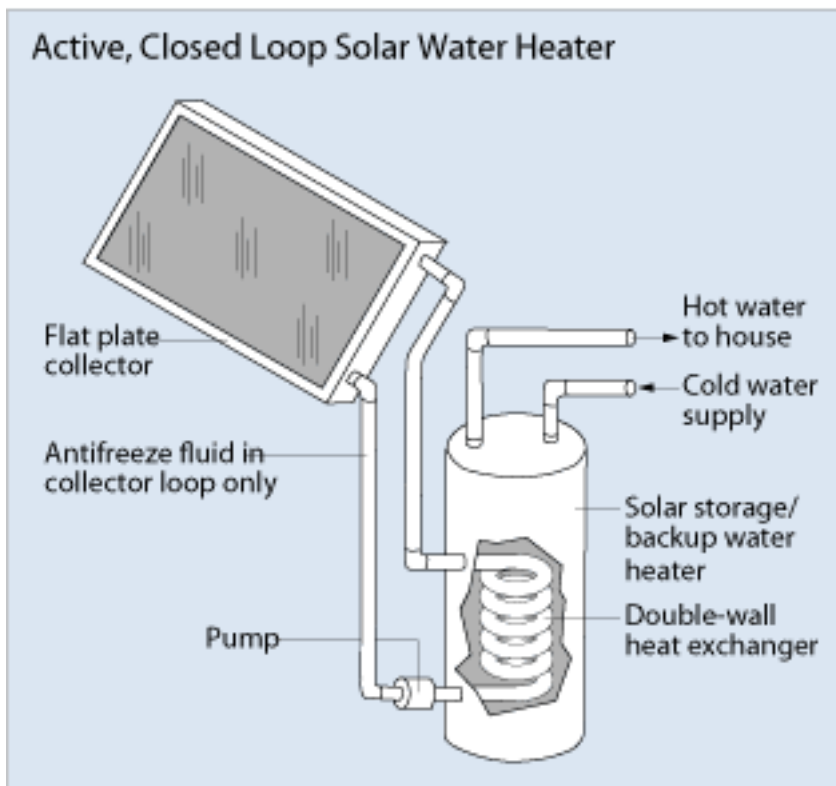
The Commonwealth of Massachusetts offers a variety of financial and tax incentives to help encourage more home owners, businesses and governments to install solar energy systems—namely solar photovoltaic (PV) electric systems and solar thermal hot water heating systems. With the help of these incentives, Massachusetts since 2008 has boosted installed solar electricity capacity to more than 400 megawatts (MW) statewide (enough to power about 38,000 homes under typical conditions) and thousands of building hot water heating systems, which can provide up to 80 percent of a building’s hot water needs.



Massachusetts Solar “Carve-Out” Program and Solar Renewable Energy Certificates (SRECs) –

The Commonwealth is creating incentives for solar PV systems through a market-based incentive program to “carve out” a portion of Massachusetts’ electricity market for solar PV. An initial statewide carve-out goal of 400 MW of new solar PV power was reached in 2013, and so in 2014 a new goal of 1,600 MW of in new solar PV was set for the year 2020.

The solar carve-out program is driven by an innovative market-based financial product called solar renewable energy certificates, or SRECs. Solar energy system owners receive one SREC from the Commonwealth for each megawatt of solar energy that their system generates. SRECs can then be sold or traded with utilities and other energy system owners. The larger the system, the more SRECs received. In Massachusetts, utility companies are motivated to buy SRECs because they must deliver a certain percentage of the energy (currently 4%) from “green” generate sources, such as solar. If they do not, a penalty is assessed. SRECs are currently valued at about \$280 to \$350 each, and their value fluctuates with the market. The revenue from SRECs is critical to offsetting the currently initial higher start-up costs of new solar energy systems to reduce their payback period, versus that of conventional technologies (though in the long term, solar energy systems still cost less to own and operate than purchasing power from the grid).



Net Metering

Net metering allows owners of renewable energy systems who feed power back into the electrical grid to receive credits on their bills for that power. The practical effect of net metering is dramatic: Any electric utility customer can become an electricity producer, too. They can earn money by generating more than they need when the sun is shining (i.e., “the meter is spinning backwards”) to offset the cost of drawing power from the grid at night or during cloudy times – in many cases, resulting in net annual electricity costs of \$0. In addition, utility customers without a power system of their own can buy green power from any supplier and also receive a credit for it on their bill.

Renewable Energy Income Tax Credit

Massachusetts also offers a tax credit for homeowners who install renewable energy systems. In the first year of installation, the homeowner is eligible for a 15% credit (up to \$1,000) on their state income tax for the net expenditure (including installation costs) for a solar PV system on a primary residence. If the tax credit amount is greater than the owner’s income tax liability, then the excess credit may be carried forward up to three years.

Commonwealth Solar II Program

This program of the Massachusetts Clean Energy Center is targeted to homeowners and businesses with solar PV systems that produce less than 15 kW of power. It provides a rebate of about 25 cents per installed watt, plus additional incentives. Project must be approved before installation through a non-competitive application process.

MORE INFORMATION ABOUT SOLAR ENERGY INCENTIVES

The solar energy needs and generating potential of every property are different. The solar energy market is new and evolving. Like the price of heating oil or natural gas, the price of solar energy can change based on market conditions. Therefore, it is important to get information ahead of time and work with an installer that you trust. Every home solar installation should begin with a free Mass Save energy assessment to understand how much power can be conserved—so unneeded solar panels are not purchased.

CALCULATE SOLAR SAVINGS AND FIND LOCAL SOLAR INSTALLERS:

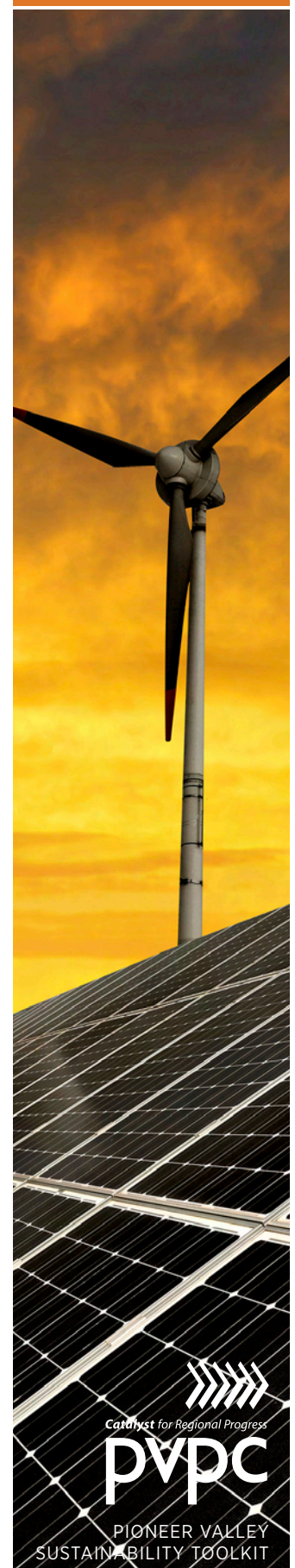
<http://www.solar-massachusetts.org/>

DATABASE OF STATE INCENTIVES FOR RENEWABLES AND EFFICIENCY:

<http://www.dsireusa.org/solar/incentives/>

APPLICATION TO FOR MASSACHUSETTS SOLAR CARVE-OUT PROGRAM:

<http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/solar/rps-solar-carve-out/statement-of-qualification-application.html>



MASSACHUSETTS CLEAN ENERGY CENTER:
<http://www.masscec.com/>

MASSACHUSETTS SOLAR HOT WATER (THERMAL) PROGRAM:
<http://www.masscec.com/programs/commonwealth-solar-hot-water>

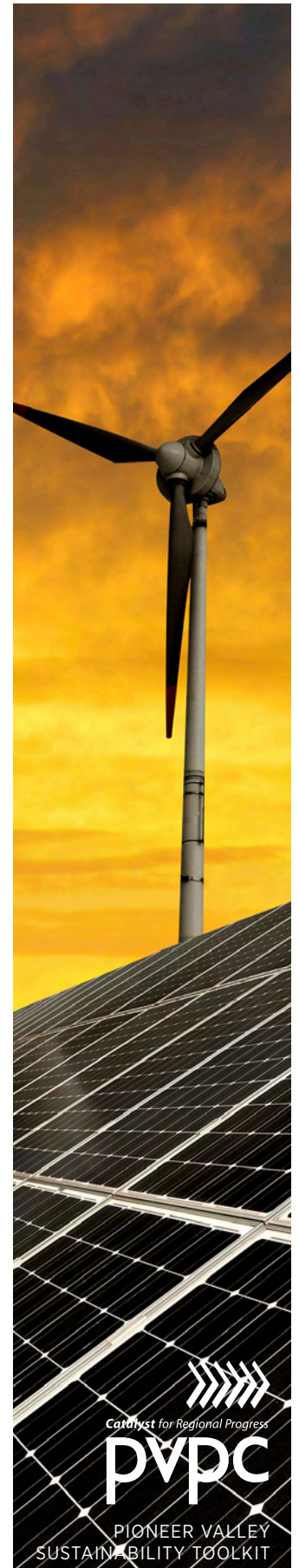
COMMONWEALTH SOLAR II PROGRAM
<http://www.masscec.com/solicitations/commonwealth-solar-ii-block-19>

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Strategies For Residents & Businesses

PURPOSE

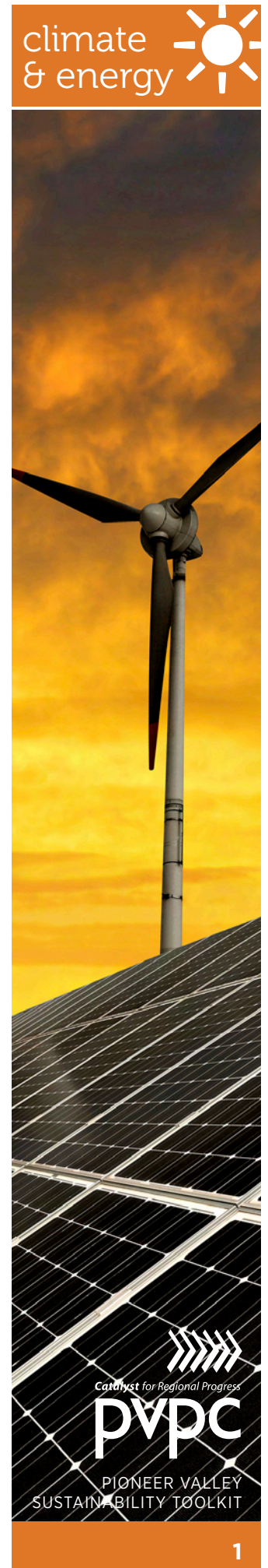
Personal choices directly impact greenhouse gas emissions and the future quality of our environment. Every person has the power to change his or her behavior, reduce greenhouse gas emissions, and slow global climate change.

Simple Steps That Work

The choices we make as individuals can have a significant impact on greenhouse gas emissions. We can choose to conserve resources and reduce emissions—in our homes, in our cars, in the products we buy, etc. Many people think that climate-positive choices require sacrifices. The truth is they often result in a better quality of life and improved financial well-being. Improving the energy efficiency of your home helps slow climate change, but it also improves the comfort of your home and saves you money. Walking or biking whenever possible saves money on gas and improves your health. “Eco” driving habits reduce emissions but also increase the life of your vehicle. Purchasing local, organic foods stimulates your local economy, and the food often tastes better and is more nutritious.

Here are **eight simple steps** any citizen or business can take to reduce their environmental footprint and emissions of carbon dioxide, the leading greenhouse gas contributor to climate change.

1. Increase your energy efficiency
2. Use renewable energy
3. Use alternative transportation
4. Conserve resources
5. Be a smart consumer
6. Respect your environment
7. Get involved! Learn more!



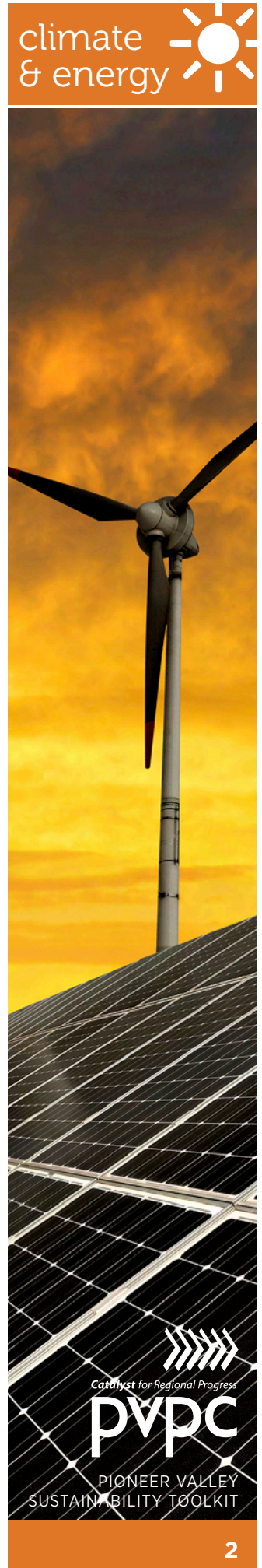
PURPOSE

Improving the energy-efficiency of a home or business can reduce utility bills while also cutting greenhouse gas emissions.

WHAT TO DO:

Investing in the efficient energy performance of your home or business is one of the most important steps an individual can take to reduce his or her carbon footprint. Even if you are considering installing on-site renewable energy generation like solar panels, it is wise to make improvements in energy efficiency first. Every \$1 spent on energy efficiency, saves \$3 to \$5 in renewable energy system costs. Here are some measures you can take to increase your efficiency:

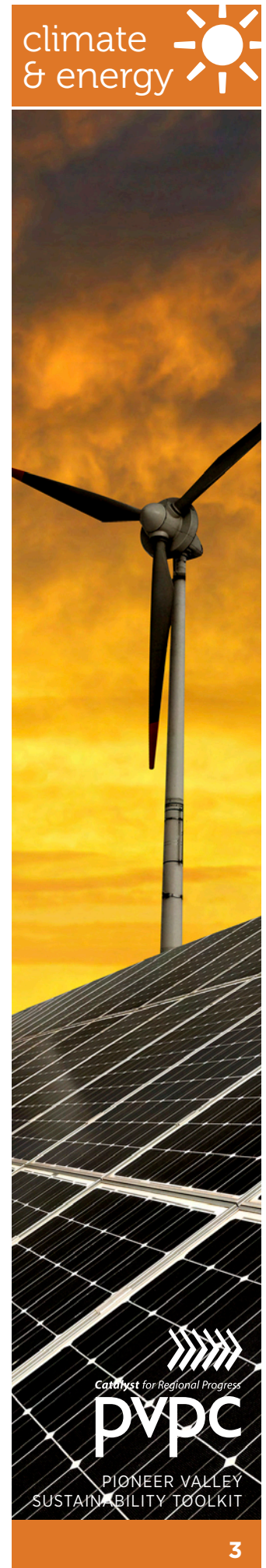
- a. Schedule an energy audit through the MassSave program: Massachusetts utilities check customers' homes, provide simple energy-saving devices such as Compact Fluorescent Lights (CFLs) for FREE, and offer suggestions on improving insulation and energy efficiency. These "retrofit" improvements include a wide range of installation and maintenance technologies such as: installing renewable energy systems, plugging air leaks in siding, using water saving technologies, planting environmental landscaping or switching to CFLs. There are economic incentives for residents and businesses that decide to make large retrofits to their properties. For example, the "HEAT" loan provides up to \$25,000 of subsidized loans to finance energy audit recommendations. Best of all, following those audit recommendations can lead to very large savings on your energy bill. Start today by scheduling an audit at www.MassSave.com or call them at 1-800-666-3303 for WMECO customers, 1-800-632-8300 for National Grid. Contact your municipal utility for more information if they are your provider.
- b. Replace regular light bulbs with compact fluorescent light bulbs (CFLs) or LED bulbs: New fluorescent bulbs use 60% less energy, last for 6 times longer and save and save approximately \$40 over their lifetime when compared to older incandescent bulbs. Handle them carefully, as they contain small amounts of mercury. Best of all, they are free with a MassSave audit! LED bulbs generally cost more upfront but last significantly longer than CFL lightbulbs. They typically last for more than 20 years!. A single Energy Star rated LED bulb can save \$135 in electricity costs over its lifetime and prevent 1,800 pounds of greenhouse gas emissions, the equivalent of keeping 850 pounds of coal from being burned.
- c. Keep an eye out for efficient appliances: Use the Energy Star rating system as a guide when purchasing electric equipment. It will show you how the product's energy consumption measures up with similar items. Eliminating or replacing



appliances such as old refrigerators commonly used for secondary storage with a new Energy Star rated refrigerator can go a long way to reduce your electric consumption. When shopping for these appliances, it is important to think long term instead of only looking at the up-front costs. Although they might cost more initially, these appliances easily pay for themselves through energy savings on your utility bill.

- d. Monitor your electricity consumption: “You can’t manage what you don’t measure” so Tracking tracking a home or business’ energy usage is the first step in moving toward efficiency. There are a number of appliances that help track where and how much electricity is used within a building. “Watt-hour meters” are small, inexpensive devices that are easily plugged into any home device. They measure how much electricity is being drawn by that particular appliance. There are also slightly more expensive “whole-house meters” that give data about every appliance in your house. Both types help pinpoint which appliances are drawing the most energy. With this information, it is easier to make small changes that reduce your utility bill.

Smart Meters are an innovative way to accurately measure energy consumption in your home or business. These meters take hourly measures of how much energy is used and transmit it wirelessly to the electric utility, providing them with data to help serve your needs better. Across the country, electric utilities are installing these systems for homeowners free of charge. These meters will allow the utility to bill more accurately and provide power at critical parts of the day. These appliances are a gateway to an increasingly more efficient national “Smart Grid” energy system that is the newest innovation within the energy delivery and usage system. WMECO and National Grid are currently installing these systems in communities across Massachusetts. Contact your local provider for more information about installing a smart meter in your home.



LEARN MORE:

MASS SAVE UTILITY PROGRAM AND AUDIT SCHEDULING:

www.MassSave.com

ABOUT ENERGY EFFICIENT APPLIANCES:

<http://www.nrdc.org/air/energy/fappl.asp>

ABOUT ENERGY STAR PRODUCTS:

http://www.energystar.gov/index.cfm?fuseaction=find_a_product.

ENERGY STAR FINANCIAL INCENTIVES:SAVER, US DEPARTMENT OF ENERGY'S HIGH QUALITY WEBSITE ABOUT ENERGY SAVINGS:

<http://www.energysavers.gov/financial/70020.html>

<http://energy.gov/energysaver/energy-saver>

ENERGY STAR HOME ENERGY PERFORMANCE AUDITS:

http://www.energystar.gov/index.cfm?c=home_improvement.hm_improvement_audits

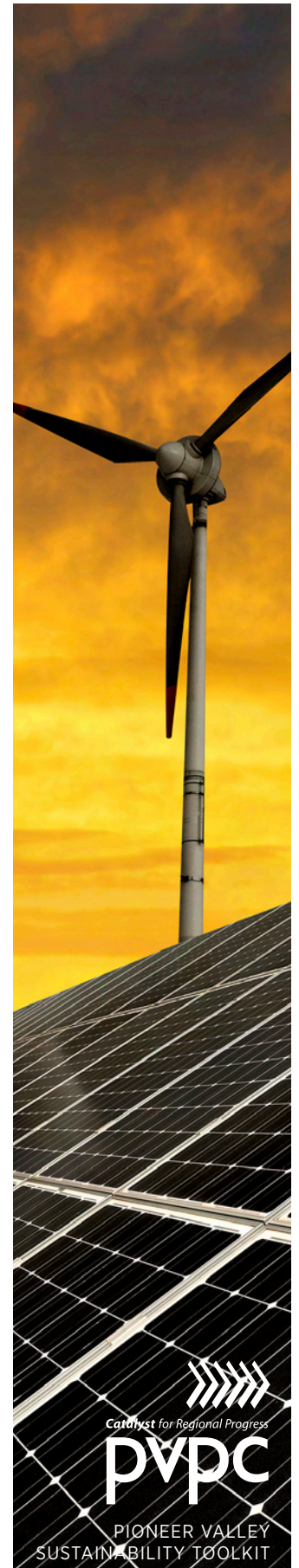
REDUCING GREENHOUSE GAS EMISSIONS - STRATEGIES FOR HOMEOWNERS:
MASSACHUSETTS' RECOMMENDATIONS FOR REDUCING EMISSIONS

<http://www.mass.gov/eea/air-water-climate-change/climate-change/massachusetts-global-warming-solutions-act/how-can-i-reduce-my-emissions.html>

<http://www.mass.gov/dep/air/climate/reduce.htm#homeowners>

LEARN ABOUT SMART METERS:

<http://www.pge.com/myhome/customerservice/smartmeter/>



PURPOSE

Using renewable energy in your home or small business is a personal investment towards energy independence, a cleaner environment and climate change mitigation.

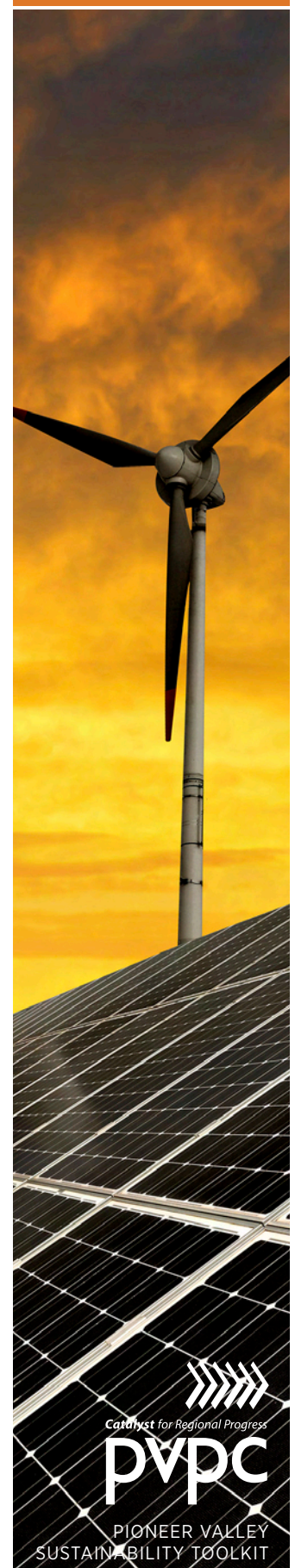
WHAT TO DO:

Renewable energy has become more common and cost-efficient effective in recent years. Types of renewable energy systems include solar panels, wind turbines, and microhydropower and heating and cooling systems. Massachusetts consumers can also purchase renewable energy through a utility by signing up through various available programs. These investments and consumer choices can pay for themselves through energy savings, tax breaks, incentives and benefits to the environment.

Ways to use renewable energy include:

- a. Utility purchasing program: The easiest way to consume renewable energy without putting a new system on your property is through your utility's renewable energy purchasing program. Massachusetts utilities such as National Grid allow you to purchase part or all of your electricity from renewable sources through their "Green-Up" program. WMECO also encourages consumers to purchase from renewable energy sources by providing a growing list of renewable energy suppliers on their website. Customers must call the supplier to sign up, and then that company makes all necessary changes with WMECO. While the electricity you directly receive at your home or business will remain unchanged, the utility uses the money you pay for electricity towards paying renewable energy providers; therefore you "consume" renewable energy.
- b. Renewable heating and cooling: Solar water heaters and geothermal heating and cooling systems are two ways to use renewable energy without generating electricity in your home or business. Solar water heaters use the sun's heat to warm up water, reducing the use of oil or natural gas hot water heaters. Geothermal heating and cooling systems function by circulating air through tubes many meters underground. Consistent moderate temperatures within the ground cools the air in the summer and heats it during the winter while using substantially less fuel.
- c. Electric generation system: Homes and businesses can install electrical generation systems such as those that use solar panels or wind turbines. Massachusetts encourages businesses, municipalities and residents to invest in and install energy saving technologies. There is a multitude of ways for Massachusetts residents to benefit both economically and environmentally through state programs such as:

- i. Commonwealth Solar II Program: This program is designed for homeowners and businesses that produce less than 15 kW of solar energy. It provides rebates (minimum of \$.40/watt) to smaller projects to make them more appealing. The project must be approved before installation through a non-competitive application process. For example, a 5 kW system which could provide enough energy for a standard single family house would save the homeowner \$2,000 through this program alone.
- ii. Renewable Energy Income Tax Credit: Homeowners installing renewable energy systems are eligible for a 15% credit -- up to \$1,000 -- against the state income tax for the total installed cost of the system. If the credit amount is greater than a resident's income tax liability, the excess credit amount may be carried over and used within three years.
- iii. Net Metering : Many forms of distributed renewable energy do not produce a consistent amount of energy throughout the course of a day or year. For example, solar photovoltaic panels do not produce electricity at night. To provide consistent power, users of distributed renewable energy generators can either store excess power in batteries or connect to the electric grid. Typically, an electric company customer with a grid-tied renewable energy generator produces more electricity than they need at some times. This is "exported" to the grid. At other times, the renewable sources don't generate enough electricity and the customer "imports" energy from the grid. Net Metering enableallows for these electric company customers to financially balance the value of the energy that they export with the cost of the energy they import. renewable systems without any batteries. Within this program, owners sell extra daytime solar energy to the utility in exchange for a credit. These credits can be used at night or whenever you need extra electricity - no batteries necessary! At the end of the month, you the customer isare only billed for the "net" amount of electricity you they drew from the grid. Leftover credits can be carried over to the next billing cycle.
- iv. Solar Carve-Out Program and SREC's: The Solar Carve-Out program is a market based incentive to support residential, commercial, public, and non profits in developing 400MW of solar photovoltaic across Massachusetts. The program requires utilities to purchase a quota of solar renewable energy every year. Utilities can take credit for a homeowner or business' solar energy system by purchasing that system's Solar Renewable Energy Credit (SREC). Currently the minimum mandated SREC price is \$285, but that could rise as high as \$600 due to market conditions. This subsidy amounts to approximately a \$5,000 to \$6,000 incentive to small-scale system owners.



When all of these renewable energy subsidies and incentives are added together, they accumulate to a lot of savings for the homeowner! One Massachusetts company estimates that an average sized system with decent southern exposure can produce 8,000 kWh of energy and reduce a \$200/month electric bill by half. This system costs approximately \$19,000, but would produce a savings of \$3,500 a year when all of incentives and credits listed above are used. Therefore, it would pay for itself within 5 ½ years while also in cash and even more in increased adding value to the home home value. In fact, it is estimated that in 20 years, this system will have paid back the homeowner \$100,000 in addition to the monumental significant environmental benefits.

LEARN MORE:

DATABASE OF STATE INCENTIVES FOR RENEWABLES AND EFFICIENCY:

<http://www.dsireusa.org>

MASSACHUSETTS CLEAN ENERGY CENTER:

<http://www.masscec.com/>

SOLAR HOT WATER:

<http://energy.gov/energysaver/articles/solar-water-heaters>

http://www.energysavers.gov/your_home/water_heating/index.cfm/mytopic=12850

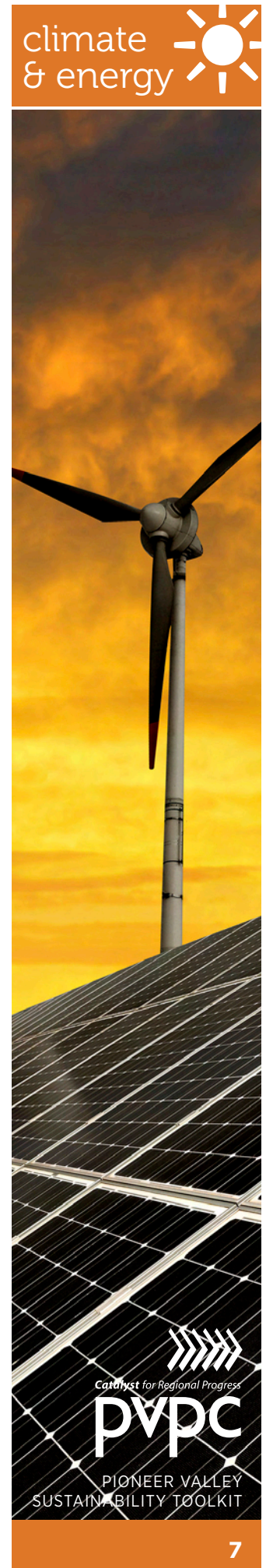
GEOHERMAL HEAT PUMPS:

<http://energy.gov/energysaver/articles/geothermal-heat-pumps>

http://www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12640

NATIONAL GRID “GREEN UP” PROGRAM:

http://www.nationalgridus.com/masselectric/business/energychoice/3_renewable.asp



pvpc

PIONEER VALLEY
SUSTAINABILITY TOOLKIT

PURPOSE

Private automobiles are the most common form of transportation within the Pioneer Valley. Automobiles are also one of the largest contributors to greenhouse gas emissions and other air pollutants that cause climate change and reduce air quality. By following “eco friendly” driving practices, a driver can reduce pollution, save money by using less fuel, and increase the useful life of their vehicle.

WHAT TO DO:

Lighten Your Load:

Remove unnecessary items from your vehicle. Every extra 100 pounds in or on the vehicle could reduce your miles per gallon (mpg) by up to 2%. Remove unused roof, ski, and bike racks and when possible try not to carry items on your roof or on a trailer as they increase aerodynamic drag and fuel use.

Keep Your Cool;

It's a Breeze: Roll down windows and use the flow through air vents when first getting into a hot car and generally when driving under 40 miles per hour (mph). Above 40 mph, air conditioning is more fuel efficient than open windows. Use the “recycle inside air” feature that reuses the cooled air inside the car and so doesn't take as much gas to run. Try to park in the shade or use a window heat reflector.

Use the Highest Gear Possible:

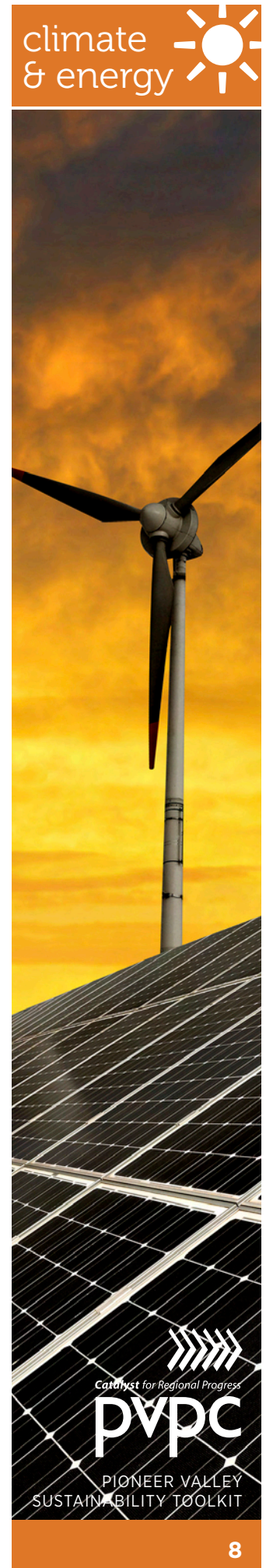
Use the highest gear, or overdrive, on highways if your car has this feature. This practice requires less power while reducing fuel consumption, emissions, and engine wear.

Drive the Posted Speed Limit or the Minimum Allowed:

Vehicle fuel consumption increases about 5% for every 5 mph driven above 60 mph. Overall savings in fuel costs from slower driving can range from 7% to 23%.

Avoid Rapid Starts & Stops and Maintain a Constant Speed:

Quick starts and hard stops can increase fuel use by up to 40% but reduce travel time by only 4%. Instead, accelerate gradually and coast up to stops where not prohibited. Conserve momentum; a steady speed often helps avoid red lights and keeps cars moving more efficiently. By driving sensibly, an individual can save 5% to 33% in city driving costs. The MassPike FAST LANE transponder will let you sail through road, tunnel, and bridge toll plazas in 12 Eastern states. High occupancy vehicle (HOV) lanes save time, fuel and hassle.



Avoid idling:

Idling gets zero mpg. Do not idle or race your engine to warm it up; the engine will warm up quicker when you are driving. If you need to idle, shift to neutral, so the engine is not working against your brake and consuming more fuel.

Optimize vehicle trips:

Schedule travel so that multiple tasks can be accomplished in one trip.

Read your Vehicle Owner's Manual & Follow the Recommended Maintenance Schedule:

Change engine oil with correct grade oil (1-2% mpg benefit), replace your clogged air filter (up to 10% mpg benefit), and tune your engine (4% average mpg benefit). Practicing routine maintenance on your car helps it last longer and run more efficiently.

Check Your Tire Pressure Monthly:

An estimated 25% of all vehicles are running on under inflated tires. Tire pressures change an average of 1 pound per square inch (psi), a common unit of pressure, for every 10°F change in air temperature and can deflate naturally up to 1.5 psi per month. Proper tire pressure is safer, extends tire life, reduces risk of a flat tire, and can improve mpg by up to 3%. You can purchase a tire pressure gauge for accurate readings, and check tire pressure when tires are cold (when not driven for at least 3 hours or for less than 1.5 miles).

Consider Purchasing Fuel-Efficient Tires:

“Lower rolling resistance” tires that can improve mileage are now available. Tire traction and handling characteristics for your car should be checked when considering these tires.

Tighten Your Fuel Tank Cap:

A loose, damaged, or missing fuel tank cap can cost you as much as 30 gallons of fuel a year. Unsecure or missing fuel caps can also lead to fuel contamination and engine malfunctions that can be costly.

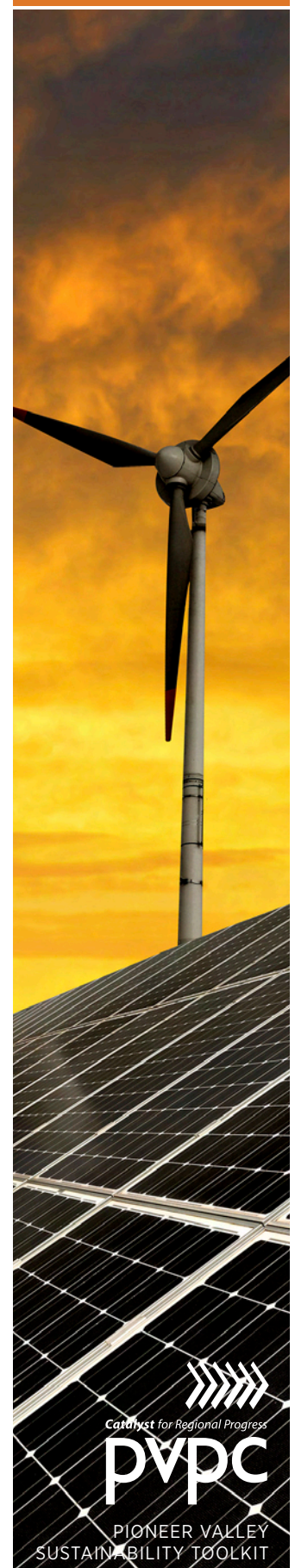
Learn More:

MASSACHUSETTS GAS SAVING TIPS:

[http://www.eot.state.ma.us/gastips/Learn to raise your fuel economy](http://www.eot.state.ma.us/gastips/Learn%20to%20raise%20your%20fuel%20economy)

FROM AN ONLINE COMMUNITY:

<http://www.cleanmpg.com/>

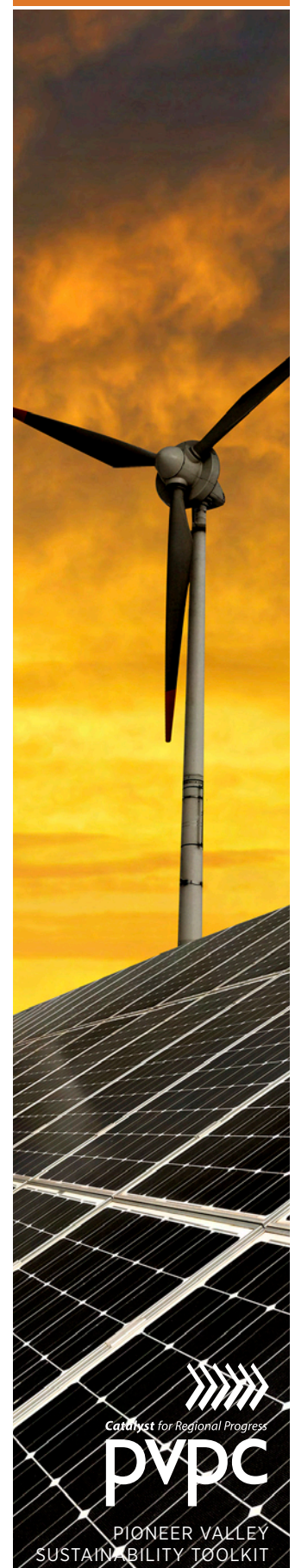


PURPOSE

Using alternative transportation such as biking, walking, vanpools or busses has many benefits. They include increased energy efficiency, reduced air pollution, money savings in automobile costs and individual health benefits.

WHAT TO DO:

- a. Bike or walk for short errands: According to the Alliance for Biking and Walking, 40% of all US trips generated in 2009 were shorter than two miles, yet 87% of those trips were made by car. It is recommended that adults get about 30 minutes of exercise per day, such as walking or biking. So the next time you only need to travel a mile or two, try biking or walking to save on gas and burn some calories instead! If you are a business owner, providing showers for those who bike to work provides incentives to continue biking.
- b. Use mass transit – The Pioneer Valley Transit Authority (PVTA) provides bus services as well as disabled and elderly services in the Pioneer Valley. Rides cost \$1.25 or less for the elderly and children. Taking the bus is much more cost and fuel efficient than driving alone in a car. The bus is also a good choice for longer trips. Other bus systems operate throughout the entire country and though it may take a little longer, taking the bus is almost always cheaper than flying and the climate impact is significantly less.
- c. Use carpools and vanpools: Carpoolers can save money on fuel, insurance, and car maintenance. The ability to use high occupancy vehicle (HOV) lanes often reduces commuter time spent in traffic. When they are not behind the wheel, carpoolers can read, nap, or chat, which is shown to reduce stress and improve health. Fewer cars on the road also means less air pollutants and less greenhouse gas emissions.
- d. Register with NuRides: Get rewards when you walk, bike, telecommute, carpool, vanpool, take a train, bus, or even work a compressed week. When you record trips with NuRide, it tallies the CO₂ you save and gives you points that are redeemable for real discounts at major national and local stores. There are currently 66,000 members and growing!
- e. Consider transit opportunities when deciding where you live and work: Living near your work, shopping, food stores, schools, and transportation systems saves time, money and pollution. Denser, multiuse development generally provides communities with less congestion, better accessibility to necessities and an increased sense of community.
- f. Use a car share program when you need an automobile: Choosing not to own a car is a viable option for people who live close to public transportation, but



sometimes it is necessary to drive just for a few hours or a day. “Car sharing” programs are incredibly easy and affordable. A frequent user of one car share program can report an average monthly savings of \$500 over owning a car. Car shares can be more affordable and friendly than taxis and can get you to destinations that public transportation sometimes can’t. They also help the commuters and the environment—each car share vehicle by taking takes an estimated 15 privatelypersonally- owned vehicles off of the road. For the infrequent driver, car shares can be the perfect solution.

- g. Allow employees to telecommute: Telecommuters are people who occasionally work from home and are connected to a business through various communication systems. This system can offer fuller employment by allowing parents or retirees a chance to work from home. It also reduces traffic congestion, energy use and greenhouse gases. For companies, it requires a different management style, but offers many benefits such as less sick days taken by employees, increased accountability for work and reduced overhead costs. Successful telework operations can save up to \$20,000 per employee per year.

LEARN MORE:

MASSRIDES REWARDS FOR COMMUTING ALTERNATIVES:

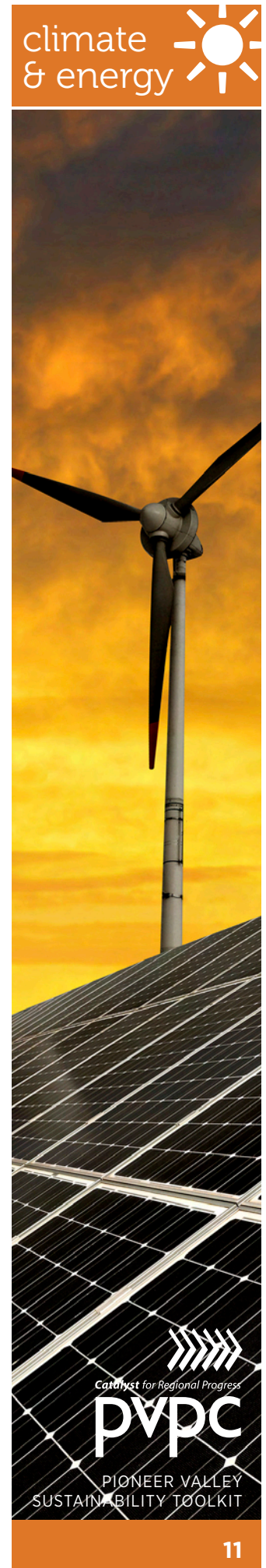
www.commute.com

NURIDE BENEFITS:

www.nuride.com

PIONEER VALLEY TRANSIT AUTHORITY:

www.pvta.com



pvpc

PIONEER VALLEY
SUSTAINABILITY TOOLKIT

PURPOSE

Conserving resources is a simple way to use less energy, reduce food and packaging waste in landfills, prevent water pollution and decrease fossil fuel consumption.

WHAT TO DO:

Understanding where waste occurs is the first step in conserving resources. Water, electricity, oil, and gas can all be wasted without a home or business owner's knowledge. Give these tips a try for a month and compare your energy usage. You will be surprised how much money and energy you save!

- a. Use less water:
 - i. Try installing a low-flow showerhead and low-flow toilets, or place a displacement object in your toilet's tank to reduce the water used with each flush.
 - ii. Wash clothes in cold or warm water instead of hot. This can save 850 pounds of carbon dioxide savings from entering the atmosphere each year.
 - iii. In your garden, plant vegetation that doesn't require a lot of water. Locally found vegetation is a great choice because it is used to surviving with your climate and water availability.
 - iv. Shut off the faucet while you brush your teeth.
 - v. If you own a pet, wash them outside where the waste water can be used to water the lawn.
- b. Be aware of phantom loads: 5-10% of American energy use is a result of electronic devices using electricity while they are off or in standby mode. Even if some appliances are powered off, they can still draw power and cost you money! To reduce this "phantom load", unplug appliances you don't use frequently, and put those you do on a power strip or "smart" strip (image on right). That way, you can turn them off easily at night or when you don't need them. For businesses, make sure computers are completely off at the end of the day.
- c. Insulate your water heater: Wrap an insulation blanket around your water heater to save 10% of energy used by this appliance. While you're at it, set the unit's thermostat to no higher than 120 degrees Fahrenheit. Any temperature higher than this is a waste of energy.
- d. Adjust your thermostat: Buttoning up instead of raising the heat can have significant money savings, since heating and cooling account for half of all energy use at home. Set your thermostat 2 degrees Fahrenheit lower in winter



and 2 degrees higher in summer.

- e. Recycle: Reuse products as much as possible, and when it's time to dispose of them – recycle! Most products – cell phones, clothing, batteries, light bulbs, computers, other large appliances and even paint can be responsibly recycled. Many programs take electronics for free and some even pay you for your used electronics! Earth911.com provides lists of local recycling centers for all products, making it easy to find a place to dispose of your unwanted items.
- f. Practice cooking and ordering the right amount of food: Approximately 11.2% of all trash thrown in landfills in America is wasted food. Combined it is enough food to feed the 1 billion hungry people on the planet! This waste depletes natural resources, raises the cost of food and contributes to pollution. Practice cooking the right amount and not wasting any food. Compost leftover food and use it to fertilize your garden. The environment and your pocket will thank you.

LEARN MORE:

FIND RECYCLING CENTERS:

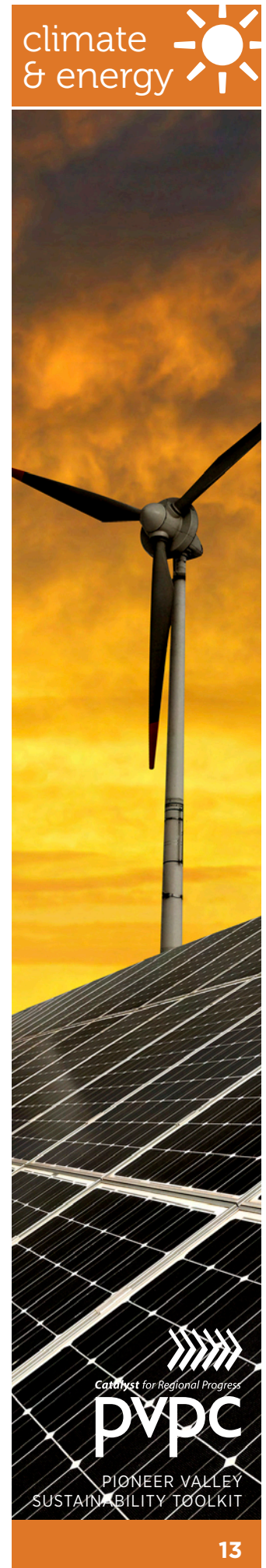
<http://earth911.com/>

HOW TO MEASURE ACCURATE PORTIONS:

http://www.lovefoodhatewaste.com/perfect_portions

LEARN ABOUT RECYCLING FROM THE MASS DEP:

<http://www.mass.gov/dep/recycle/reduce/recyclin.htm>




Catalyst for Regional Progress

pvpc

PIONEER VALLEY
SUSTAINABILITY TOOLKIT

PURPOSE

As a consumer, you have the power to “vote with your wallet”. Purchasing eco-friendly products has a direct impact on what and how consumer products are produced. When buying goods, understanding how it is made and what it contains can protect your health and the health of the environment.

WHAT TO DO:

- a. Avoid products with excessive packaging: Avoiding products with extra Styrofoam, cardboard or plastic wrap can reduce the amount of trash you need to recycle or throw away by 10%.
- b. Bring your own shopping bag: Choosing between paper and plastic at the grocery store is usually a lose-lose situation. In an average year, a grocery store uses 86,000 trees in paper bags. Although plastic can be recycled, in reality less than 3% of all bags get to the recycling plant. Keep reusable shopping bags in your purse or car. Many stores have incentive programs for shoppers who bring their own bags. You can save a little money while saving trees!
- c. Buy local food: Purchasing in season, organic or locally grown foods can be healthier for you, your local economy and the environment. In today’s globalized food market the average product travels 1,200 miles from farm to shelf. Fossil fuels are wasted in the transportation of these items. By purchasing organic food from local vendors, you keep money within the community which benefits everyone in the long run by boosting the economy, decreasing pollution and reducing chemicals used in conventional food production.
- d. Explore close to home: Air travel is more popular than ever and fuel prices have made it increasingly expensive. Try taking a bus or train and explore the regions near where you live. If it is necessary to fly, offset the carbon released by flying through a carbon offset program.
- e. Purchase more efficient vehicle: When replacing your car, choose a more fuel-efficient vehicle. If you are in the market for a new or used car, buy the most fuel-efficient one that will meet your family’s needs. Miles per Gallon (mpg) ratings for all new cars can be found at: www.fueleconomy.gov. No matter what size vehicle you need, you can save a lot of gas by choosing one of the models with the best mileage ratings. For example, if gas costs \$3 a gallon and you drive 15,000 miles a year, you could save \$1,300 a year by buying a 26 mpg mid-size car rather than a 15 mpg sports utility vehicle (SUV).

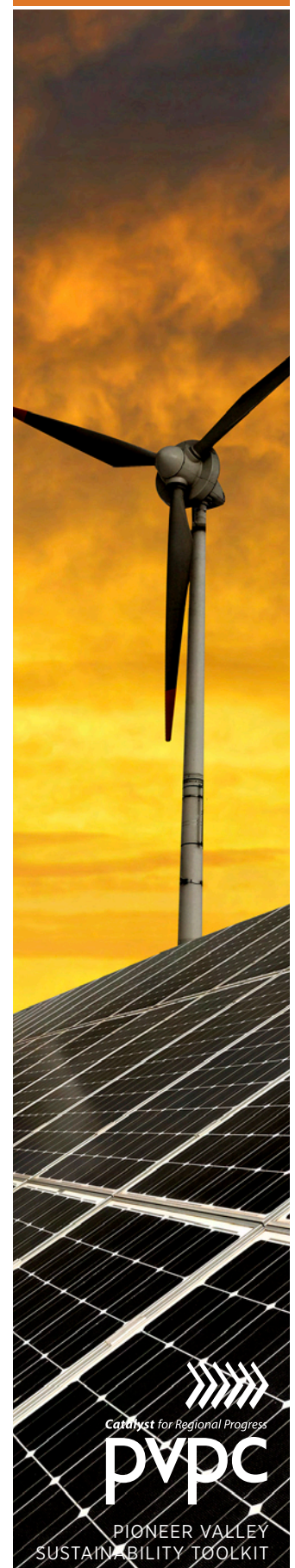
LEARN MORE:

WHAT IS LOCAL FOOD?:

<http://www.sustainabletable.org/issues/eatlocal/>

HOW TO OFFSET YOUR CARBON FOOTPRINT:

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



PURPOSE

A The health of the environment largely impacts human health. Planting gardens and trees, reducing chemical waste and picking up trash are easy ways to keep your community beautiful and clean for this and future generations to come.

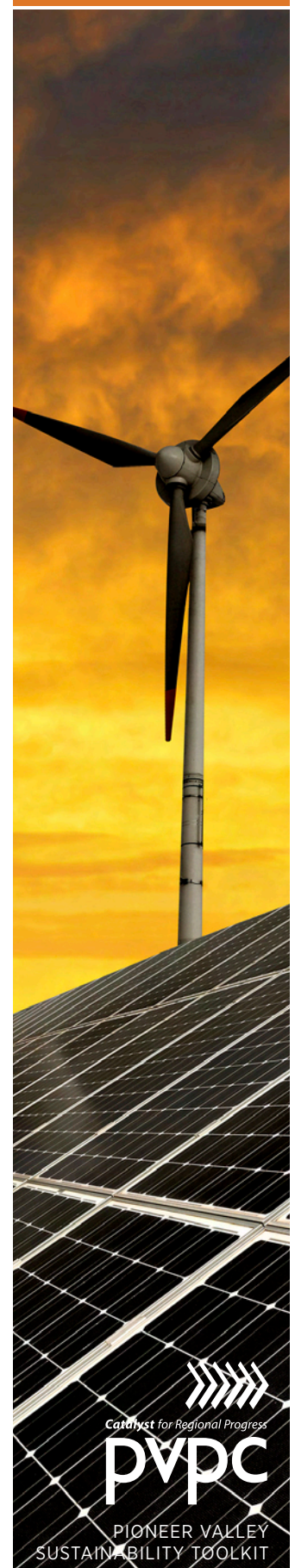
WHAT TO DO:

- a. **Plant trees:** Trees are the earth’s air filters. Areas with more trees see increased economic, social and environmental benefits. According to the Massachusetts Department of Conservation and Recreation, these benefits include decreased energy costs due to shading as well as improved air quality for residents. Vegetation provides a sense of place as well as community valuation. More trees are shown to increase revenue from tourism from fall foliage viewing, as well as raise property values and revenue through taxes by 7-10%. Moreover, plantings can reduce storm water runoff and decrease the likelihood of flooding. Fruit and nut bearing trees can provide food to communities while beautifying the city streets.
- b. **Re-use Gray Waters:** Gray water is any wash water used inside the home (excluding toilets) as well as collected rain water. These sources account for 50-80% of residential “waste” water that usually either runs off into rivers or is directed to a waste water treatment plant. This water is safe to use for other purposes such as toilet flushing, or landscape irrigation. A grey water system collects this water and passes it through an advanced filtration system. Once filtered, it is reused by pumping it into your garden or lawn or directly into the bathroom where it can be used to flush toilets. Increasing gray water usage lowers fresh water use, reduces strain on septic tanks or treatments plants and reclaims nutrients lost in the water. These measures reduce storm water and waste water volumes and lower the chance of flooding within these systems. Moreover, installing a gray water system is incredibly safe – there has never been a case of gray water illness of 22 million users in the US.
- c. **Reduce chemical use:** Harmful chemicals are around us every day, but we often don’t realize their health effects. Use environmentally- sensitive chemicals to clean your house such as those with the “Green Seal” third party standard rating. Time-tested products such as baking soda and vinegar are safe and inexpensive ways to clean your home. Be careful to not to put spill oils and or chemicals into onto the streets because they end up polluting rivers and streams. Consider organic fertilizing fertilizers rather than chemical fertilizing fertilizers and eliminate pesticide use on your lawn. It is much healthier for your lawn, your family and even your pets, who have a greater exposure risk to chemicals.

LEARN MORE:

EPA FACTSHEETS ABOUT COMMON HOUSEHOLD CHEMICALS:

<http://www.epa.gov/chemfact/>



PURPOSE

Knowledge is empowering! Continue your education about ways to fight climate change and help others learn about their environment as well.

WHAT TO DO:

- a. Calculate your carbon footprint: It's hard to change if you don't know where to start. Calculate your personal or household impact on climate change by using the Nature Conservancy Carbon Footprint Calculator at: <http://www.nature.org/greenliving/carboncalculator/>. Find out how your home electricity use and transportation choices affect air quality and global climate change with the EPA Power Profiler found at: <http://www.epa.gov/cleanenergy/energy-and-you/how-clean.html>.
- b. Attend town meetings: Make yourself heard in your local community. Voice concerns about environmental problems and offer solutions to mitigating climate change on a local level such as implementing recommendations found in this toolkit.
- c. Educate yourself and others about energy efficiency: Teach your children, family and friends about the importance of protecting our environment. The world we create now has all the air, water and food we and our children will consume for generations to come. Do your part in protecting it and helping others learn how to as well.
- d. Get the word out about MassSave.com: Tell you neighbors about the free energy audit that Massachusetts utilities offer. They might want to know that they can get renewable energy too!
- e. Share this Toolkit with others: Email, call or use social media to tell others about how much you saved by making simple changes. By encouraging others to modify behaviors, larger change is possible!
- f. Visit www.SustainableKnowledgeCorridor.org for more information on sustainability and learn about the projects that are happening right here in the Pioneer Valley to make our communities more sustainable.

FOR MORE INFORMATION, PLEASE CONTACT

Pioneer Valley Planning Commission
413-781-6045

60 Congress Street, Floor 1
Springfield, MA 01104-3419

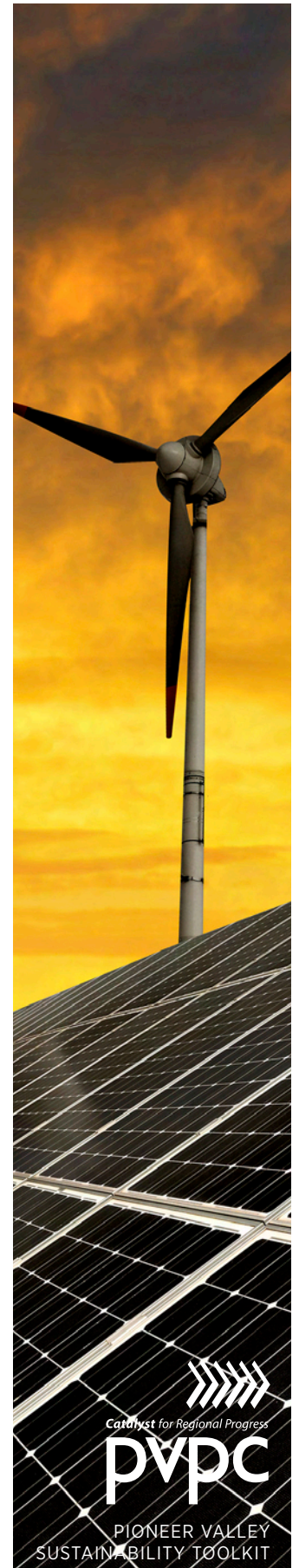
www.pvpc.org

Sustainable Landscaping & Tree Preservation Standards

PURPOSE

To promote landscaping around development that is compatible with the existing environment, and which reduces greenhouse gas emissions by requiring a minimal use of energy and natural resources for growth and maintenance. To mitigate climate change through the planting of new trees, preservation of undeveloped space, and protection of larger and special interest trees in new developments.

Ordinances that protect trees and encourage the planting of native, non-invasive vegetation help to reduce greenhouse gasses and mitigate climate change. Native vegetation requires fewer resources to grow because water and nutrient needs are already in line with that provided by the surrounding weather and climate. Mature trees require less maintenance which also makes them more energy efficient. Additionally, trees and vegetation absorb carbon dioxide and reduce the urban heat island effect.



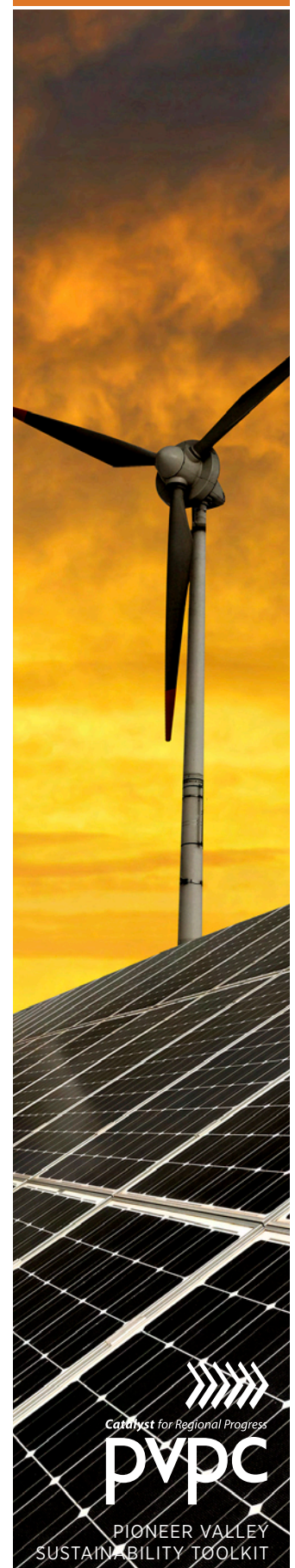
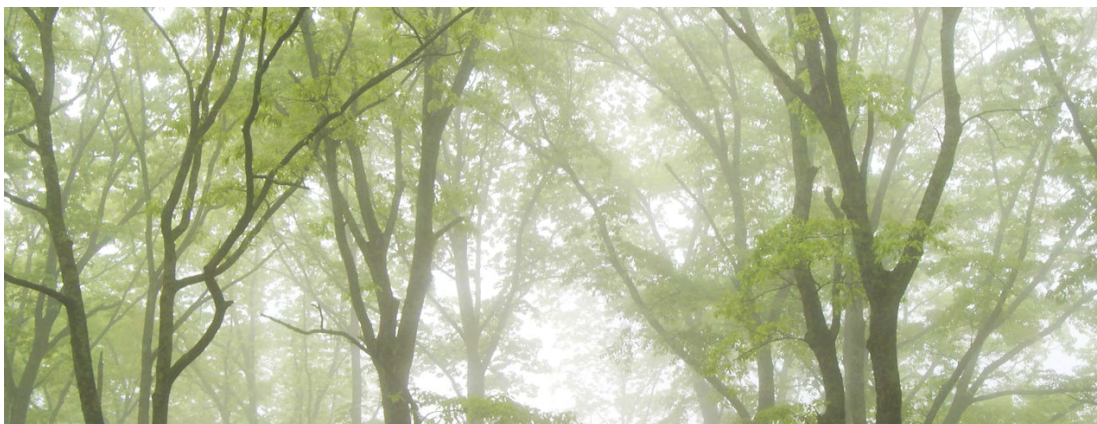
Due to time and cost factors, the construction of new development often involves the clearing and grading of land rather than retention of native vegetation and trees. This large-scale clearing and grading has several negative effects, including increased stormwater runoff, reduced water quality, threatened wildlife habitat, and a decline in aesthetic appeal. Additionally, even when newly planted trees grow to maturity, they often do not provide the same level of structural diversity and other benefits to wildlife that the original tree canopy offered.

HOW IT WORKS

An ordinance can be implemented to control large-scale clearing and grading of vegetation, as well as encourage protection of the tree canopy during the development process. Effective implementation of these regulations consists of several elements:

- » Defining and enacting an ordinance regarding the protection and types of trees and vegetation
- » Setting out a pre-development procedure for protecting trees and vegetation
- » Providing a means for compensatory mitigation where trees and vegetation cannot be retained on-site
- » Verifying and enforcing compliance with regulations after new developments are completed

Municipalities should consult with their staff and residents to determine what specific requirements are to be enacted. The language in the bylaw should carry provisions for the types of vegetation and trees allowed, the maximum number or percentage of trees and vegetation that can be removed, and construction best practices that can help reduce damage to existing trees during development. Other protections may also be put in place targeting trees that are determined to have special significance because of their history, age, or size.



Pre-development requirements establish what a potential developer must submit prior to receiving approval from the municipality. These requirements can be incorporated into the building permit application directly, or as a required accompanying application document such as a landscape protection plan or forest preservation plan. The application or plan should include information about the location of trees and vegetation on site, their size and species, and what actions will be undertaken to ensure their protection. Requiring that this information be provided before development begins allows the municipality to strictly enforce its regulations.

In cases where it is deemed impossible or inappropriate to keep trees and tree cover intact, or when it is deemed acceptable by the municipality to limit the protection of individual trees or tree cover, regulations should provide for an alternative method of compliance. Once again, these alternative methods can be incorporated into the existing building permit application or landscape protection plan, as set forth in the tree ordinance. Alternative compliance methods include planting trees on site after construction has concluded, placement of cash value for trees lost in a municipal account for street tree planting, or addition of other green initiatives that closely match the benefits of keeping the tree cover on site such as green roofing, green walls, rain gardens, or bio swales.

Once the building permit application or landscape protection plan has been approved through either direct compliance or mitigation methods, development can occur. To ensure compliance, post-development monitoring is necessary. The monitoring can incorporate the information collected prior to development and compare it to the post-development conditions existing on-site. Depending on the language in the bylaw, enforcement might be the responsibility of the zoning inspector, building inspector, or a tree board.

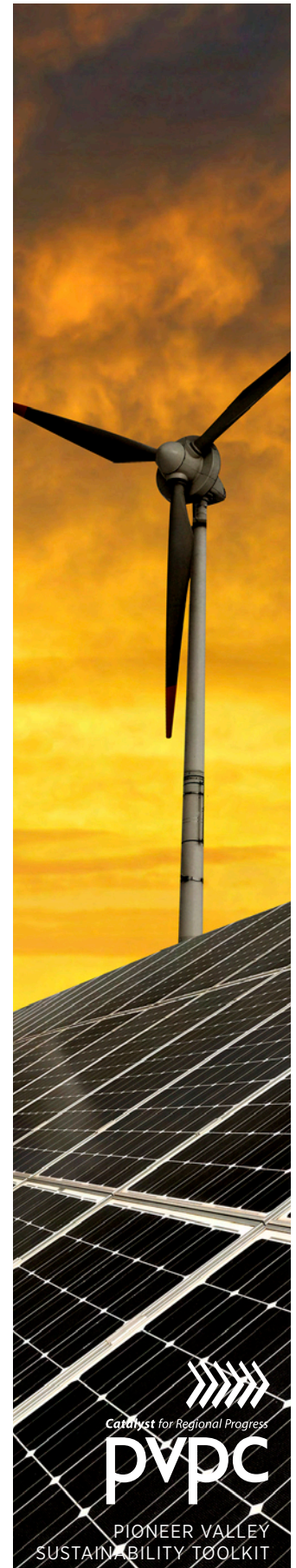
EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED:

Carroll County, Maryland

The Carroll County Forest Conservation Ordinance requires Forest Stand Delineations and Forest Protection Plans to accompany development applications. In addition, the ordinance requires reforestation activities to accompany any type of land development. Except in agricultural districts, the ordinance specifically requires one acre of forest to be planted for every acre removed. The ordinance also designates priority areas for reforestation, (i.e., stream buffers, wildlife corridors, steep slopes, etc.).

Chapel Hill, North Carolina

The Chapel Hill Tree Protection Ordinance requires applicants for a development permit to submit a Landscape Protection Plan that details how preservation of specimen and rare trees and significant tree stands will occur. In addition, as part of its carbon reduction strategy, the Town is considering revisions to the ordinance that will require no net loss of



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PIONEER VALLEY SUSTAINABILITY TOOLKIT

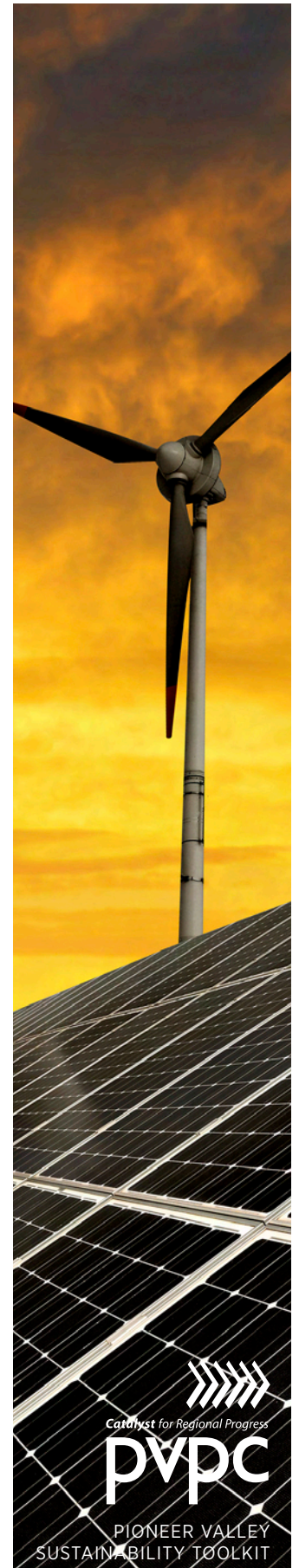
the canopy cover and an increase in trees proportional to population growth.

Amesbury, Massachusetts

The Amesbury Tree Ordinance sets out regulations concerning trees along streets and public parks. The ordinance includes a list of approved tree species, regulations for how much pruning and cutting can be performed, and provisions for the establishment of a three-person Town Tree Board. The Tree Board is charged with administering a written plan for the care and maintenance of public trees. The ordinance also includes requirements for a minimum of twenty foot spacing between smaller trees and forty foot spacing between large trees.

Lexington, Massachusetts

Lexington passed a tree ordinance in 2001 which included the creation of a tree committee and provisions requiring the protection of trees during major construction. The ordinance was followed up by additional tree and landscaping protection efforts through a Tree Management Manual, created in 2003 and updated in 2009. The Tree Management Manual covers a variety of topics directed towards the preservation and cultivation of healthy trees, including guidelines for the protection of trees during site construction, priority locations for where trees should be planted so that they will grow successfully, and maintenance specifications.



LINKS TO MODEL BYLAWS OR MORE INFORMATION

CARROLL COUNTY:

http://townhall.townofchapelhill.org/agendas/2007/02/12/4c/4c-2_lumo_excerpts.htm

CHAPEL HILL:

<http://ccgovernment.carr.org/ccg/resmgmt/forconsmanual.pdf>

AMESBURY:

<http://www.mass.gov/dcr/stewardship/forestry/urban/docs/ordames.pdf>

LEXINGTON TREE MANAGEMENT MANUAL:

<http://ci.lexington.ma.us/committees/tree/TreeManualRevised2009%20much%20smaller.pdf>

PVPC HAS DEVELOPED MODEL BYLAW “GREEN DEVELOPMENT PERFORMANCE STANDARDS” WHICH ADDRESS THE CONCEPT OF SUSTAINABLE LANDSCAPING AND TREE PRESERVATION:

http://www.pvpc.org/val_vision/html/toolbox/index.html

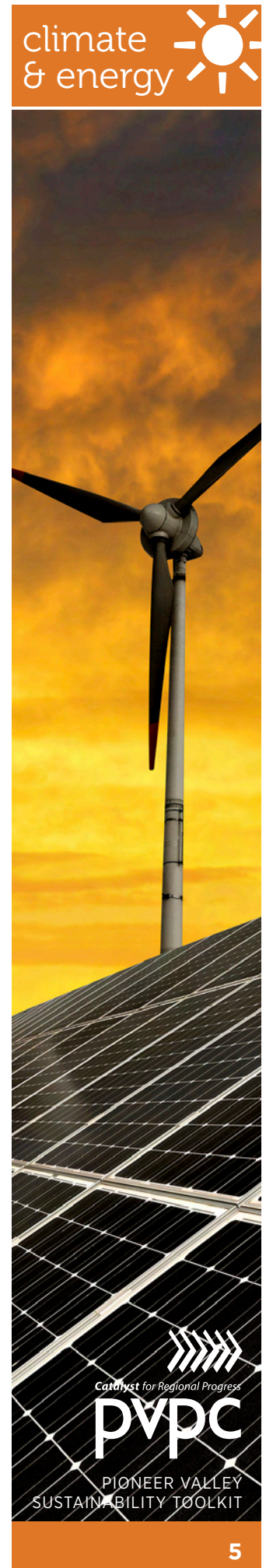
FOR MORE INFORMATION, PLEASE CONTACT

Pioneer Valley Planning Commission

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www.pvpc.org



Tax Incentives Solar & Clean Energy

PURPOSE

To encourage the wider and more rapid purchase and installation of clean energy generation and energy conservation measures by providing income tax credits to individuals and businesses.

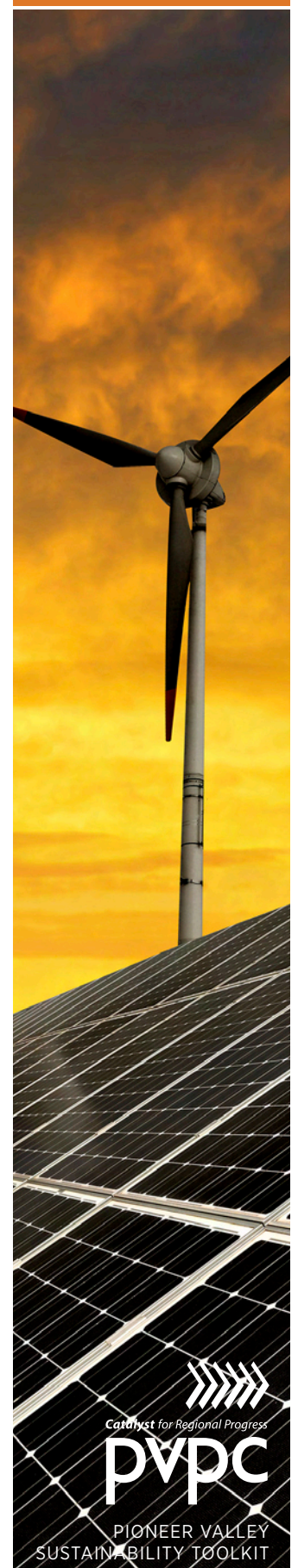
THE BASICS

Many states now offer credits to reduce state income and business taxes that help offset the initial costs of purchasing and installing clean energy generation equipment and energy conservation measures. This credit functions as a subsidy that helps shorten the “payback” period for the start-up cost of clean energy equipment. Consumers begin to realize the savings over conventional energy systems sooner—often within three to five years, and sometimes immediately.

CLEAN ENERGY TAX INCENTIVES IN MASSACHUSETTS

The Massachusetts Residential Renewable Energy Income Tax Credit offers a 15% credit, up to \$1,000, off a person’s state income tax if they buy and/or install a renewable energy system for their primary residence (renters are eligible, too). Products that are eligible for this credit include solar hot water, high efficiency heat pumps, solar photovoltaic (PV) and wind-energy systems. Energy efficiency measures for new and retrofitted buildings are also eligible, including insulation, air sealing, window replacement and other measures to save energy.

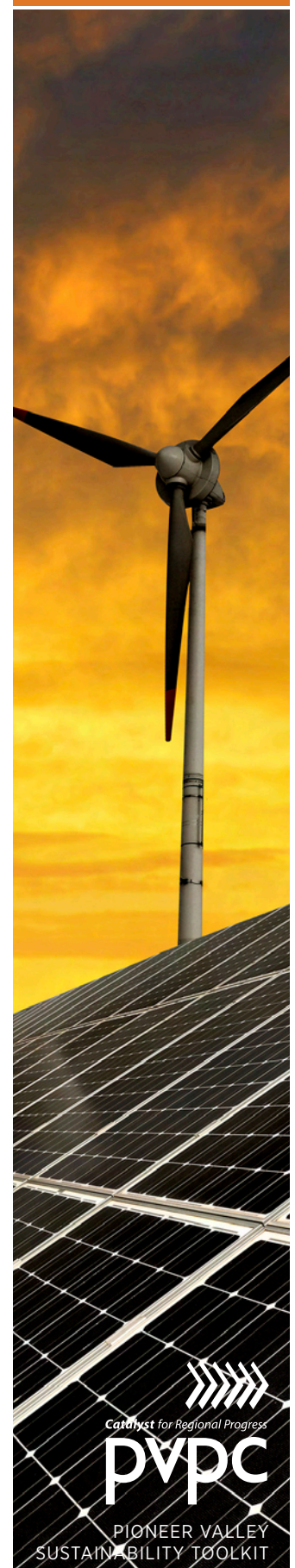
For example, a person who has extra insulation blown into their attic and walls for a typical cost of \$2,000 would see their state income tax bill reduced by \$300 (15% of \$2,000). If a person purchases and installs a rooftop solar PV system (which can cost between \$15,000 and \$30,000), he or she would receive the maximum tax credit of \$1,000. If the person’s tax credit is greater than their total tax bill for the year the system is installed, then the extra savings can be carried forward and spread out for up to three years.



Businesses have an additional benefit available to them: Massachusetts law (M.G.L. Chapter 63, Section 38H) exempts 100% of any “solar or wind powered climatic control unit and any solar or wind powered water heating unit” or any other unit or system powered by solar or wind from corporate excise tax for the length of the system’s depreciation period. Corporations that install qualifying solar or wind units can exempt the value of the unit from the overall property valuation used to assess the corporate excise tax.

FEDERAL CLEAN ENERGY TAX INCENTIVES

The U.S. government also offers tax credits or deductions for individuals and businesses that invest in renewable energy or energy efficiency. Individuals can receive up to \$500 in federal income tax credits for “Energy Star” certified energy efficient equipment, including biomass stoves, HVAC, insulation, roofs, water heaters, windows and doors, geothermal heat pumps, small wind turbines, and solar energy systems. And both individuals and businesses can earn up to a 30% tax credit on renewable energy generation equipment purchases, such as solar panels, heat pumps and wind turbines.



LINKS TO MORE INFORMATION

MASSACHUSETTS RESIDENTIAL CREDITS:

<http://www.mass.gov/legis/laws/mgl/62-6.htm>

MASSACHUSETTS CORPORATE CREDITS:

<http://www.mass.gov/legis/laws/mgl/63-38h.htm>

FEDERAL INCENTIVES FOR CLEAN ENERGY:

www.dsireusa.org

FOR MORE INFORMATION, PLEASE CONTACT

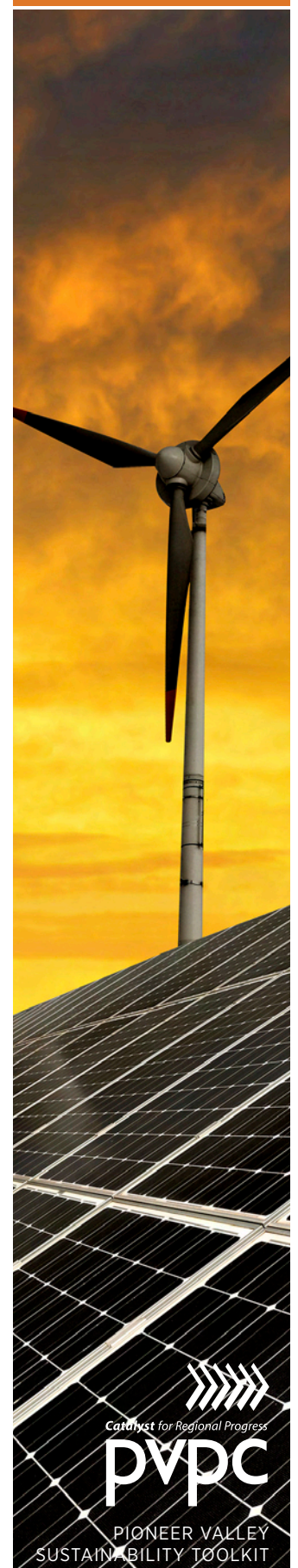
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Traffic Signals

PURPOSE

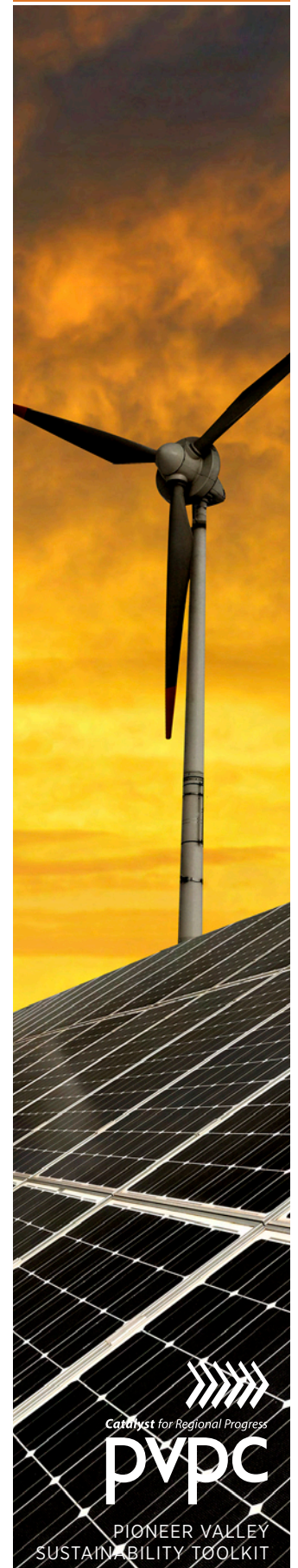
To reduce energy use and municipal utility bills by replacing inefficient traffic signals with very efficient Light Emitting Diode (LED) lighting.

HOW IT WORKS

New LED traffic signals consume 80 to 90 percent less energy and last up to six to eight times longer than traditional incandescent signals. Initial purchase cost for LEDs are much higher than incandescent, fluorescent, compact fluorescent, or other electric light sources. However, monetary savings come in the form of lower utility bill and saved labor for replacement and maintenance of traditional incandescent signals. How to pay for this? Options include grants (see below) and incremental purchases as light replacements are needed.

EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED

Easthampton, MA decided to replace over 400 street lights with LED high-efficiency street lights in 2011 to conserve energy as well as save money on annual maintenance and operating costs. The City estimated that the LED streetlights would save the city an estimated \$23,700 in energy bills and \$13,000 in maintenance costs each year. Easthampton was the first municipality in western Massachusetts to use the Green Communities Grant to create a large-scale installation of LED street lighting. The Mayor of Easthampton noted that the LED bulbs not only are more energy efficient but they also cause less light pollution and will last 10 to 15 years longer. The total cost of this project was \$223,000 of which all but \$300 was covered by grant funding from the Massachusetts Green Communities Program (\$170,000) and from the Western Massachusetts Electric Company (\$52,700).





Weymouth, MA is among the many communities statewide that recently changed its traffic signals to LED lighting. The town's Economic Development Planner estimates that the switch to LED will reduce energy use by 85 percent and maintenance by 50 percent. Weymouth also received grant funding through the Green Communities Program.

LINKS TO MORE INFORMATION

CITY OF EASTHAMPTON, MA, DEPARTMENT OF PUBLIC WORKS

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

MASSACHUSETTS GREEN COMMUNITIES PROGRAM:

<http://www.mass.gov/?pageID=e0eeesubtopic&L=3&LO=Home&L1=Energy%2C+Utilities+%26+Clean+Technologies&L2=Green+Communities&sid=E0eea>

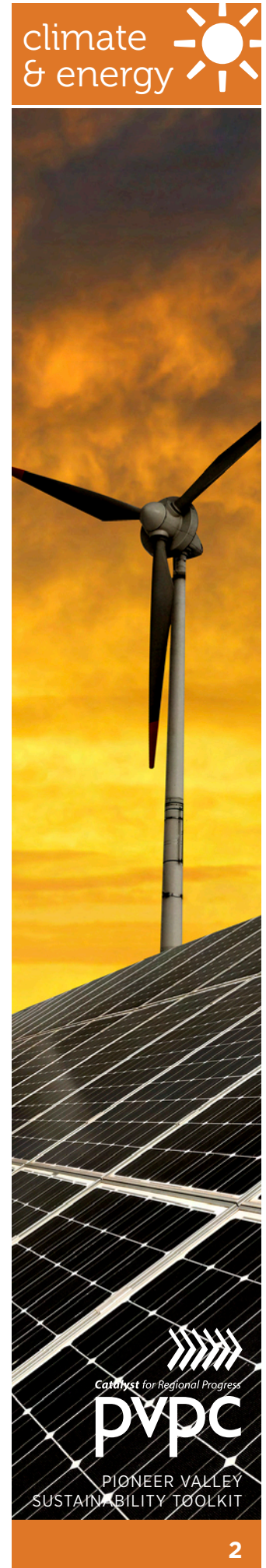
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Transfer of Development Rights For GHG Reduction

PURPOSE

To provide bonus densities for developers in and around existing town and city centers, requiring in exchange, that the development include transit, bicycle and pedestrian amenities, as well as on-site workforce housing. Increased density reduces vehicle miles travelled, resulting in reduced greenhouse gas emissions.

HOW IT WORKS

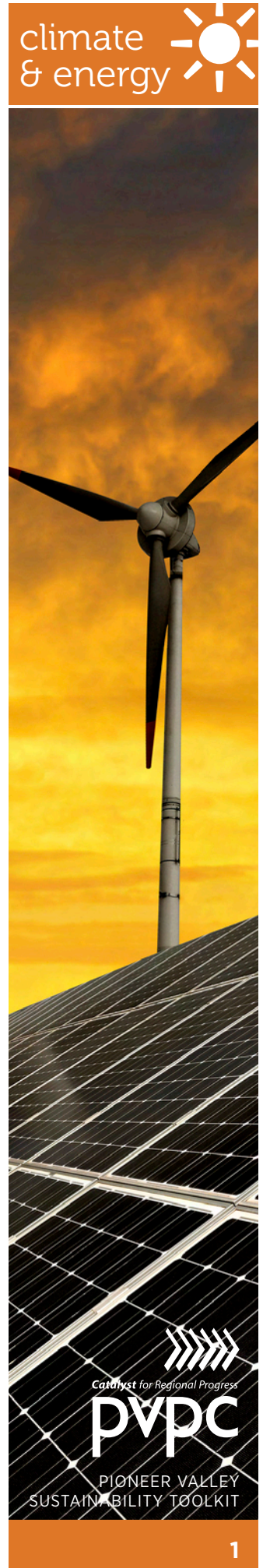
Transfer of Development Rights (TDR) is a planning tool that can protect important habitats and ecosystems while promoting economic growth and denser development in less sensitive areas.

Most TDR programs designate a “Sending Area” and a “Receiving Area” with established boundaries. Sending Areas can include the community’s priority areas for land protection, such as farmlands, river corridors, water supply areas and wildlife habitat areas. Receiving Areas can include areas designated by the community to receive higher density development, such as areas in and around city/town centers, designated

SENDING



RECEIVING




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growth centers, areas served by existing infrastructure/transit and brownfields ready for redevelopment. The TDR program enables landowners in the sending area to sell development rights to landowners or developers in the receiving area.

The TDR process uses a Special Permit from the Planning Board for all TDR transactions. Applicants are developers of land in “Receiving Areas” seeking additional density or reduced lot size, parking, or height requirements. Applicants must identify a willing seller of development rights in the “Sending Area”. They must file development plans for both the Sending Area and Receiving Area parcels affected. The plans must illustrate the lots to be transferred from the Sending Area, and the lots to be created or increased density or reduced parking proposed in the Receiving Area. The Planning Board reviews the Special Permit application and approves or denies the application based on detailed criteria in the ordinance.

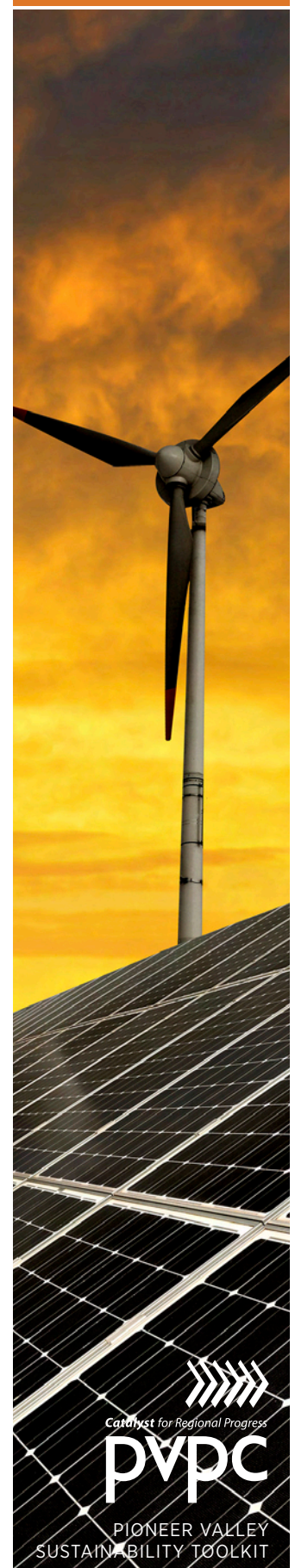
In some cases, TDR bylaws/ordinances are set up to enable developers to make cash payments, equal to the value of needed development rights, to the city/town in lieu of purchasing development rights from another landowner. This option simplifies the TDR process for developers and enables more participation in the program. Communities then use the cash payments to either buy development rights directly for priority parcels, or leverage state/federal funds to make larger purchases.

While TDR has been used extensively across the United States to preserve farmland, its use to reduce greenhouse gas emissions has little track record to date. The King County, Washington TDR program described below is one area where this approach is proposed.

EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED

Pioneer Valley Region: The Pioneer Valley Planning Commission has a model TDR bylaw/ordinance that is unique in the United States, in that it enables the transfer of development rights from farmland to commercial or industrial properties. The PVPC model has been adopted, to date, in three communities: Hadley, Easthampton and Westfield, Massachusetts. In Hadley, the TDR bylaw has been particularly effective, and has resulted in the payment of \$338,000 in TDR cash payments to the town, which have in turn leveraged \$3.8 million in state/federal funds, and used to preserve nine farms and 239 acres of important farmland.

King County, Washington: This TDR program has been very effective and has preserved 92,000 acres of valuable open space and fish and wildlife habitat since 2000. The county has provided increased housing and infrastructure improvements in urban areas around the county’s municipalities. The newly adopted 2008 King County Comprehensive Plan stipulates that TDRs are an option available to developers to mitigate for project-related



greenhouse gas (GHG) emissions that exceed a set threshold. That is, developers who use TDRs for increased density can also capture the GHG reducing benefits that TDRs create to meet emission reduction requirements. The requirements, which are forthcoming in 2009, will be in accordance with the State Environmental Policy Act. The idea is that TDRs carry with them a GHG reduction “value” which is based on the vehicle miles that will not be traveled as a result of restricting future development on rural TDR sending sites and relocating the development potential onto projects within existing urban areas – areas known to require less driving and commuting.

Montgomery County, Maryland: This TDR program was established to preserve farmland and curb sprawl originating from Washington D.C. The county has promoted development in areas that are readily served by public services such as transportation, wastewater, and public water supply. Montgomery County is touted as having one of the most successful TDR programs in the nation. Since its inception in 1980, the county has protected over 50,000 acres of farmland and open space. Montgomery County’s achievement is due in large part to its success in forming a market for development rights.

LINKS TO MODEL BYLAWS OR MORE INFORMATION

PIONEER VALLEY PLANNING COMMISSION:

http://www.pvpc.org/val_vision/html/toolbox/index.html

KING COUNTY, WASHINGTON TDR PROGRAM:

See <http://dnr.metrokc.gov/wlr/tdr/>.

MONTGOMERY COUNTY, MARYLAND PROGRAM:

www.mcpcandplanning.org/community/plan_areas/rural_area/planning_process/about_the_process/tdr.shtm

FOR MORE INFORMATION, PLEASE CONTACT

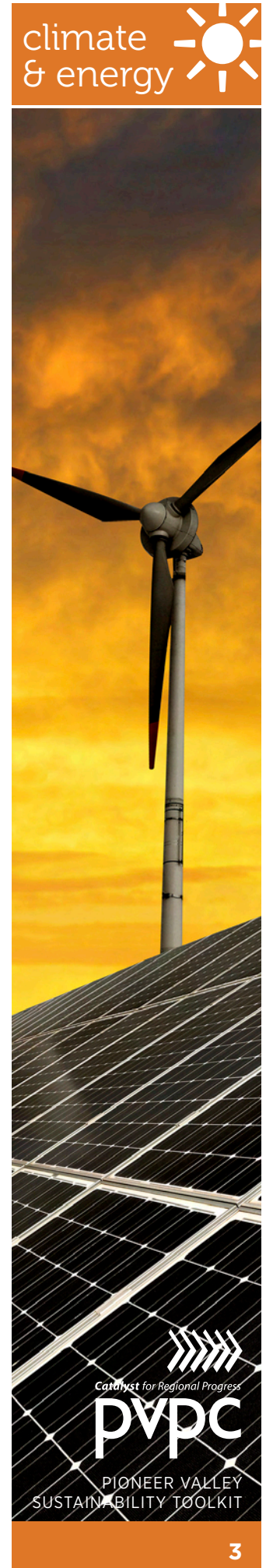
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Transit Oriented Development

PURPOSE

To encourage a vibrant mix of residential, retail and commercial development and activities within walking distance of public transportation hubs.

Transit-oriented development (TOD) has been around a long time. Since the colonial era, our homes, shops, eating establishments, businesses, and work places have tended to be grouped within walking distance of ports, roads, trolley lines and train stations. It's only since the 1950s that an automobile-centric approach to development and zoning has largely reshaped communities and made it virtually impossible for many people to live without using a car for every trip they make.

But in recent years, many communities have begun to re-discover the benefits of encouraging the location of more people and jobs near transportation nodes. By returning to our TOD tradition in development patterns, communities are increasing the home values and walkability of their neighborhoods. TOD neighborhoods often include multifamily homes, parks, cafes, restaurants and civic gathering spaces, helping to strengthen the social and economic fabric of the community. These kinds of housing choices and neighborhoods are very appealing to retiring Baby Boomers (ages 55+) and the upcoming Millennials (ages 21 to 35), many of whom are seeking alternatives to single-family suburban homes on large lots.

Although most TOD districts are built around a transit or bus station, not every TOD district requires one. What is required are a walkable environment and multiple transportation options—especially public transit that is frequent, reliable, and easy to use.

HOW TOD ZONING WORKS

Transit-oriented development (TOD) zoning involves updates to local bylaws or ordinances to give property owners near transit stations greater flexibility to create homes and commercial buildings that are responsive to market demands and create high-quality pedestrian environments that encourage walking and transit use. This can be accomplished by: 1) establishing a new base zoning district with TOD-supporting performance standards; 2) adding TOD standards to an existing zoning base district; or 3) creating (or modifying an existing) overlay district to include TOD standards.

Geographically, a TOD district usually focuses on an area that is within a 5- to 10-minute walk of a transit station, usually ¼ to ½ mile. Critical to the success of a TOD district are dimensional and density standards that foster more compact and fully built-out development near transit—and yet are compatible with the general existing neighborhood context. For example, a residential density of 25 to 40 units per acre (or more) is typically desirable in a downtown TOD neighborhood with high-capacity subways and/or light rail, but 12-15 units per acre may be more appropriate for a village TOD center served by commuter rail. Similarly, building heights, floor-area ratios, setbacks, lot coverage and other standards should encourage greater density while preserving what people like about the existing neighborhood.

TOD: A MIX OF USES

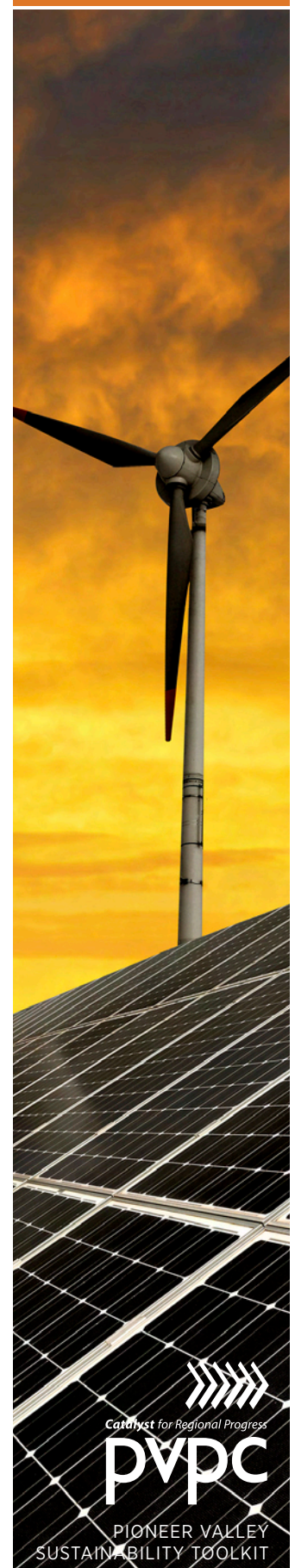
A diverse mix of residential and commercial uses is also desired in TOD districts. The optimal mix depends a lot on the station area context, whether it is a busy downtown area, a suburban location, or even small town center. Typical uses to consider include:

- » **Multi-family homes (townhouses or apartment buildings with at least 3 units)**
- » **Live-work units (in which some occupants are also employed by a business also on the premises)**
- » **Grocery stores**
- » **Restaurants, cafes and bars**

Uses that involve less efficient land use are not usually desirable in a TOD district and include auto sales, large parking lots (more than 50 spaces), mall-style shopping centers, drive-through restaurants and large-scale industry (though some types of manufacturing facilities may be a good fit).

Attractive street design is an important consideration for TOD zoning. Every attempt should be made to improve the safety and appeal of the pedestrian environment by minimizing curb cuts, requiring street-facing windows and entrances on buildings, specifying adequate sidewalk widths, allowing sidewalk café seating, locating parking at the side or rear of buildings, and using other complete streets techniques.

The issue of parking is critical to TOD districts. In many cases, a community will want to consider setting maximum parking limits in a TOD district, rather than minimum parking requirements for various types of uses. This approach relies more on developers' knowledge of parking needs for their respective uses, and can effectively reduce the amount of land that is devoted to autos. Strategies for meeting parking demand in TOD districts include shared parking among residential and commercial/office uses (residents park in the spaces during the evenings; shoppers or office workers during the day); credit for available underutilized on-street spaces; setting an appropriate price for



public parking; neighborhood parking permit systems; and developing public parking—especially parking garages.

ENGAGING STAKEHOLDERS

As with other zoning update process, it is important that community stakeholders participate. While TOD is actually a historically well-established development pattern, reaching community consensus about the best regulations and standards for TOD in your community can be challenging—especially because of the emphasis it places on pedestrian and transit access, versus the private automobile. It's also important to understand the existing and potential market for real estate development in the future district; can the market support the densities and uses needed to make TOD succeed? Therefore, it is strongly recommended that any TOD zoning effort include the participation of a local advisory committee. Before drafting the zoning code itself, it may be helpful to produce a station-area plan; this could be a brief vision statement about the goals for the new zoning district, or a more detailed document. Think not only about the land uses and transit services that exist in the area today, but those that are likely to be there 20 or 50 years in the future.

ASKING THE RIGHT QUESTIONS

Now is the time to ask questions about potential barriers to TOD development—and how to overcome them. Consider:

- » Are existing sewer, water and other infrastructure adequate for desired densities and uses?
- » If infrastructure upgrades are necessary, how they be funded? How long will they take?
- » Does the proposed TOD district currently have, or will have, reliable and frequent transit service? (“Frequent” usually means a minimum of every 15 minutes during peak travel hours). Is the service frequent enough to support targeted residential densities? (see below)
- » Is there enough parking for new growth? If not, where will it be provided and by who?
- » Are existing streets pedestrian-friendly? Is funding available for public streetscape improvements, and how long will it take to put them in place?
- » What park and streetscape improvements are needed to attract private investment?

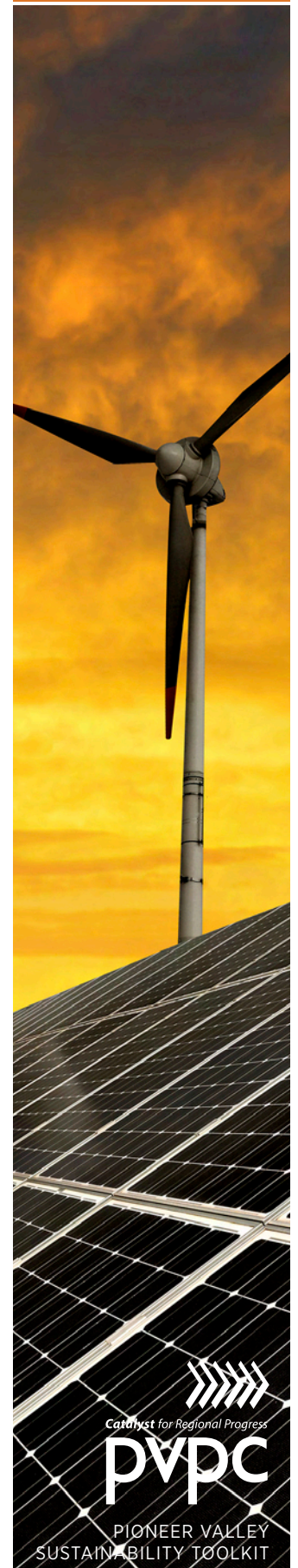


Table 1: Residential Density Associated with Levels of Service

Service	Frequency	Coverage	Dwelling Units Per Acre
Commuter Rail	5 Minute Peak Headways ¹	100 – 150 mile corridor	12
Light Rail	5 Minute Peak Headways	20 – 100 mile corridor	9
Bus – Frequent Service	120 Buses per Day	½ mile between routes	15
Bus – Intermediate Service	40 Buses per Day	½ mile between routes	7
Bus – Minimum Service	20 Buses Per Day	½ mile between routes	4

Source: Pushkarev, B.S., Zupan, J.M. and R.S. Cumella. Urban Retail in America – An Exploration of Criteria for Fixed-Guideway Transit. Bloomington: Indiana University Press. 1982.

EXAMPLES OF TOD ZONING

TOD zoning has been implemented in numerous communities in Massachusetts and the United States, including Abington, MA; Ashland, MA; Concord, MA; Needham, MA; Woburn, MA; Atlanta, GA; Columbus, OH; Hartford, CT; Lower Merion, PA; and Seattle, WA.

LINKS TO MORE INFORMATION

CENTER FOR TRANSIT-ORIENTED DEVELOPMENT:

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

HARTFORD CAPITOL REGION COUNCIL OF GOVERNMENTS TOD MIXED USE MODEL CODE:

http://www.sustainableknowledgecorridor.org/site/sites/default/files/CRCOG_MU_TOD_FINAL%204-4-2014.pdf

MASSACHUSETTS SMART GROWTH TOOLKIT MODEL TRANSIT-ORIENTED DEVELOPMENT OVERLAY DISTRICT BYLAW:

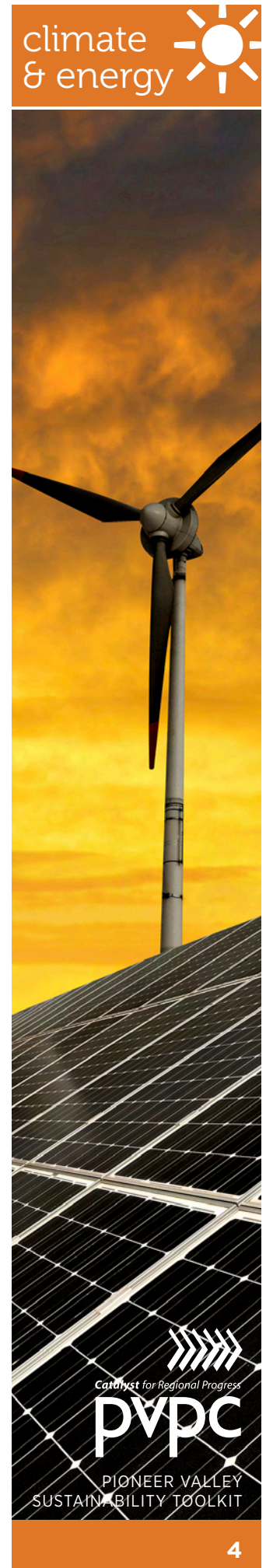
http://www.mass.gov/envir/smart_growth_toolkit/pages/mod-tod.html

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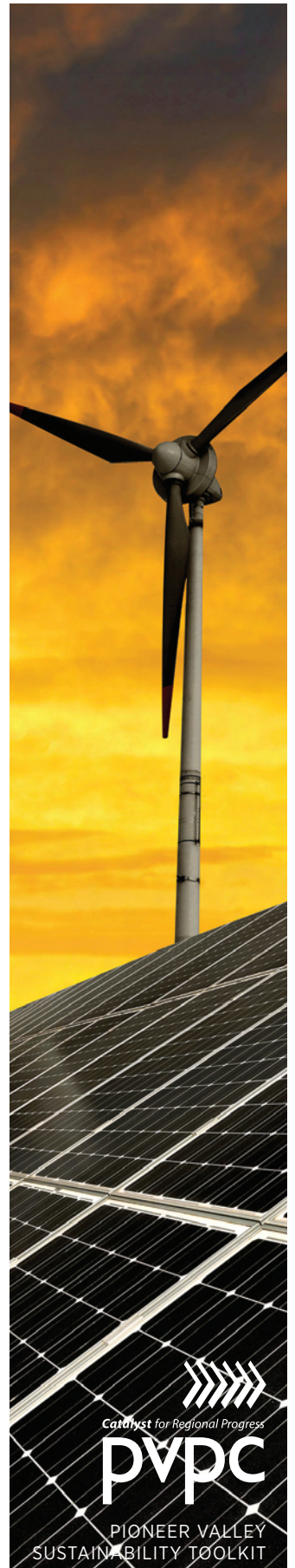
Tree Planting & Reforestation

PURPOSE

To promote the planting of trees and forests. Planting trees improves air quality and absorbs carbon from the atmosphere, provides shade, cooling and water management benefits as well as improving quality of life through beautiful public places and increased community valuation.

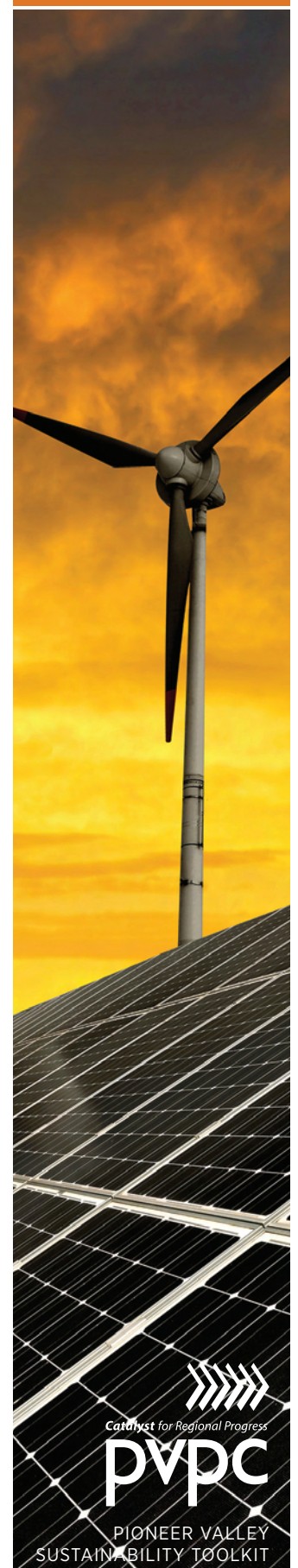
HOW IT WORKS

Planting trees and reforestation is a simple way to mitigate climate change while improving quality of life within a community. Areas with more trees see increased economic, social and environmental benefits. According to the Massachusetts Department of Conservation & Recreation, these benefits include decreased energy costs due to shading as well as improved air quality for residents. More trees are shown to increase revenue from tourism related to fall foliage viewing, as well as raise property values and revenue through taxes by 7-10%. Moreover, plantings can reduce storm water runoff and decrease the likelihood of flooding. Fruit and nut bearing trees can also provide food to communities while beautifying the city streets.



There are different ways to promote tree planting and reforestation in a community:

1. Urban and Community Forestry Program: Creating a municipal forestry department with management plans and professional staff is a strong way to encourage tree planting. These groups aim to improve their local environments and enhance livability of communities by protecting, growing and managing community trees and forests. The overall management plan should focus on caring for mature trees, creating planting programs and conserving the overall canopy as well as using the staff and funding to educate the public about the importance of trees in their community. Creating and following tree ordinances as well as adhering to state policies and regulations including Massachusetts General Law Chapter 87 is crucial for these bodies. Forestry programs within the government structure benefit by having city funding and enforcement agencies to support tree maintenance. Forestry programs can range from paid full time employees to a volunteer community tree board with a city budget.
2. Tree Ordinances: There are three basic types of tree ordinances:
 - a. **Planting and removal ordinances** regulate tree requirements within the public realm, such as the replacement of damaged or removed trees, plantings within new developments as well private tree removal if they pose a hazard to passing public.
 - b. **Tree protection ordinances** protect native or historic trees. These ordinances require a permit for pruning or removal of these trees.
 - c. **View ordinances** create rules for homeowner disputes about blocked views, shade or sunlight due to tree planting or removal. They set guidelines for planting trees that protect private property rights, scenic landscapes, and viewsheds. These ordinances attempt to provide a consistent process that homeowners must follow when planting or removing trees, so that conflicts can be minimized.
3. Volunteers and Non-Profit Organizations: Another way to promote tree planting is by engaging volunteer and citizens. Volunteer groups can help to secure outside funding to buy trees and supplies. Citizen members can encourage their neighbors to care for their current trees, and request new trees to be planted in beneficial locations. Success within these groups can be the catalyst for expanding tree planting within a community and eventually help in the creation of an Urban and Community Forestry Program.
4. Schools: Involving children in tree planting programs is a common way to get added help while teaching them about the importance of a healthy environment. Children have a lot to benefit from a shaded school and community environment and are willing to improve their town or city.



EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED

Million Trees NYC

A public-private program that aims to plant one million trees in New York City. When complete, the effort will have increased the urban forest by 20%. To date, over 900,000 trees have been planted.

Boston Tree Party

The Boston Tree Party is an Urban Agriculture project run by a non-profit organization with the collaboration of organizations, institutions and groups across Boston. Their main goal is to support the planting of heirloom apple trees throughout the city. Communities request to be “Tree Delegations” – groups that work together to plant the trees in their communities and commit to the future care of their environment. Various companies throughout the city donated all supplies and helped organize the launch of the project.

Casey Trees, Washington D.C.

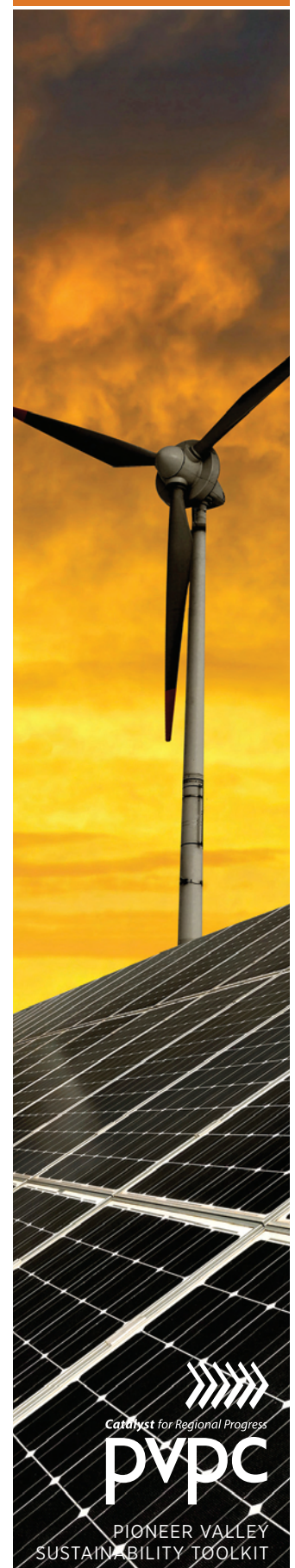
Casey Trees is a non-profit organization established in the nation’s capitol to restore the tree canopy. Their education coordinator helps schools make a treescape plan and implements the planting at the school. Casey Trees holds a rally for students, teaching them about the importance of planting trees and the varieties that will be planted. Then, the students get to plant these trees with the help of the Casey Trees employees. Programs such Casey Trees and the Boston Tree Party are located throughout the country. They help utilize youth volunteers while educating at the same time.

City of Cambridge Tree Planting

The Cambridge Urban Forestry Department uses a variety of tools to make tree planting successful in their city. Their website outlines exactly how to request a tree be planted on the sidewalk, or within a property. Their department handles the actual planting, but citizen volunteers are a crucial aspect of their department. Neighborhoods are asked to water newly planted trees, and people are asked to attend public hearings about new plantings and maintenance. They have programs for children to be involved in tree care.

Tree City USA

Throughout the country, communities have become members of Tree City USA, an organization that formally recognizes a town or cities commitment to planting, protecting and managing community forestry projects. It is a partnership of The Arbor Day Foundation, the USDA Forest Service and the National Association of State Foresters. There are 3,400 communities involved throughout the country - 89 in Massachusetts. Many of these communities are within the Pioneer Valley – including Amherst, Chicopee, Longmeadow, Springfield and Westfield. Receiving this recognition bestows a positive image on the community and enhances town pride, while letting citizens actively participate in their urban forestry program. Communities must apply to become a Tree



City USA member, and meet certain criteria established by the program. Criteria include having a party legally responsible for the care of and responsibility of the community's trees. The tree board can be an entire department, or a volunteer tree board. A tree ordinance must designate the establishment of a tree board or forestry department and give this body the responsibility for writing and implementing an annual community forestry work plan. The tree ordinance provides rules for planting, maintaining and removing trees. The third criterion is a \$2 per capita budget for the program, which many municipalities often already spend in maintenance. The goal is to use these funds in preventative care instead. The final criterion is that the community must participate in an Arbor Day Celebration, a fun event for the community.

Universities

The University of Arizona has thousands of olive trees flanking its roads and sidewalks. They recently conducted a study of their benefits and found that the trees reduced heating cost by \$18,230 per year, and intercepted over one million gallons of storm water. The University of California at Davis also has an abundance of olive trees. Instead of letting the olives drop to the ground, they collect and use them to create olive oil to sell for profit; making a once burdensome problem into a money making idea.

LINKS TO MORE INFORMATION

MILLION TREES NYC

<http://www.millontreesnyc.org/html/home/home.shtml>

BOSTON TREE PARTY

www.bostontreeparty.org

CITY OF CAMBRIDGE TREE PLANTING PROGRAM

<http://www.cambridgema.gov/theworks/ourservices/urbanforestry/citystreeplantingprograms.aspx>

MASSACHUSETTS DCR URBAN AND COMMUNITY FORESTRY RESOURCES

<http://www.mass.gov/eea/agencies/dcr/conservation/forestry-and-fire-control/picks-and-shovels-urban-and-community-forestry-faqs-resources-fact-sheets.html>

<http://www.mass.gov/dcr/stewardship/forestry/urban/urbanFAQs.htm>

TREE CITY USA

<http://www.arboday.org/programs/treeCityUSA/index.cfm>

FOR MORE INFORMATION, PLEASE CONTACT

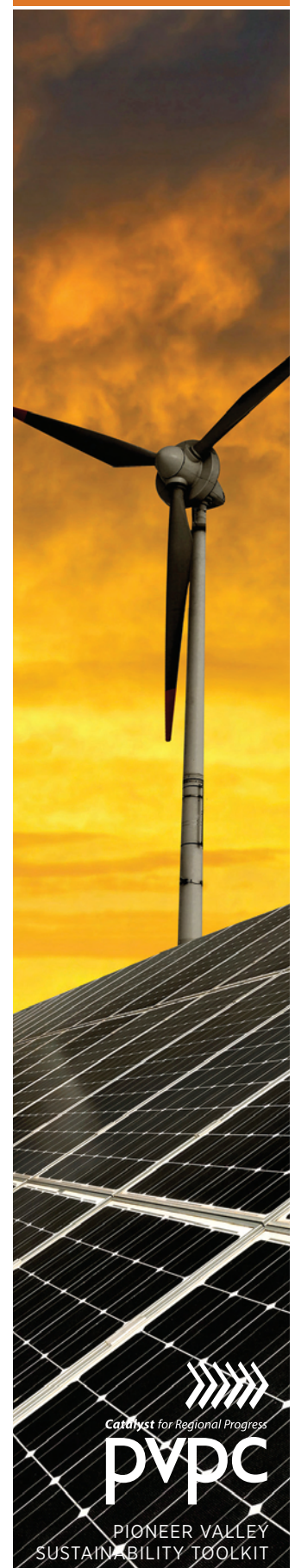
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Trip Reduction Plans



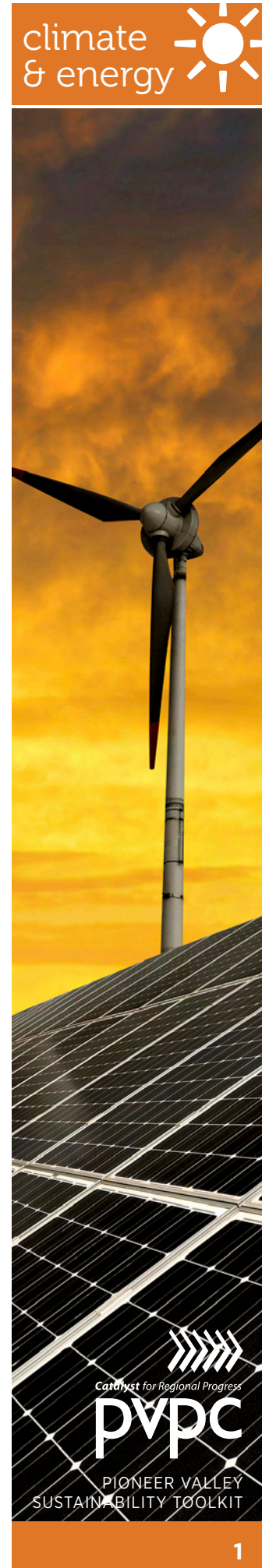
PURPOSE

To encourage the use of alternative modes of transportation for day to day travel by requiring plans for vehicle trip reduction as part of large-scale commercial or residential development proposals. Trip reduction directly reduces greenhouse gas emissions.

HOW IT WORKS

Reducing the number of trips one makes is a key element in reducing overall greenhouse gas emissions. Communities can require trip reduction plans for large-scale commercial or residential developments to reduce single-occupancy automobile travel through zoning regulations. A municipal trip reduction plan regulation typically requires that the applicant outline the methods the development will employ to reduce single-occupancy automobile travel. Common methods include:

- » Provision of an on-site bus stop shelter if development is along an existing transit route.
- » Installation of bike racks and provision of bike storage areas.
- » Rideshare matching through carpools or van pools.
- » On-site postings of public transit schedules.
- » Financial incentives for commuters such as: free or discounted transit fares, travel reimbursement policies that reimburse bicycle or transit mileage for business trips, and Parking ‘Cash Out’ payments equivalent to the subsidy that employees receive for parking spaces in lots or garages at or near the place of employment.



- » Financial disincentives for commuters who drive alone such as elimination or reduction of parking subsidies for employees.
- » Alternative scheduling opportunities that allows for flextime, compressed work weeks, and working from home.

An effective municipal Trip Reduction Plan policy should be supported by an overall municipal Transportation Demand Management (TDM) that encourages more efficient travel patterns while taking into account local and regional travel patterns and socioeconomic conditions. A TDM program is a comprehensive set of policies to reduce travel demand, specifically that of single occupancy private vehicles. A TDM program may include bicycle and pedestrian amenities, subsidized transit costs, transit infrastructure, ridesharing programs and other measures.

EXAMPLES WHERE STRATEGY HAS BEEN IMPLEMENTED

CITY OF NORTHAMPTON, PROJECTS REQUIRING SITE PLAN APPROVAL AS MAJOR PROJECTS

<http://www.ecode360.com/?custId=NO2226>

TOWN OF HADLEY, COMMERCIAL DEVELOPMENT & PERFORMANCE STANDARDS BYLAW [HERE](#)

CITY OF EASTHAMPTON, COMMERCIAL DEVELOPMENT PERFORMANCE STANDARDS

<http://www.easthampton.org/downloads/ZONING008102010.pdf>

LINKS TO MORE INFORMATION

VICTORIA TRANSPORT POLICY GROUP, ONLINE TRANSPORTATION DEMAND MANAGEMENT ENCYCLOPEDIA.

<http://www.vtppi.org/tdm/tdm9.htm>

THE NATIONAL CENTER FOR TRANSIT RESEARCH'S NATIONAL TDM AND TELEWORK CLEARINGHOUSE

<http://www.nctr.usf.edu/clearinghouse/tro.htm>

MASSRIDES PROGRAM

<http://www.commute.com/>

MASSBIKE

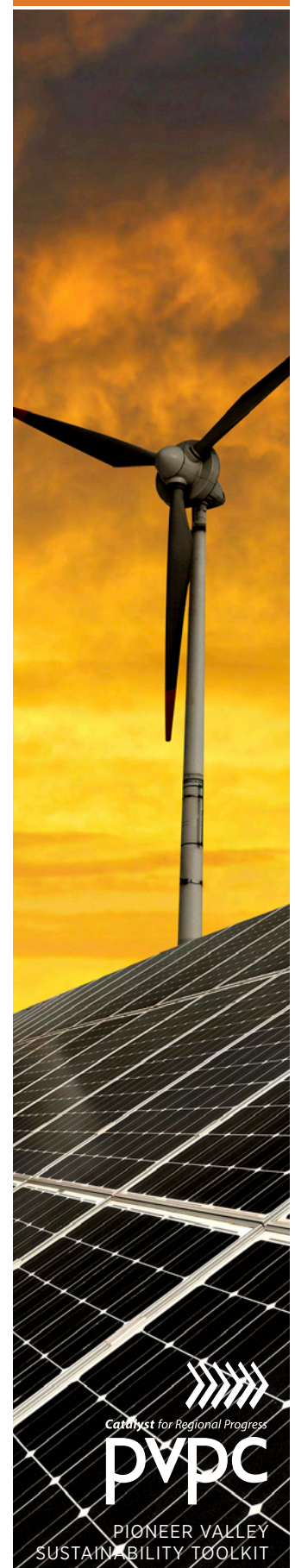
<http://www.massbike.org/aboutus/pioneer-valley-chapter/>

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Address Climate Action Goals In Regional Transportation Planning

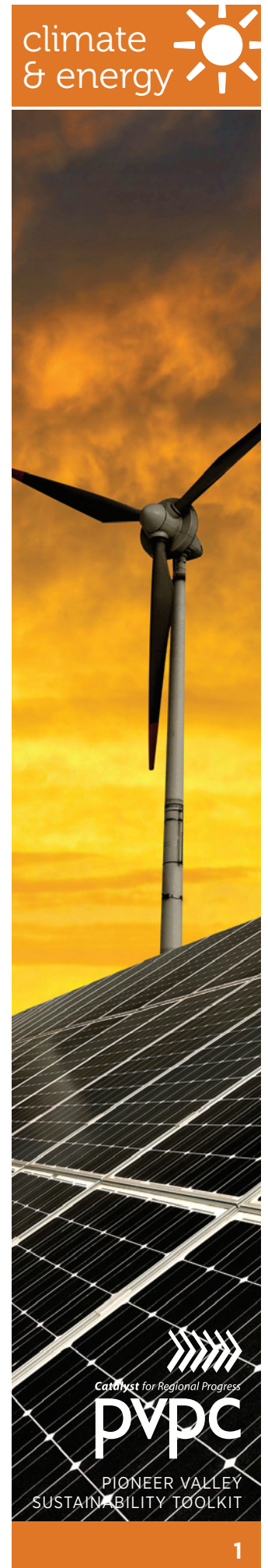
PURPOSE

To include consideration of goals for reducing greenhouse gas emissions (GHG) and climate action in regional transportation plans and transportation project selection. This will encourage expenditures of federal and state transportation funding for projects which will help to reduce vehicle miles traveled (VMT) and greenhouse gas emissions.

HOW IT WORKS

Metropolitan Planning Organizations and Regional Planning Agencies can significantly affect how public transportation funds are spent, and how transportation projects affect carbon emissions. Here are some examples:

1. **Include Climate Goals in Regional Transportation Plans**
GHG and VMT reduction targets can be included in regional transportation plans, which are blueprints to guide investments in the region's transportation system.
2. **Quantification of GHG Impacts in Transportation Plans**
Some metropolitan regions are now creating GHG inventories, and are taking steps to quantify the GHG emissions of transportation projects within their Regional Transportation Plans (RTPs). This can be done with sophisticated models or simple Vehicle Miles Travelled (VMT) multipliers applied the outputs of the travel demand model.
3. **Regional GHG Inventories and Reduction Targets**
Creating a regional GHG inventory with reduction targets is an important first



step in addressing GHG emissions from regional transportation projects. There are no standard tools yet for this task, and regions are trying a variety of approaches. Two regions, Philadelphia and Washington, are currently engaged in this process, with EPA assistance.

4. Redirect Transportation Funds from Road Expansion to Transit and Bike/ Pedestrian Facilities
Metropolitan Planning Organizations (MPOs) can shift investments away from road expansion toward transit, bicycling and walking facilities.
5. Calculation of Emissions from Specific Projects
Some MPOs have begun calculating GHG emissions from specific highway and transit projects, as part of evaluating projects for funding.
6. Adding GHG Criteria for Evaluating Transportation Improvement Plan Projects
Regions currently use a variety of criteria for reviewing and ranking transportation projects to be placed on the Transportation Improvement Plan or TIP. Regions could add new criteria to this evaluation, by evaluating GHG emissions from individual projects and including these criteria in their rankings.
7. Alternative RTP Investment Packages
Regions can calculate and evaluate the GHG emissions from Regional Transportation Plan alternative investment packages. This is different from the traditional approach to RTPs, where only a single proposed package is evaluated. The San Francisco region is currently using this approach (see below).

EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED

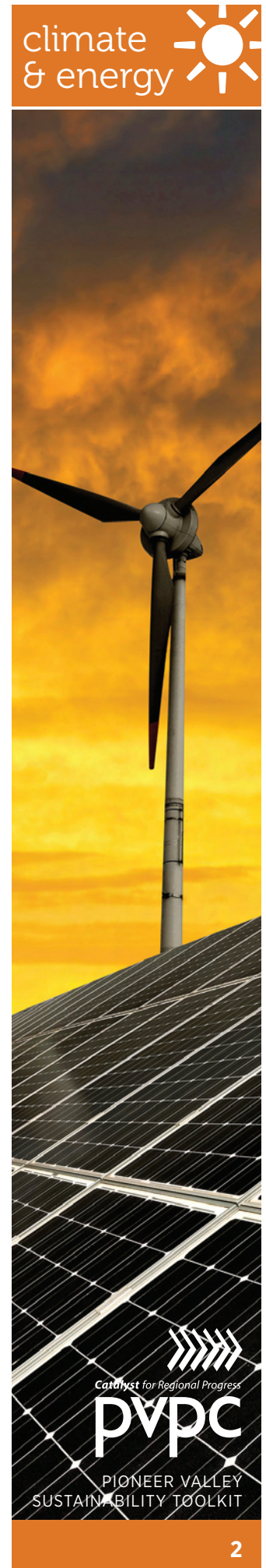
Quantification of GHG Impacts in Transportation Plans

The EPA's MOVES model is the recommended tool for GHG analysis. The MOVES model develops on-road energy consumption and emissions estimates based on speed and vehicle power output. The MOVES model has already been used by several State and local agencies for GHG analyses.

Metropolitan Transportation Commission, San Francisco

The Metropolitan Transportation Commission (MTC), the MPO for the San Francisco Bay Area, adopted performance targets for GHG emissions in its Regional Transportation Plan. Targets are to reduce CO2 emissions 40% below 1990 levels by 2035, and to reduce VMT per capita by 10 percent by 2035. Proposed packages of investments are being analyzed for their ability to meet these targets, including:

- » freeway investment with modest efficiency improvements,



- » a high-occupancy toll (HOT) network with expanded express bus service,
- » an expansion of rail transit,
- » a comprehensive road-pricing policy, and
- » a land-use strategy based on smart growth principles.
- » Puget Sound Regional Council

The Puget Sound Regional Council, the MPO for the Seattle area, is using the U.S. EPA's Motor Vehicle Emission Simulator (MOVES) model to do a regional level analysis of GHG emissions in its Long Range Transportation Plan.

Missoula County

Missoula County, Montana undertook a regional land use and transportation visioning exercise called Envision Missoula. Missoula plans to provide a basic estimate of CO2 emissions from the plan, probably using a simple VMT multiplier applied to the outputs of the travel demand model.

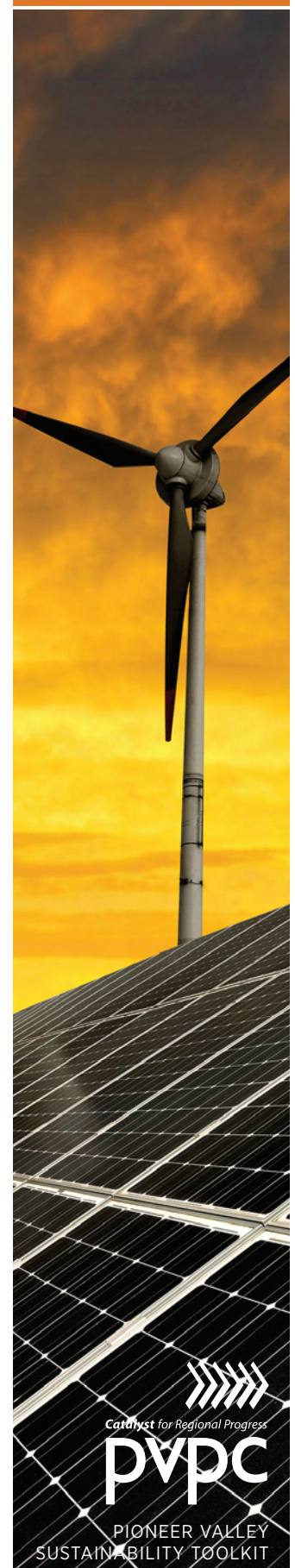
Capital District Transportation Committee

Albany's Capital District Transportation Committee (CDTC) incorporates analysis of GHG emissions in its planning process in two ways. First, CDTC applies a "full cost analysis," including analysis of global warming costs, to major system decisions. Full cost analysis is also used to evaluate candidate TIP projects. Second, the agency estimates the GHG emissions resulting from its LRTP. New York requires MPOs to estimate the energy and CO2 emissions from their long range transportation plans and also from their transportation improvement programs.

CDTC has taken an innovative approach to the use of their travel demand modeling. The region has been proactive in encouraging concentrated, sustainable development patterns, and has a focused interest in establishing linkages between policy setting and environmental responsibility. CDTC forecast a 15% reduction in trip generation per household based on a range of policies and principles, such as urban reinvestment, transit oriented development, and bus rapid transit.

Sacramento Area Council of Governments

SACOG is working with several modeling applications to analyze the impacts of different transportation and land use scenarios. SacSim, the agency's new travel demand forecasting model, is the first regional model to use individual land parcels as the level of input data.



REGIONAL GHG INVENTORIES AND REDUCTION TARGETS

Delaware Valley Regional Planning Commission, Philadelphia PA

The Delaware Valley Regional Planning Commission (DVRPC) is in the process of preparing a regional GHG inventory for 2005, as well as projected GHG emissions for 2035. Among the sources to be included in this inventory are emissions from on-road transportation, which are expected to be one of the region's primary sources of GHG emissions. CO₂, CH₄, and N₂O emissions will be calculated using modeled estimates of annual average daily vehicle miles traveled (VMT) by vehicle type and road class. Per mile emissions factors will be applied to the VMT totals. The VMT estimates will be generated by DVRPC's regional transportation model, which is used to support the region's long range transportation planning and air quality conformity analysis process. The regional transportation model will also be used to generate GHG emissions estimates for various transportation plan alternatives.

Metropolitan Washington Council of Governments, Washington DC

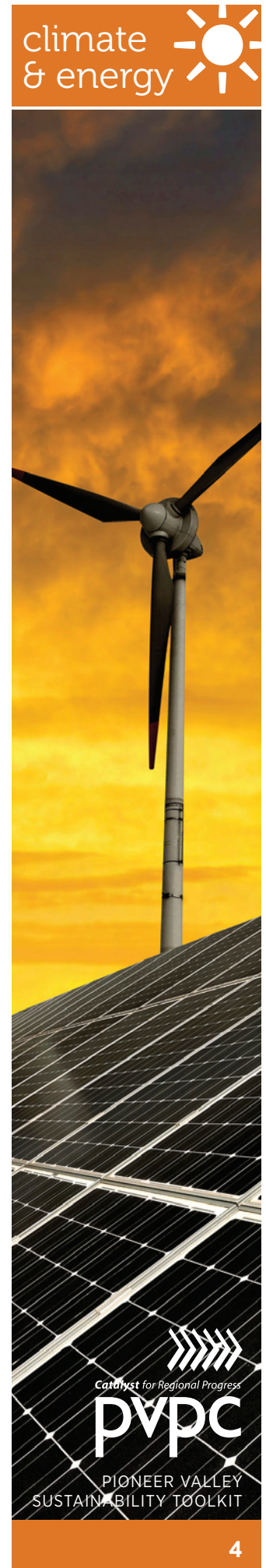
A regional inventory of CO₂ emissions from transportation was developed by the Metropolitan Washington Council of Governments (MWCOG). CO₂ estimates from mobile sources were calculated using data and forecasts of vehicle miles of travel (VMT) by vehicle type from the region's air quality conformity analysis. Emission factors were modeled using the software MOBILE6 and travel patterns in the COG region on network and local roadways. Emissions forecasts to 2030 were developed using the MOBILE6 model and the COG's travel forecasting model.

MWCOG has proposed two GHG emission reduction scenarios for development. The first scenario reflects the current Long Range Transportation Plan. The second scenario examines how new long-term goals could be achieved using various combinations of interventions, including improved fuel efficiency, alternative fuels, and reducing vehicle travel. The first step in developing this scenario is identifying a CO₂ emission reduction goal. The COG's Climate Change Steering Committee has discussed a proposed regional goal of reducing overall regional CO₂ emissions by 70-80% below 2005 levels by 2050.

CALCULATION OF EMISSIONS FROM SPECIFIC PROJECTS

New York

The State's Energy Plan requires an energy and GHG analysis for MPO transportation plans and TIPs and for all regionally significant projects and other projects that may lead to large increases in vehicle miles traveled. The environmental documents for those proposed projects typically include an analysis of projected CO₂ emissions associated



with construction and operation of each alternative.

Massachusetts

Certain projects subject to the Massachusetts Environmental Policy Act are required to include a quantification of GHG emissions as well as consideration of measures to avoid, minimize or mitigate such emissions. Massachusetts also has GHG planning level requirements under its GreenDOT initiative

California

The California Coastal Conservancy has developed a methodology for calculating GHG emissions from specific projects, including construction emissions, lifecycle emissions, operational emissions, building energy use, transportation trip generation, and alteration of land use cover or vegetation.

Metropolitan Transportation Commission, San Francisco

The Metropolitan Transportation Commission, the MPO for the San Francisco Bay Area, is currently evaluating the CO2 impacts of individual highway and transit projects. This analysis will feed into a performance comparison of projects.

LINKS TO MODEL BYLAWS OR MORE INFORMATION:

MASSACHUSETTS' GREENDOT PROGRAM:

<http://www.massdot.state.ma.us/GreenDOT.aspx>

DELAWARE VALLEY REGIONAL PLANNING COMMISSION GHG INVENTORY:

<http://www.dvrpc.org/EnergyClimate/inventory.htm>

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Integrating Land Use And Transportation Strategies

PURPOSE

To help reduce green house gas emissions by aligning transportation plans with sustainable land use strategies through strategic targeting of federal and state funds for sustainable infrastructure/development projects.

HOW IT WORKS:

Long-range Regional Transportation Plans (RTPs) and Transportation Improvement Plans (TIPs) provide the most important opportunities for linkages with local and regional land use goals. These linkages can take the form of evaluation criteria for analyzing potential transportation investments, or targeting of transportation funds for sustainable development projects.

Transportation agencies can:

1. include land use goals as part of scoring criteria for transportation projects, and;
2. create specific funding programs for transportation projects that support community and land use goals, such as pedestrian or streetscape improvements, mixed-use infill, transit-oriented development and transit improvement projects.

EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED:

1. Include land use goals as part of scoring criteria for transportation projects

Aligning Transportation with Land Use: Atlanta Regional Commission

In Georgia, the Atlanta Regional Commission has taken several steps to better align its long range transportation decision-making processes with local land use goals. For the 2025 Regional Transportation Plan, ARC's scoring criteria for federal STP and CMAQ funds included support of local land use, which can provide a maximum of 15 points out of 135 total.

ARC has also created a \$350 million fund to help local agencies implement bicycle and pedestrian projects, streetscape projects, transit access improvements, and parking coordination efforts. To help local jurisdictions develop projects for this fund program, ARC has also provided funding for planning under a separate grant program called the Livable Centers Initiative.

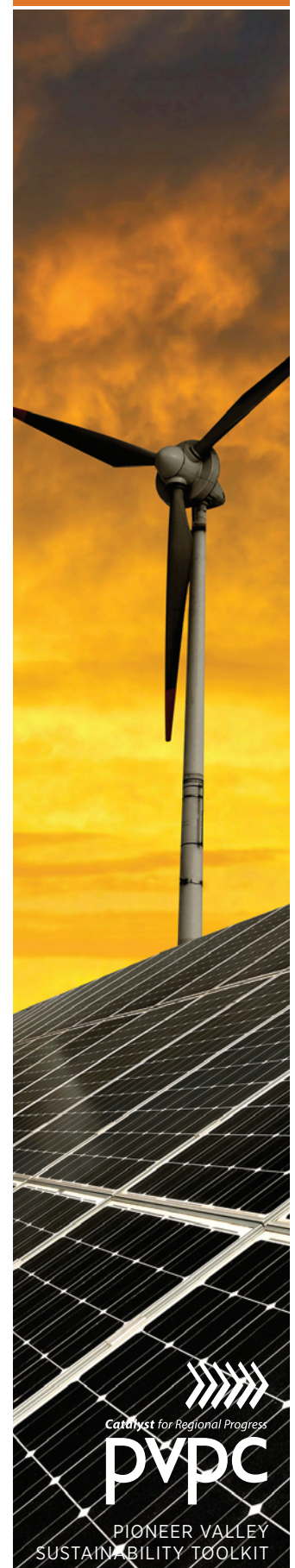
Supporting Sustainable Land Uses with Transportation: North Central Texas COG

NCTCOG's Mobility 2030 Plan is the Metropolitan Transportation Plan for the Dallas-Fort Worth area, which establishes sustainable development as the region's strategic approach to transportation planning, programming, and construction. Sustainable development leverages the land use/transportation relationship to improve mobility, enhance air quality, support economic growth, and ensure the financial stability of the transportation system. The plan recognizes four categories of sustainable development:

- » Strategic Urban Development
- » Integrated Land Use Planning/Urban Design
- » Transit-Oriented Development
- » Access Management

The NCTCOG's Sustainable Development Funding Program was created by its policy body, the Regional Transportation Council (RTC), to encourage public/private partnerships that positively enhance existing transportation system capacity, rail access, air quality concerns, and/or mixed land uses. By allocating transportation funds to land use projects promoting alternative transportation modes or reduced automobile use, NCTCOG and its regional partners are working to address escalating air quality, congestion, and quality of life issues.

The program is designed to encourage planning and foster growth and development in and around historic downtowns and Main Streets, infill areas, and along passenger rail



lines and at stations. Three Calls for Projects were conducted in 2001, 2006, and 2010 to fund Sustainable Infrastructure, Landbanking, and Planning projects.

Program goals include:

- » Respond to local initiatives for town centers, mixed use growth centers, transit oriented developments, infill and brownfield developments, and pedestrian-oriented developments;
- » Complement rail investments with coordinated investments in park-and-ride, bicycle and pedestrian facilities;
- » Reduce the growth in vehicle miles traveled per person;
- » Promote economic development throughout the region through public-private partnerships.

Staff review project applications for the following criteria:

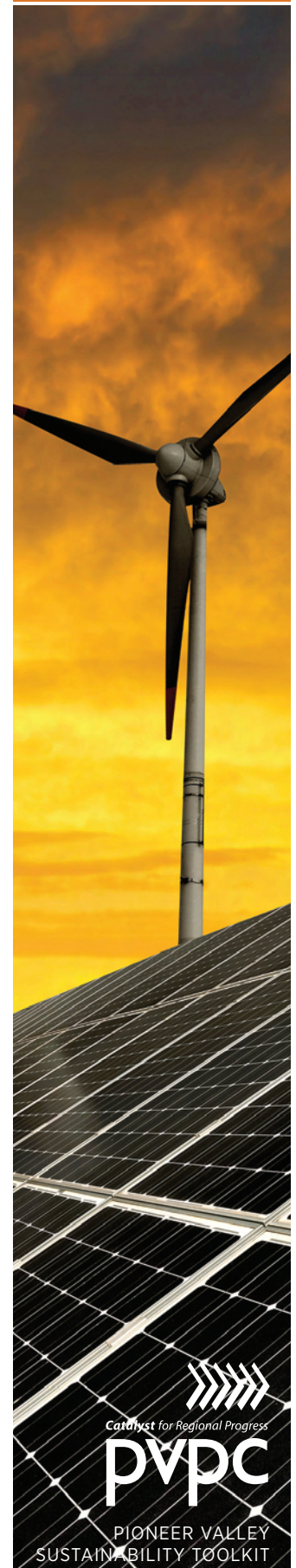
- » the proposed land-use change;
- » the private/public partnership and commitment to the project;
- » the project's consistency with the Mobility 2025 Update;
- » the project's consistency with Regional Transportation Council (RTC) policy on sustainable development.

Sustainable Development projects of approximately \$124 million over the past decade have been selected for funding through the program, with additional local match contributions of \$31 million from local governments and the private sector. Most of the funding is provided by Regional Toll Revenues (RTR).

This program supports private sector investment in mixed/integrated land use, infill development, transit, and pedestrian-oriented development by providing dedicated planning assistance and designating transportation project investments to support those projects. NCTCOG works through local governments to identify potential Development Excellence partners, to support their participation in the process, and ultimately to select projects that will receive dedicated transportation support. The program focuses on "joint ventures", referring to the contributions from multiple stakeholders: in addition to the developer's investment and the transportation investments, selected projects receive local tax, zoning, and other regulatory support.

FOR MORE INFORMATION:

<http://www.nctcog.org/trans/sustdev/landuse/>



Denver (Colorado) MPO

The Denver Regional Council of Governments' (DRCOG) selection criteria for local projects in the 2005-2010 TIP include up to 16 points (out of 100) for various, specified local actions supporting the regional Metro Vision. Points are awarded for a variety of criteria including signing the regional Mile High Compact, protecting open space, approving infill and mixed use development plans, adopting zoning changes, completing major streetscape projects, and building multi-family housing.

Wilmington (Delaware) MPO

In the late 1990s, the Wilmington Area Planning Commission (WILMAPCO) designated "Transportation Investment Areas" in the Wilmington region, including Center, Community, Development, and Rural areas. The agency has used these areas in the screening of projects for the LRTP to ensure that projects are appropriate to their respective area. WILMAPCO reports that a primary application of the policy has been to identify urban centers in which pedestrian and bicycle facilities should be included along with roadway improvements. Contact: Heather Dunigan, Principal Planner (302-737-6205).

Maryland State agencies, including DOT

Since the late 1990s, the State of Maryland has used priority funding areas to set criteria for State investments, including transportation investments by the Maryland Department of Transportation (MDOT). Priority Funding Areas are locations where the State and local governments want to target their efforts to encourage and support economic development and new growth. The criteria have led to the removal of bypass projects from MDOT's capital funding program, multimodal improvements in urban areas, and the use of access control as a tool for locating development. Contact: Don Halligan, MDOT Transportation & Land Use Planning (410-865-1294).

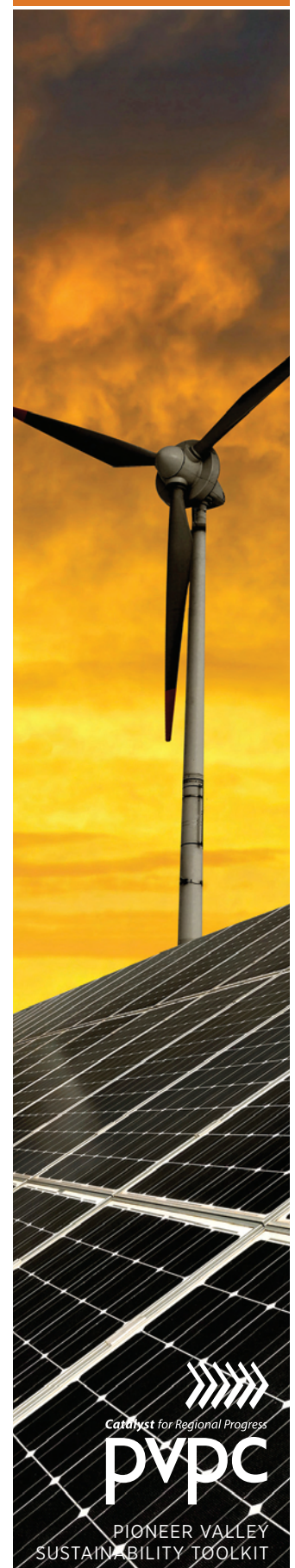
Seattle (Washington) MPO

The Puget Sound Regional Council's (PSRC) 2002 Regional TIP Policy Framework includes project selection criteria for consistency with Vision 2020, a regional transportation and land use vision adopted in 1990 and updated in 1995. Candidate TIP projects receive points for supporting designated urban centers, manufacturing/industrial centers, and connecting corridors, with specific criteria including circulation/continuity, urban environment, mobility/accessibility, benefit to the center, and sustainability. See: Puget Sound Regional Council, "Regional Project Evaluation Criteria."

LINKS TO MODEL BYLAWS OR MORE INFORMATION:

FOR MORE INFORMATION ON THE ATLANTA REGIONAL COMMISSION:

<http://www.atlreg.com/transportationair/transportationair.html>



2. Create specific funding programs that support community- and land use- oriented transportation projects, such as pedestrian, streetscape, mixed-use infill, transit-oriented development and transit improvement projects

EXAMPLES:

San Francisco (California) MPO

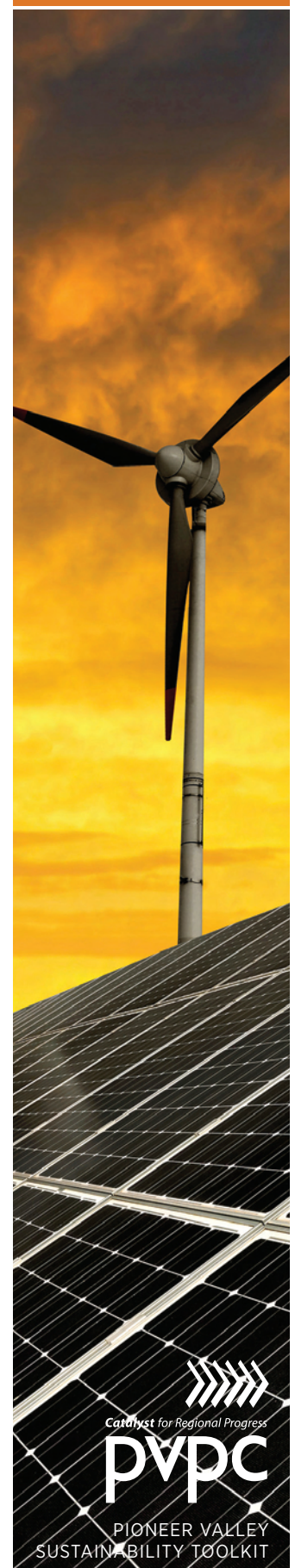
Since 1998, the Metropolitan Transportation Commission’s (MTC) Transportation for Livable Communities program has provided planning and capital improvement grants for town centers, public transit hubs, key streets and other improvements designed to foster community vitality. The Housing Incentive Program provides additional funding for streetscape, pedestrian, bicycle, and other infrastructure improvements for communities building housing within 1/3 mile of rapid transit stations. Between 1998 and 2003, the programs funded \$2.2 million in planning grants and over \$54 million in capital grants and housing incentives. Funding has come from Federal sources including STP, CMAQ, and Transportation Enhancements, as well as from the State Transportation Development Act. Contact: Evelyn Baker, MTC (510-464-7753).

Dallas (Texas) MPO

Through the Land Use-Transportation Joint Venture Program, the North Central Texas Council of Governments (NCTCOG) provided \$41 million in STP and CMAQ funds between 2002 and 2004 for 19 transportation improvements (such as pedestrian and bicycle improvements) supporting transit-oriented developments, mixed-use, urban developments, and infill developments. Federal funds were matched with local, private sector funds, local/city funds, tax increment financing district funds, and right-of-way land donations. Due to the success of the first call for projects, NCTCOG issued a second \$40 million Sustainable Development call in October 2005. In addition to transportation infrastructure improvements, funds are available for land banking and local sustainable development planning programs. NCTCOG reports that as a result of the first call for projects and in anticipation of the second call, many local governments have updated or changed their zoning to include classifications that will allow mixed-use sustainable development projects to be built by right. In addition, NCTCOG is “trading” local for federal dollars to streamline and quicken implementation of small infrastructure projects that support development. Contact: Alicia Hopkins, NCTCOG (817-608-2380).

Massachusetts Executive Office of Transportation

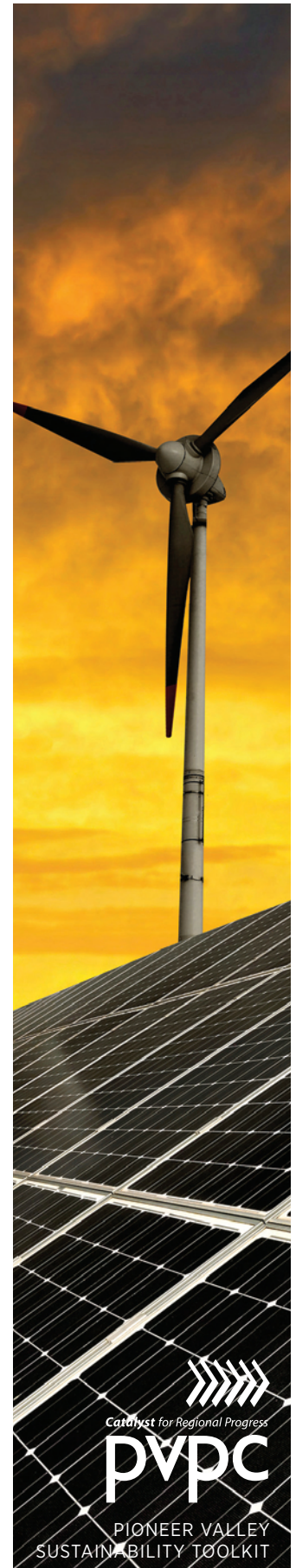
The 2004 Massachusetts’ Transportation Bond Bill directed the Office for Commonwealth Development (OCD) to create a Transit Oriented Development Infrastructure and Housing Support Program, to be administered through the Executive Office of Transportation (EOT). The program is providing \$30 million in financial assistance to public agencies for pedestrian improvements, bicycle facilities, housing projects, and parking facilities in mixed use developments located within one-quarter mile of a transit station. EOT is



collaborating with the Department of Housing and Economic Development (DHED) on implementing the housing component of this program. To ensure that projects support TOD principles, OCD, in consultation with EOT and DHED, established specific evaluation criteria for each of the four project types. Contact: Jane Healey, OCD (617-573-1388).

California: MPOs assigned responsibility for reducing GHG emission from cars and light trucks

In December 2008, the California Air Resources Board (CARB) approved the Climate Change Scoping Plan, which contains the main strategies California will use to reduce GHG emissions. An essential component of the state Scoping Plan is reducing GHG emissions from transportation. In September 2008, Governor Schwarzenegger signed Senate Bill (SB) 375 which mandates an integrated, regional land use and transportation planning approach to reducing GHG emissions from cars and light trucks. Cars and light trucks generate about 31% of statewide GHG emissions. The law directs CARB to establish regional GHG reduction targets for cars and light trucks and assigns Metropolitan Planning Organizations (MPOs) throughout the state (the Association of Bay Area Governments and the Metropolitan Transportation Commission in the Bay Area) to develop plans for achieving those targets. Essentially, SB 375 is a mechanism for implementing the measure in the state's Scoping Plan related to reducing regional transportation-related GHG emissions. Through the SB 375 process local governments in the Bay Area (and in other regions) will have to work together to integrate development patterns and transportation networks in a way that achieves regional GHG reduction targets while also meeting housing needs, protecting greenspace, and addressing other regional planning objectives.



LINKS TO MODEL BYLAWS OR MORE INFORMATION:

SAN FRANCISCO METROPOLITAN TRANSPORTATION COMMISSION'S (MTC)
TRANSPORTATION FOR LIVABLE COMMUNITIES

http://www.mtc.ca.gov/planning/smart_growth/tlc/

MASSACHUSETTS TRANSIT ORIENTED DEVELOPMENT INFRASTRUCTURE AND
HOUSING SUPPORT PROGRAM

<http://www.reconnectingamerica.org/resource-center/browse-research/2006/transit-oriented-development-infrastructure-and-housing-support-program-guidelines/>

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Regionalized Performance Contracting

PURPOSE

To reduce the upfront cost of pursuing energy efficiency measures in municipal buildings by pooling the demand of several municipalities into one regional service contract for capital improvements.

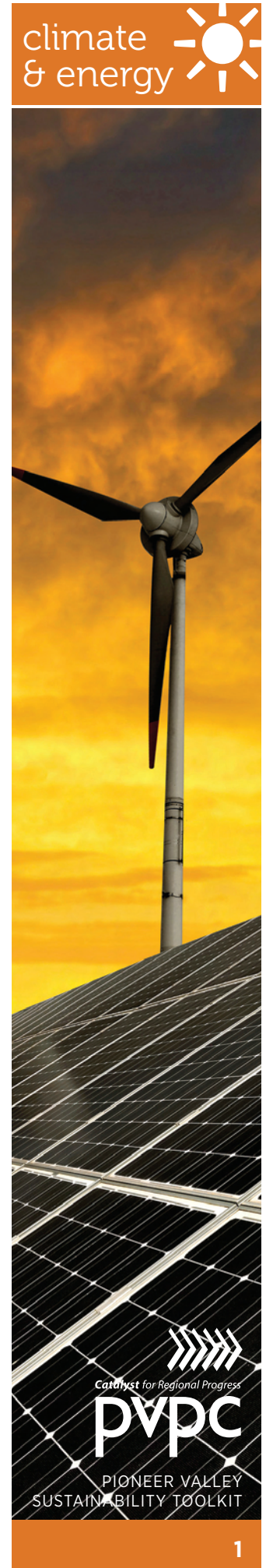
Energy use in municipally-owned buildings, such as administrative offices and schools, accounts for a significant percentage of municipal budgets. One way to accomplish significant energy efficiency improvements in public buildings at no incremental cost to the local public purse is to engage an energy service company (ESCO) through a performance contract.

HOW IT WORKS

Through a performance contract, an ESCO will identify and evaluate energy-saving opportunities and recommend improvements, such as new lighting technologies, boilers and chillers, energy management controls, to be paid for through monthly energy savings over several years. The ESCO will guarantee that savings meet or exceed annual payments to cover all project costs. To ensure savings, the ESCO offers staff training and long-term maintenance services. If savings don't materialize, the ESCO pays the difference, not the municipality.

However, ESCOs have drawn a line at undertaking performance contracts directly with smaller municipalities, because the savings from energy consumption is deemed too small to cover their costs. As a result, many municipally owned structures in smaller communities and regional school districts have a harder time accessing these services. But by pooling the energy demand from buildings in multiple municipalities, such as town centers and schools from neighboring towns, officials can increase their municipality's profile and make energy performance contracting viable to companies.

Town	Annual Savings
Belchertown	\$300,000
Easthampton	\$166,262
Granby	\$60,000
Hadley	\$60,000
Holyoke	\$360,000
Ludlow	\$120,000
Monson	\$120,000
Palmer	\$120,000
South Hadley	\$120,000
Southampton	\$60,000
Southwick	\$120,000
Wilbraham	\$120,000
TOTAL	\$1,726,262



EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED

In 2008, the Franklin Regional Council of Governments (FRCOG) launched a regionalization effort for energy savings performance contracting that encompassed sixteen towns and three regional school districts. FRCOG was able to successfully pool municipal demand, launch a Request for Proposals on behalf of the municipalities, and contract an ESCO for the initial energy audits. Once the ESCO provided initial energy audits, each town had the ability to decide whether or not to contract the ESCO for the capital improvements and longer-term repayment of the improvements through energy savings.

Likewise, the Pioneer Valley Planning Commission (PVPC) launched a regional energy auditing and building efficiency services initiative in 2010, assisted by funding provided by the Massachusetts Legislature and administered by the Department of Housing and Community Development. PVPC pooled the energy demand of buildings in over a dozen towns and regional school districts and successfully procured an ESCO at a lower-than-market price. The participating communities were Belchertown, Easthampton, Granby, Hadley, Holyoke, Ludlow, Monson, Palmer, South Hadley, Southampton, Southwick, Wilbraham and Williamsburg. The school districts for Chesterfield-Goshen, Southwick-Tolland and Granville also participated in the pool to contract an ESCO. The total estimated savings

LINKS TO MODEL BYLAWS OR MORE INFORMATION

ENERGY SAVINGS COALITION:

<http://www.energyservicescoalition.org/resources/whatis.htm>

FRANKLIN COUNTY COUNCIL OF GOVERNMENTS (FRCOG) ENERGY SAVINGS PERFORMANCE-BASED CONTRACTING:

http://www.frcog.org/services/regional_services/svcs_energy.php

PIONEER VALLEY PLANNING COMMISSION (PVPC) REGIONAL ENERGY AUDITING AND BUILDING EFFICIENCY SERVICES:

http://www.pvpc.org/pressreleases/pr-jul-16-09_enaud.shtml

FOR MORE INFORMATION, PLEASE CONTACT

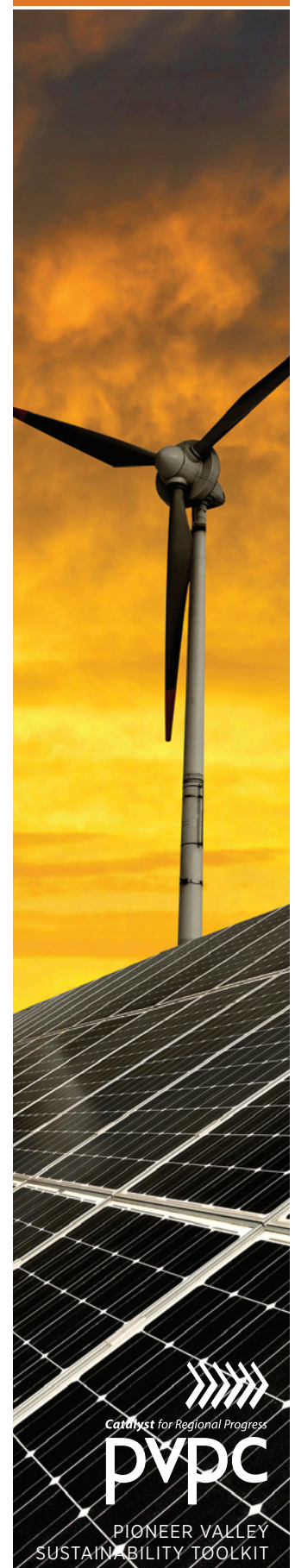
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PVPC

PIONEER VALLEY
SUSTAINABILITY TOOLKIT

Conservation Zoning

PURPOSE

To promote responsible use of natural resources by preserving open space and ensuring that development has minimal adverse impact.

Conservation zoning protects public open space, natural wildlife habitats, and scenic areas. It also reduces stormwater runoff and erosion. The preservation of vegetation and trees reduces the quantity of greenhouse gas in the atmosphere. By preventing development in areas that are susceptible to flooding, conservation zoning also helps adapt to the increased rainfall that will occur from climate change.

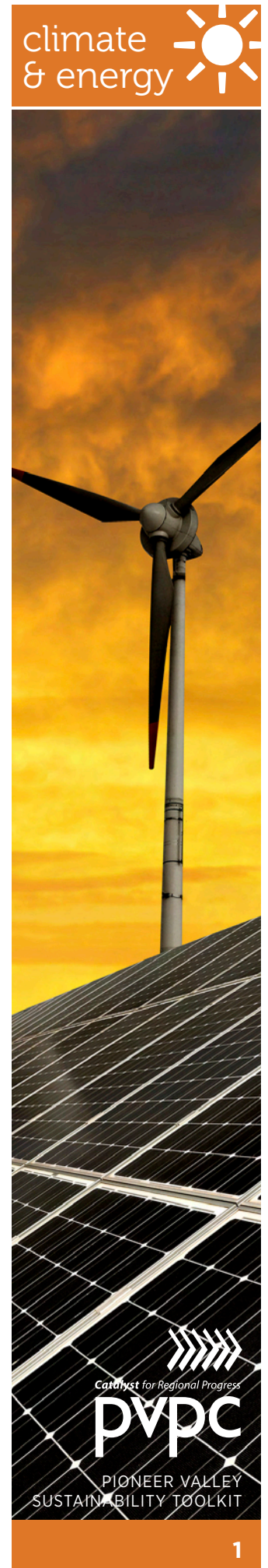
The language and methods used to regulate development through zoning ordinances, such as restrictions on density and land use, are well suited for implementing conservationist principles.

Conservation zoning is the act of restricting development completely in an area, because it is in a floodplain, there is a risk of soil erosion, or there or because they considered environmentally sensitive water table, risk of soil erosion, or fragile ecosystem. The most common conservation zoning ordinances are floodplain bylaws.

HOW IT WORKS

Similar to other zoning districts, conservation zoning focuses primarily on the density and type of permitted uses. Examples of commonly permitted uses for conservation purposes include fishing, forestry, wildlife preserves, and single family detached homes. Density requirements may be based on the floor-area ratio or total lot area coverage. For example, model zoning guidelines for Lancaster County, Pennsylvania includes a requirement that 80% of each lot be pervious. The particular details of the conservation district will be based on a community's needs and context. For example, municipalities that have a large amount of farmland may enact an agricultural zoning district. Similarly, in areas with wetlands, the zoning will have the purpose of protecting waterbodies and their associated watersheds.

The language for a conservation district can be incorporated into the zoning ordinance either as a stand-alone district or an overlay, the latter placing an additional layer of regulations on top of an existing district. For both methods, the implementation of the conservation district or zoning will be based on the municipality's standard procedures. Conservation zoning may also be incorporated into a municipality's subdivision code, in



order to reduce the environmental resources consumed by large-scale developments. Subdivision regulations can promote the use of cluster development, in which all buildings and impervious area are concentrated in one portion of a development. This allows the remaining land to be left untouched and kept as public open space or wildlife habitat.

EXAMPLES OF COMMUNITY IMPLEMENTATION

Frederick County, Maryland

The County's zoning includes a resource conservation (RC) district, which allows for low intensity uses in areas of forests and steep terrain. The County also incorporates an agricultural district that allows the operation of farms and related light industrial uses, and a floodplain district which requires a permit for all development within it.

LINKS TO MODEL BYLAWS OR MORE INFORMATION

WHITE TOWNSHIP IN NEW JERSEY HAS A CLUSTER DEVELOPMENT ORDINANCE:
LANCASTER COUNTY, PENNSYLVANIA DEVELOPED MODEL CONSERVATION DISTRICT ZONING LANGUAGE, WHICH CAN BE FOUND AT:

<http://www.co.lancaster.pa.us/toolbox/cwp/view.asp?a=3&q=641973>

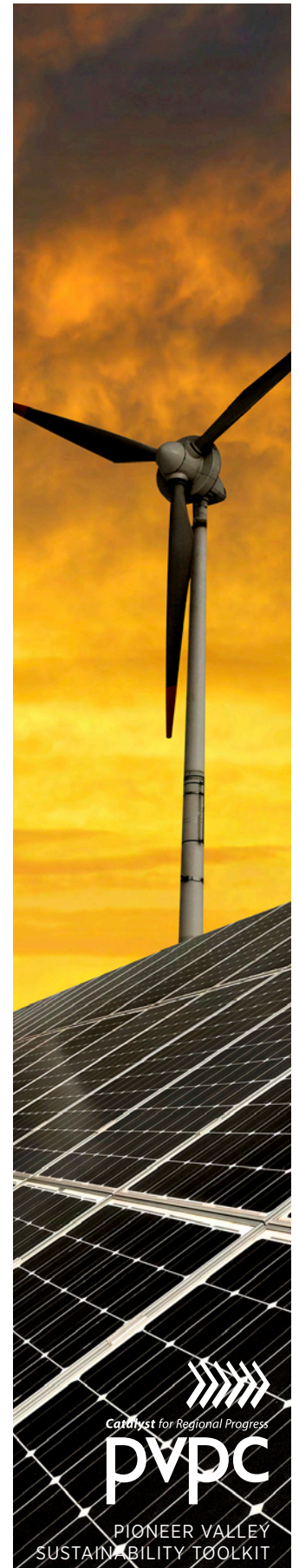
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Energy Efficient Building Requirements

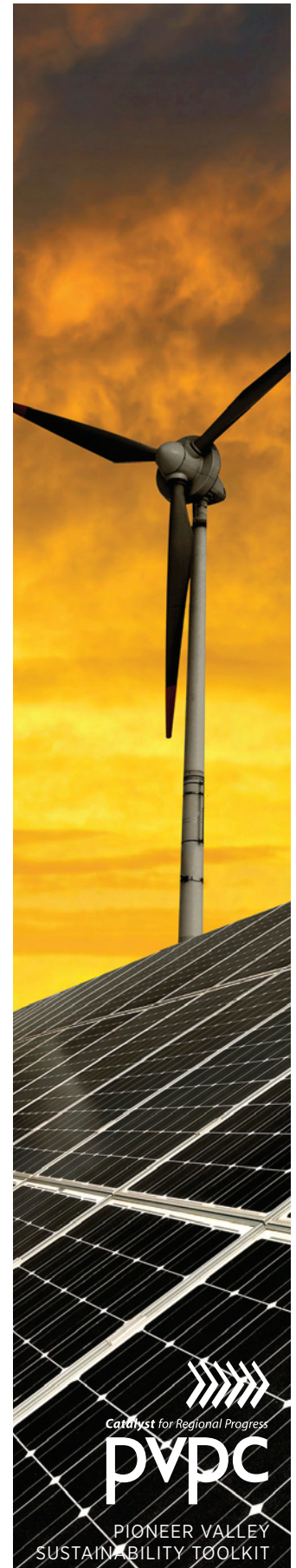
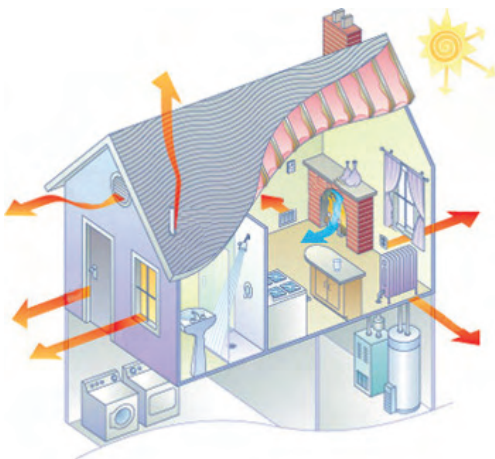
PURPOSE

To improve building energy efficiency for new and existing buildings in Massachusetts by locally adopting a building code which is a more energy efficient alternative to the state's Building Code.

There are many benefits associated with improving building energy efficiency. Residents, business owners, and municipal governments see energy savings and reduced energy bills. Energy efficient buildings consume less energy which helps to reduce greenhouse gas and environmental pollution. Increased energy efficiency also reduces dependence on foreign oil resources.

HOW IT WORKS

A Massachusetts municipality seeking to ensure that construction within its boundaries is designed and built above the energy efficiency requirements of the existing State Building Code (780 CMR) may elect to adopt a super-efficient building code known as the "Stretch Code" in place of the State's existing "base" Building Code. The term "stretch code" refers to the stretching of the existing Massachusetts State Building Code to cover more energy efficient measures. As of December, 2011, over one hundred municipalities had adopted the "Stretch Code" in Massachusetts.



The “Stretch Code” requires all new residential, commercial and industrial construction to minimize, to the extent feasible, the life-cycle cost of the facility by utilizing energy efficiency, water conservation and other renewable or alternative energy technologies. The “Stretch Code” uses real-world testing to ensure residential energy savings, and energy modeling to ensure commercial energy savings. Performance testing is necessary because prescriptive codes do not guarantee good installation, air and water tightness, or that thermal insulation will be effective. Even the smallest air gaps can reduce the thermal resistance value of insulation by 50% or more.

Any town or city in the Commonwealth may adopt the “Stretch Code” by decision of its governing body following a public hearing. In a city, the governing body is the city manager and the city council, or the mayor and city council. In towns, the governing body is the Board of Selectmen. In order to be adopted, the “Stretch Code” must be first considered at an appropriate municipal public hearing, subject to the municipality’s existing public notice provisions.

Adoption Process

- » Training for building officials
- » Public education campaign
- » Municipal Public Hearing
- » Vote of Town Meeting, or Mayor and City Council

Timing of Adoption

- » Municipal vote can be at any time
- » Code change takes effect on January 1st or July 1st
- » Base & Stretch Code both in place for the first 6 months (concurrency period) during which builders can choose EITHER code.

Towns are advised to seek adoption of the Stretch Code as a general bylaw through a vote of Town Meeting. There can be no amendments to the bylaw/ordinance language in order for the bylaw / ordinance to be in effect. Municipalities that successfully adopted the “Stretch Code” found public outreach to the building community on the key requirements played an important role in its passage. A model article and bylaw as well as public outreach materials are provided in the links below.



LINKS TO MORE INFORMATION

FOR MORE INFORMATION ON THE STRETCH CODE, VISIT THE MASSACHUSETTS GREEN COMMUNITIES GRANT PROGRAM:

<http://www.mass.gov/eea/energy-utilities-clean-tech/green-communities/>

SAMPLE WARRANT ARTICLE

STRETCH CODE MODEL GENERAL BYLAW (CITY)

STRETCH CODE MODEL GENERAL BYLAW (TOWN)

STRETCH CODE REQUIREMENTS FACT SHEET

FOR MORE INFORMATION, PLEASE CONTACT

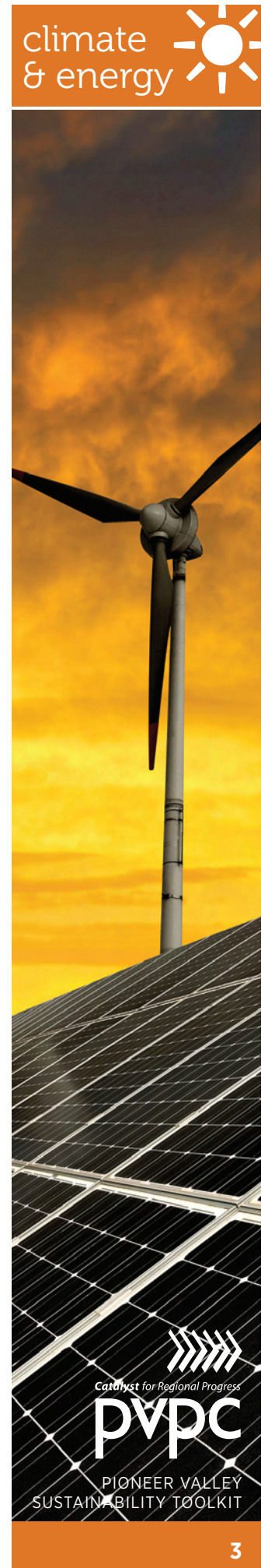
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Solar Photovoltaic System Zoning

PURPOSE

To promote the production of clean, renewable power with solar energy systems while ensuring that they are properly sited, installed and maintained.

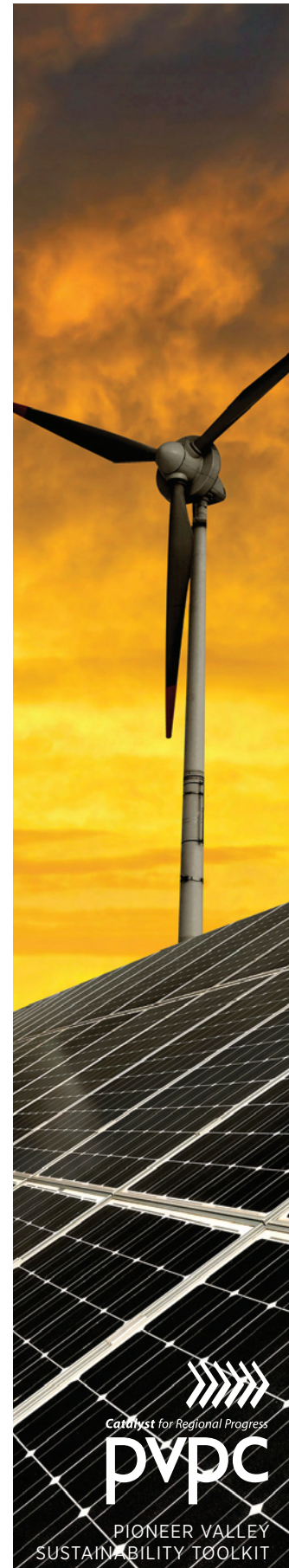
HOW IT WORKS

Photovoltaic (PV) systems use one or more panels to generate renewable energy by converting sunlight into electricity. PV Systems lower fossil fuel use and pollution, and increases energy independence.

These systems can be sized at different scales, from a few panels that aid a home's consumption to a utility-scale solar array meant to sell energy to electric utilities. While Massachusetts General Law Chapter 184, Section 23C states that municipalities cannot "forbid or unreasonably restrict" solar energy systems, cities and towns are free to create bylaws and ordinances that address environmental, design and safety standards to ensure PV systems are properly installed and sighted to avoid potentially negative impacts on neighbors.

In general, these municipal ordinances or bylaws are designed with standards that address different scales of PV installations, placing higher standards on large-scale, ground-mounted photovoltaic systems, since they have the potential to use a significant amount of land and therefore have a broader impact on the public. These bylaws cover issues such as: land clearing, landscaping, setbacks, lighting, signage, utility connections, emergency services, maintenance and decommissioning of the systems once it has reached the end of its useful life. Complying with these standards requires at a minimum Site Plan Approval and in some cases a Special Permit.

On the other hand, small-scale or building-mounted photovoltaic installations are often held to lower standards since their potential for public impacts is so low. These smaller systems, which are usually meant to provide electricity on-site rather than for the wholesale energy markets, are generally permitted as long as they comply with the building code and obtain a municipal building permit.

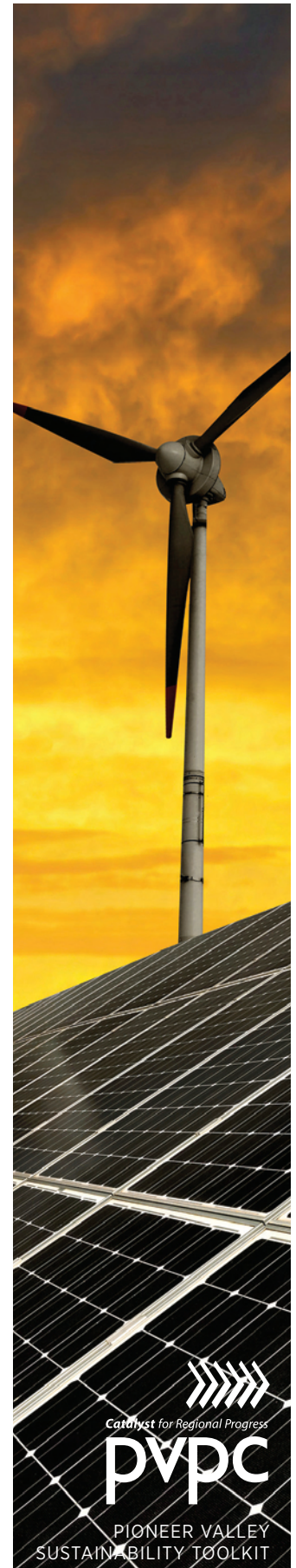


EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED

Several Pioneer Valley municipalities, including Chesterfield, Easthampton, Holland, Holyoke, Monson, Middlefield and Palmer, and a handful of others throughout the state, have already adopted zoning ordinances or bylaws that allow photovoltaic systems in their jurisdiction.

The Massachusetts Green Communities Office, under the Department of Energy Resources, has developed a model bylaw for large-scale, ground-mounted solar photovoltaic systems. The bylaw allows these systems to be installed by-right as long as they meet the requirements it outlines and passes site plan review. The Town of Middlefield used this state model to allow large photovoltaic systems in their town, adding height limits, soil permeability and site shading requirements. Other towns, such as Chesterfield, Palmer, Monson and Holland have also used this state model to develop their own bylaws.

The Town of Hadley took a slightly different approach. The town's planning board worked on a bylaw that establishes clear guidelines for solar energy system permitting at all scales. The bylaw allows building integrated systems with only a building permit, allows small ground-mounted systems with planning board review, and requires a special permit for utility-scale installations.



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LINKS TO MODEL BYLAWS OR MORE INFORMATION

U.S. DEPARTMENT OF ENERGY, DIVISION OF ENERGY EFFICIENCY AND RENEWABLE ENERGY

http://www.energysavers.gov/your_home/electricity/index.cfm/mytopic=10710

THE MASSACHUSETTS DEPARTMENT OF ENERGY RESOURCES HAS DEVELOPED A MODEL BYLAW FOR ALLOWING AS-OF-RIGHT USE OF LARGE-SCALE GROUND-MOUNTED SOLAR PHOTOVOLTAIC INSTALLATIONS. THIS MODEL CAN BE FOUND AT:

<http://www.mass.gov/eea/docs/doer/green-communities/grant-program/model-solar-bylaw-rev-dec-2010.doc>

PALMER PHOTOVOLTAIC BYLAW:

http://www.townofpalmer.com/Pages/PalmerMA_TCOrdinances/Ordinance%202011-02%20Photovoltaic%20Ordinance?textPage=1

MASSACHUSETTS GREEN COMMUNITIES THAT HAVE ADOPTED BY-RIGHT RENEWABLE ENERGY BYLAWS:

<http://www.mass.gov/eea/docs/doer/green-communities/grant-program/adopted-as-of-right-siting-through-re-generation.pdf>

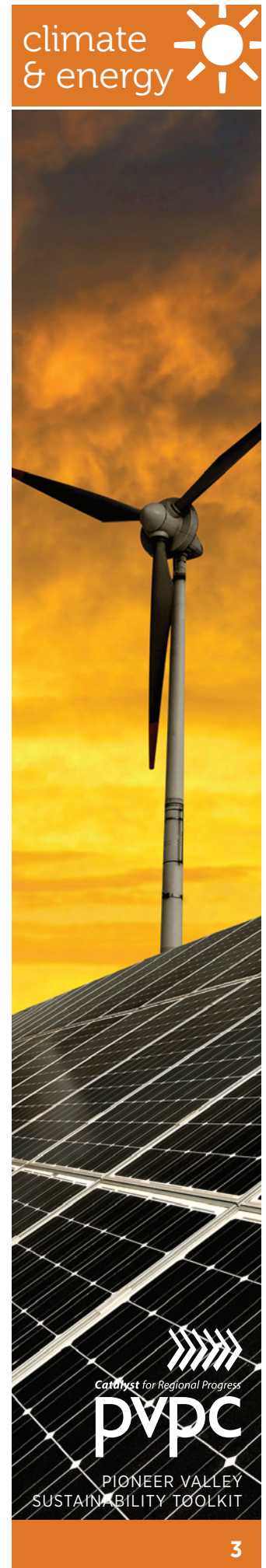
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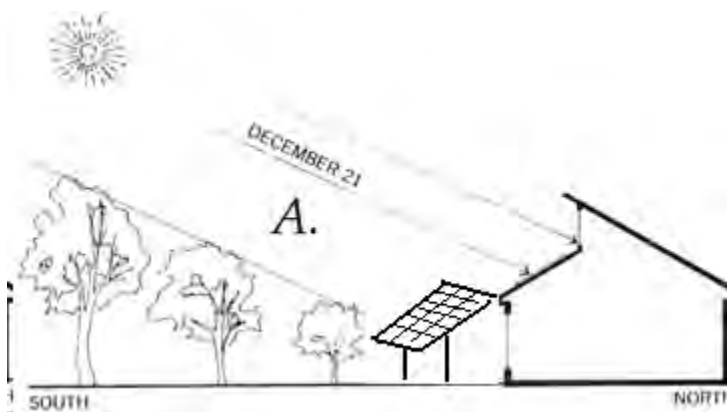
Solar Access Zoning

PURPOSE

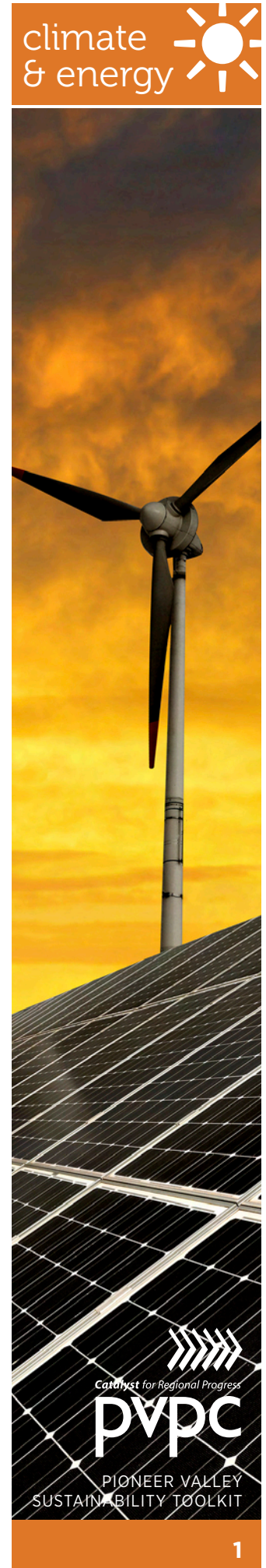
To protect access to sunlight for all properties, and restrict shade due to structures and vegetation. Solar access zoning preserves the economic value of solar radiation falling on structures, investments in solar energy systems, and options for future uses of solar energy.

HOW IT WORKS

Solar access zoning preserves the economic value of solar radiation falling on structures, investments in solar energy systems, and options for future uses of solar energy. This is particularly important for the latter two; since their value is dependent on solar access and their installation require significant investment.



In Massachusetts, the state’s Zoning Act, in Chapter 40A, Section 9B, provides that local zoning may protect solar access by regulation of the orientation of streets, lots and buildings, maximum building heights, minimum building setback requirements, limitations on vegetation, and other provisions. These height and setback requirements can be placed as a precondition for a permit by requiring a shadow analysis on the structure to be erected to make sure it does not block solar radiation on neighboring properties.



EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED

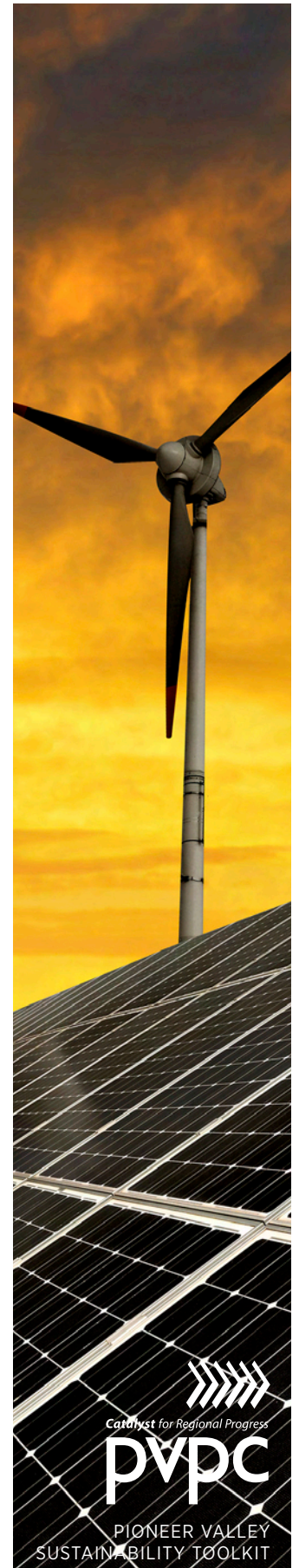
In the Town of Cornwall, Connecticut, developers are “urged to consider solar access in the layout of features on the site plan” and are prohibited from locating buildings where they would cast shadows on the buildable part of an adjacent lot between the hours of 9 a.m. and 3 p.m. on December 21 of any year.

Boulder, Colorado protects solar access by delineating a 12 foot or 25 foot hypothetical “solar fence” on the property lines of the protected buildings. The ordinance is designed to protect access for a four hour period on December 21st. Under most circumstances, new structures are not allowed to shade adjacent lots to a greater extent than the applicable solar fence.

In Oregon, Eugene, Clackamas County and Ashland have adopted solar access zoning, which requires building setbacks to ensure that shadows are no greater than a specified maximum at property lines.

Ambitious jurisdictions can also protect solar access by requiring developers to consider solar access in entire subdivision lay outs. Already subdivisions in such widely disparate locations as Drake Landing, Alberta, and Davis, California, are being designed so that each lot receives maximum solar exposure. Fort Collins, Colorado, and Multnomah, Oregon have enacted regulations requiring that a specified percentage of lots in new subdivisions — 20 to 30 percent — must be oriented to take advantage of sunlight.

The City of Vancouver has developed and approved two passive solar design toolkits detailing ways to reduce energy use in new buildings, which are a major source of greenhouse gas emissions in Vancouver. The toolkits provide best practices for homes and larger buildings for passive design elements such as layout, orientation, insulation, landscaping and ventilation.



LINKS TO MODEL BYLAWS OR MORE INFORMATION

COMMUNITY SOLAR ACCESS INFORMATION FROM THE U.S. DEPARTMENT OF ENERGY. INCLUDES LINK TO A DOWNLOAD WITH EXAMPLES OF ADOPTED BYLAWS FROM AROUND THE COUNTRY.

http://www4.eere.energy.gov/solar/sunshot/resource_center/ask/question/question_6

A COMPREHENSIVE REVIEW OF SOLAR ACCESS LAW IN THE UNITED STATES:

<http://www.solarabcs.org/about/publications/reports/solar-access/>

FREQUENTLY ASKED QUESTIONS ABOUT PLANNING AND ZONING FOR SOLAR ACCESS, AMERICAN PLANNING ASSOCIATION

<https://www.planning.org/research/solar/faq.htm>

BOULDER, CO SOLAR ACCESS ORDINANCE:

http://www.smartcommunities.ncat.org/codes/boldera1_gb.shtml

CITY OF ASHLAND, OR SOLAR ACCESS ORDINANCE:

<http://www.ashland.or.us/Page.asp?NavID=2788>

CITY OF VANCOUVER PASSIVE DESIGN TOOLKIT:

<http://vancouver.ca/sustainability/documents/PassiveDesignToolKit.pdf>

FOR MORE INFORMATION, PLEASE CONTACT

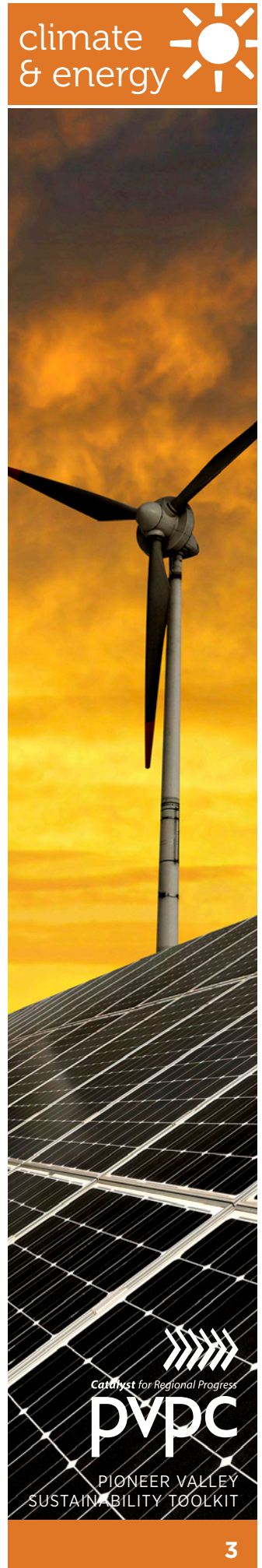
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Urban Forest Overlay Districts

PURPOSE

To mitigate climate change, reduce greenhouse gas, and absorb carbon dioxide through the use of zoning bylaws dedicated to creating a healthy tree canopy within an urban area.

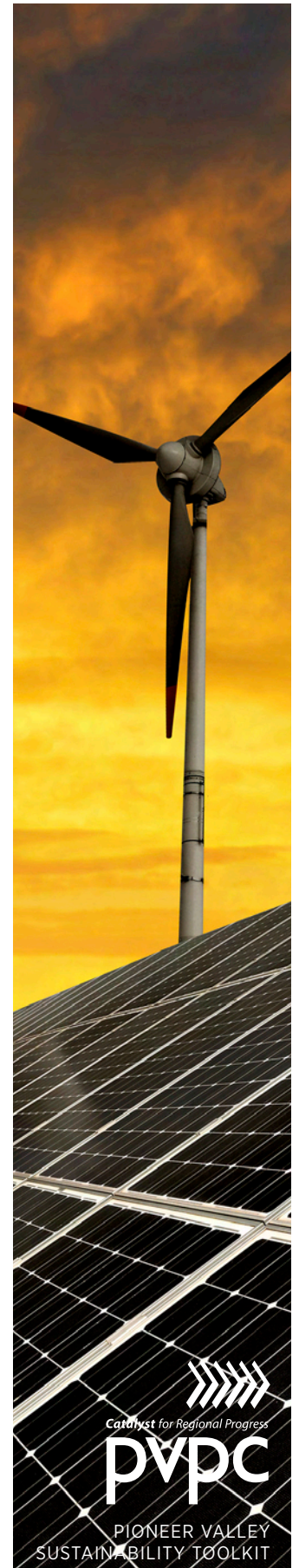
Healthy urban forests have positive impacts on both the natural environment and human health. Trees absorb carbon dioxide and other pollutants, remove greenhouse gas, and improve air quality for nearby residents. Tree cover and the resulting shade limit the rise in temperature associated with urban heat island effect. Importantly, tree branches, leaves and root systems absorb rain water and thus limit the intensity and volume of stormwater runoff. This can have major watershed benefits, including reductions in particulate matter, nonpoint source pollution, and the temperature of water bodies. Full, healthy tree canopies also reduce noise and improve the natural beauty of an area.

In a variety of ways, the more trees there are in a community, the more beneficial those trees become. The root systems of multiple trees are able to more effectively stabilize soil from stormwater inundation. Wildlife is provided with a better habitat in which to live by having a continuous tree canopy. The aesthetics of a tree-lined road are more desirable than individual, spread-out trees. Finally, because greenhouse gas is being emitted at a high rate, the planting of many trees allows for much more effective mitigation.

Municipalities can protect and increase the number of trees to create urban forests through the use of zoning overlay districts. Overlays are incorporated into a zoning ordinance and place special land use regulations on top of existing zoning districts, such as requiring new development to include a certain number of trees. The requirements also often regulate permitted tree species, maintenance procedures, and the planting of other vegetation.

HOW IT WORKS

The first step in implementing an urban forest overlay district is to conduct a community tree inventory. The inventory will provide information about the number, type, and location of trees that already exist, as well as help inform the discussion about where the overlay district should be located. When conducted with the help of volunteers, the inventory can also be a way of facilitating community involvement.



After the inventory is complete, the results can be reviewed at a public meeting. This meeting can include a discussion and determination of specific areas in the community where more trees are needed. After these areas have been identified, the specific requirements of the overlay district can be discussed, which will help develop the language amended to the zoning code. The specific language for the zoning overlay district should include the following:

- » Purpose and intent of the overlay district
- » Defined boundaries of the district with identification of specific streets and lots
- » List of size and species of trees recommended or required as part of new development
- » Minimum number of trees required per specific lot area
- » Maximum and minimum spacing distances between trees
- » Amount or percentage of lot area that must be under tree canopy

The specific requirements for each of these items will depend on the particular context of the community. The resources and examples listed below can provide more information.

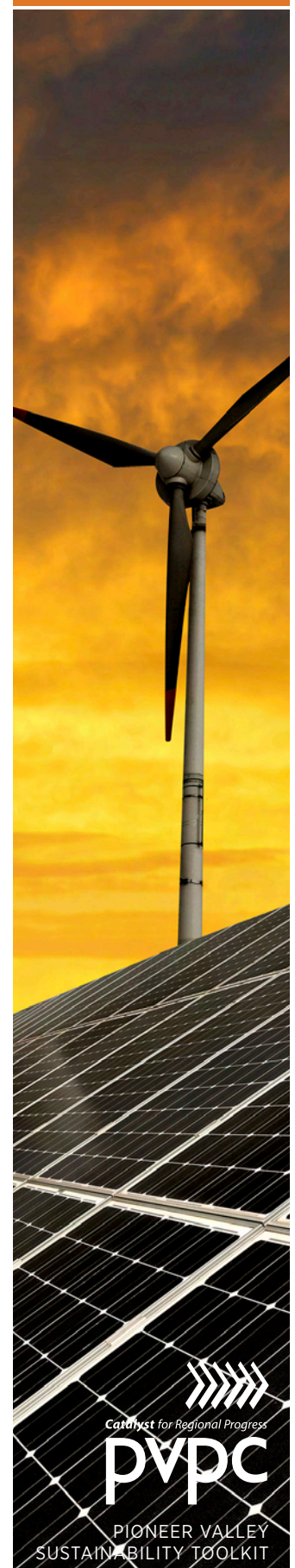
Important decision-makers to include in the discussion include the general public, the zoning board of appeals, planning board, planning department, and public works department. Once the specific requirements have been agreed upon and the language for the ordinance developed, it can be passed as an amendment to the zoning code, following the municipality's established procedures.

As an alternative to an urban forest overlay district, tree preservation and planting requirements can also be adopted in general ordinances and bylaws or in subdivision regulations. The Town of Granby, MA is an example of a community in which tree standards were incorporated into the subdivision regulations.

EXAMPLES OF COMMUNITY IMPLEMENTATION

Salem, Virginia

The purpose of the Salem Urban Forest Overlay District is to increase the quantity of trees present in new developments along seven designated corridors. New developments are required to have at least one tree per acre and at least one tree per 100 feet of street frontage. A list of specific trees is provided that are recommended for new developments. These trees are selected for their ability to grow to at least 20 feet tall, filter out particulate matter, and absorb ozone. The inclusion of these recommendations encourages the development of a healthy urban forest, with trees that are suitable to



local weather conditions and trees that will provide a large tree canopy.

Washington, D.C.

The Forest Hills Tree and Slope Protection Overlay District, effective in the city since 2007, was enacted to preserve the park-like character of several of its neighborhoods. The overlay helps to preserve natural topography and mature trees by restricting the maximum ground coverage allowed for new construction. The overlay is mapped over low-density residential zoning districts and restricts maximum lot occupancy to 30 percent, minimum lot size to 9,500 square feet, and requires side yards between 8 to 24 feet. Other density controls, such as maximum building height, remain controlled by the underlying zoning district.

Manassass, Virginia

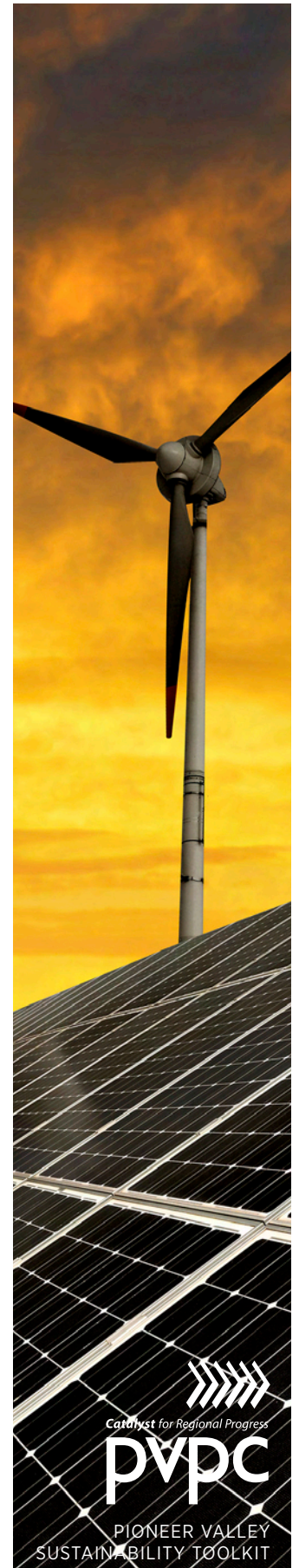
Manassass' Tree Canopy Requirements article of the City's Zoning Ordinance provides for the long term preservation and development of a mature tree canopy. The article defines "tree canopy/tree cover" as "the aggregate area of coverage by plant material exceeding five feet in height and measured at the drip line. The article requires site plans applied for in low density zones to have 20 percent of the total lot area covered by tree canopy, moderate density zones to have 15%, and higher density apartments and condos to have a minimum of 10 percent. The City's design and construction standards manual, which also includes standards for tree preservation, size, and replacement guidelines, also references the Tree Canopy Requirement.

Granby, Massachusetts

An amendment to the subdivision regulations of the Town of Granby was drafted and passed in 2005. The code calls for the preservation of existing trees to the greatest extent possible, the planting of trees for new developments along the right of way at a minimum of 30 foot intervals, and that 35% of individual lots be shaded, excluding the building footprint and driveway.

Lawrence, Massachusetts

A zoning amendment was passed by the Town of Lawrence and includes requirements for two shade trees or three ornamental trees for every ten spaces in new or expanded parking lots. Multi-family developments requiring Site Plan Review are also subject to the regulations. The code also outlines guidelines for tree preservation during construction, maintenance procedures, and an 8-foot minimum height for tree plantings.



LINKS TO MODEL BYLAWS OR MORE INFORMATION

SOMERVILLE, MA TREE INVENTORY:

<http://www.somervillema.gov/departments/ospcd/parks-and-open-space/urban-forest/inventory>

MA DEPARTMENT OF CONSERVATION AND RECREATION, URBAN FORESTRY SECTION:

<http://www.mass.gov/dcr/stewardship/forestry/urban/urbanFAQs.htm>

SALEM:

<http://www.rvarc.org/utc/SalemUrbanForestOverlayDistrict.pdf>

GRANBY:

<http://www.mass.gov/dcr/stewardship/forestry/urban/docs/ordgran.pdf>

LAWRENCE:

<http://www.mass.gov/dcr/stewardship/forestry/urban/docs/ordlaw.pdf>

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Wind Energy System Zoning

PURPOSE

To promote the production of clean, renewable power with wind energy systems while ensuring that they are properly sited, installed and maintained.

HOW IT WORKS

Wind is a renewable energy resource which lowers fossil fuel use and associated pollution, and increases energy independence. Wind energy systems use the kinetic energy in the natural motion of the wind and convert it into electricity. This is usually accomplished by fan-like structures that spin an electric generator as they are swept by the wind.

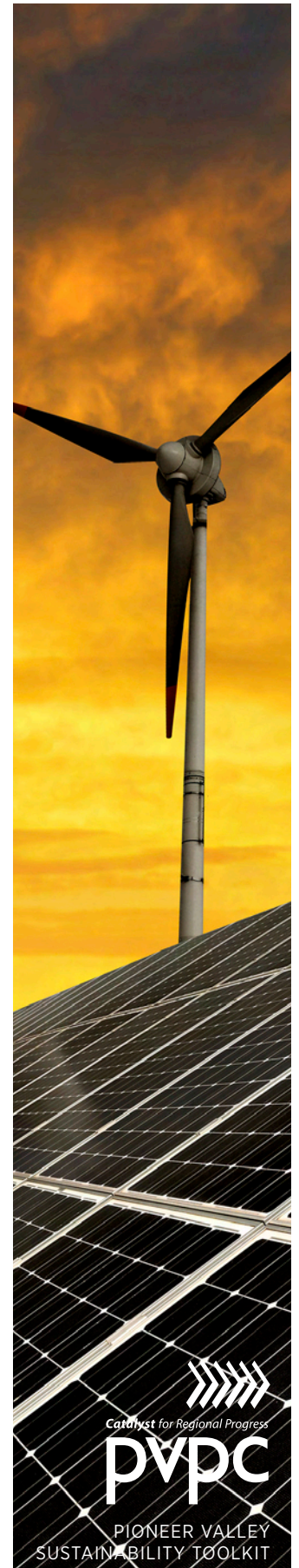
The scale of a wind energy installation can vary, from small-scale residential wind turbines as the height of a utility pole to large-scale commercial turbines a few hundred feet tall. Cities and towns can adopt bylaws and ordinances that address environmental, design and safety standards to ensure that any wind energy system is properly installed and sited to avoid potentially negative impacts on neighbors and the environment.

Zoning bylaws that regulate wind energy systems generally specify requirements for: lot size, type of tower, supporting foundations, tower height, setbacks, visual impact, color, lighting, signage, noise and measurement of any shadow or flickering effects, utility connections, emergency services, maintenance and decommissioning of the systems once it has reached the end of its useful life.

EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED

Over 30 Massachusetts' towns have adopted wind energy bylaws, including Chester, Dennis, Middlefield, Nantucket, Plymouth, Revere, Spencer, Wenham and Worcester.

The Massachusetts Green Communities Office, under the Department of Energy Resources, has developed a model bylaw for large-scale wind energy systems. This model has been used by Kingston, Milton, Revere and Wenham to allow by-right installation of wind towers as long as they meet the requirements outlined in the bylaw and that projects comply with site plan review.



The Town of Plymouth allows wind turbines of up to 350 feet in height to be located in their jurisdiction as long as they meet all the requirements for a special permit, such as those related to setbacks, noise, utility connections and others described above. Similar in requirements, the town of Chester in the Pioneer Valley region allows for large-scale wind turbines up to 420 feet.

Also in the Pioneer Valley, the Town of Middlefield allows only small-scale wind energy systems in their jurisdiction by special permit, which is defined as any system under 130 feet in height and with a capacity equal to or less than 60 kilowatts (kW).

LINKS TO MODEL BYLAWS OR MORE INFORMATION:

THE MASSACHUSETTS DEPARTMENT OF ENERGY RESOURCES HAS DEVELOPED A MODEL BYLAW WIND ENERGY INSTALLATIONS. THIS MODEL CAN BE FOUND AT:
<http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/wind/wind-energy-model-zoning-by-law.html>

TOWN OF CHESTER WIND BYLAW:
<http://townofchester.net/sitebuildercontent/sitebuilderfiles/windenergyconversionfacilitiesbylawfinal.doc>

TOWN OF DENNIS ZONING BYLAWS – SECTION 11:
http://www.town.dennis.ma.us/Pages/DennisMA_Building/bylaw.pdf

TOWN OF LUDLOW SMALL WIND ENERGY BYLAW – SECTION 6.19:
<http://www.ludlow.ma.us/reports/planning/bylaws/zoning-bylaw-text.pdf>

CAPE AND ISLANDS SELF-RELIANCE
<http://www.reliance.org/wind.asp>

MASSACHUSETTS GREEN COMMUNITIES THAT HAVE ADOPTED BY-RIGHT RENEWABLE ENERGY BYLAWS:
<http://www.mass.gov/eea/docs/doer/green-communities/grant-program/adopted-as-of-right-siting-through-re-generation.pdf>

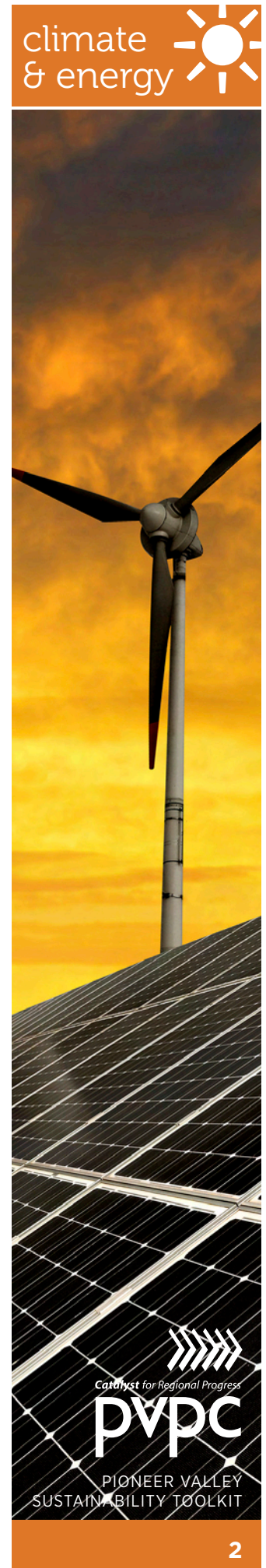
CAPE COD COMMISSION MODEL BYLAW FOR WIND ENERGY CONVERSION FACILITIES:
<http://www.capecodcommission.org/resources/bylaws/ModelWindBylaw.pdf>

FOR MORE INFORMATION, PLEASE CONTACT

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Clean Energy Financing Program

PURPOSE

To help property owners finance energy retrofits or clean energy systems in order to help municipalities achieve their greenhouse gas reduction goals, create more jobs, lower utility costs for property owners and reduce air pollution from fossil fuel sources.

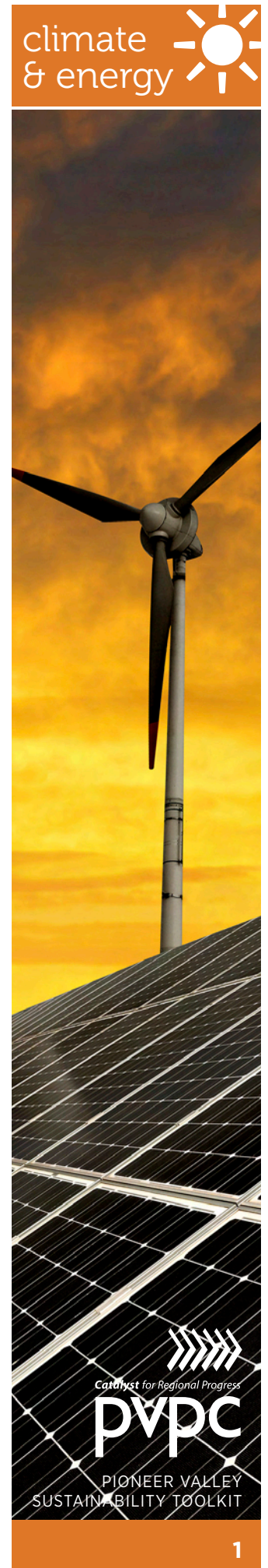
A clean energy financing program sets up a revolving loan fund where property owners can borrow to improve their home or business' energy performance and value.

HOW IT WORKS

A clean energy financing program helps property owners borrow money to improve their home or business's energy performance and value. Often the property owner will not experience an increase in total monthly costs because reduced utility costs will offset the cost of the loan payment.

Municipalities can create a revolving loan fund and receive payment from program participants over an extended period of time. Some communities choose to enact a PACE Program which ties the loan to the a lien on the deed—rather than to the owner of the property (see box about PACE Program below). This encourages property owners to make long-term investments in energy efficiency; it frees them from worrying about whether their investment will be paid back within the period of their ownership.

Other clean energy financing programs are provided by municipal or privately-owned utilities. In some instances, the utility pays for a substantial part of the clean energy improvements. In other instances, the utility provides financing with low or no interest.



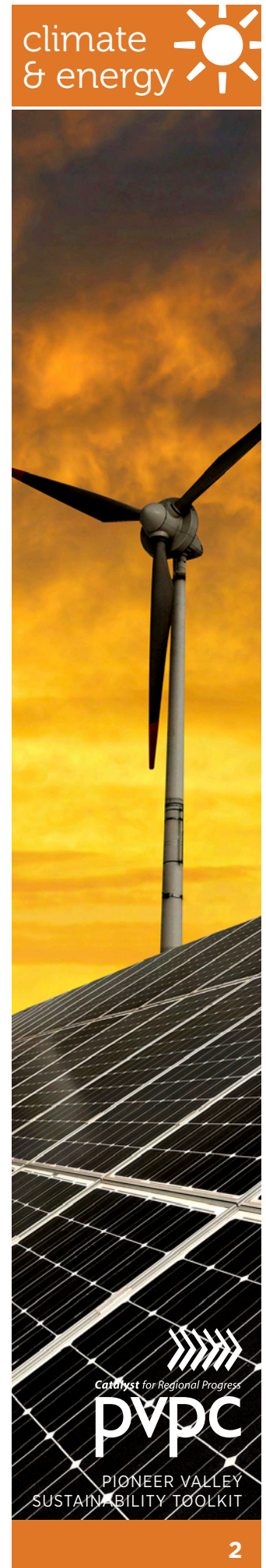
What's a PACE Program?

A PACE program is a mechanism which allows loans to be tied to the property owner through a lien on the deed. Therefore, if a home or business owner sells their property before having paid off the clean energy loan, the next owner will be responsible for continuing to repay the loan as they enjoy the benefits of the property's clean energy. PACE financing is allowed in under Massachusetts General Laws Chapter 44, Section 53E ³/₄ and requires municipal action to be enacted at the local level.

Program participation in clean energy financing programs may be open to everyone, or limited based on income level, energy use as determined by an energy audit, geography or some combination thereof. The program's first step is usually to conduct an energy audit of the residence or business, analyze the results and recommend the energy retrofits with the best monetary payback and positive environmental impact.



Thermal image of a house in the Pioneer Valley. Such imaging software helps auditors identify heat leaks to perform comprehensive energy retrofits.



After improvements have been performed, program costs can be recouped through periodic loan repayments by participants, or other innovative methods. For example, program costs may be partially repaid by utility subsidies, a monthly surcharge may be added to the utility bill of the customer, or the loan can be paid through a Property Assessed Clean Energy (PACE) financing mechanism.

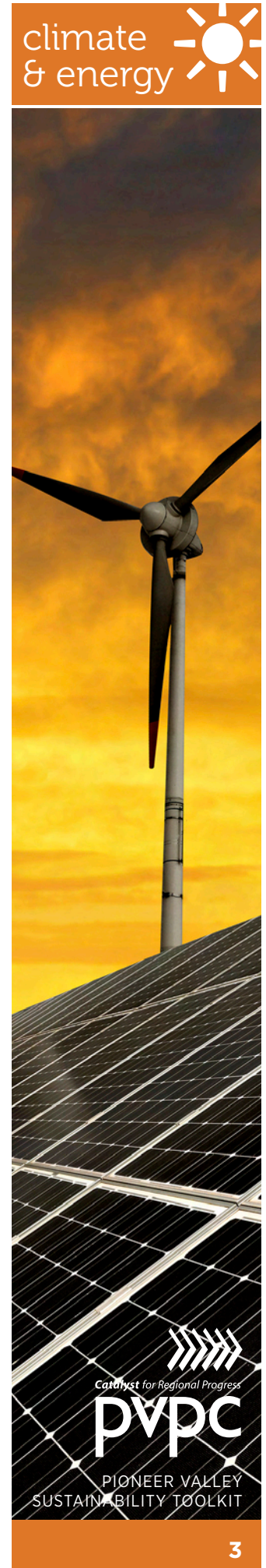
EXAMPLES OF WHERE STRATEGY HAS BEEN ADOPTED

The City of Holyoke's Municipal Gas and Electric Company assists residential customers with loans to help make energy saving improvements on their homes. The loan provides 0% interest assistance of up to \$5,000 for single-family homes, or \$10,000 for multi-family homes with 4 or fewer units. Customers are required to pay a \$100 administrative fee in order to participate in this program. The loan is repayable over up to 5 years and charged to the customer's monthly HG&E bill.

Throughout Western Massachusetts, Columbia Gas will cover up to 75% of the cost to weatherize homes, up to \$2,000. Columbia Gas performs an energy audit and reports energy-saving measures that qualify for incentives. Energy saving measures eligible for the rebate include: attic, wall, and heating pipe/duct insulation and thermostats. When needed, water heater tank wrap, low-flow showerheads, and faucet aerators are installed at no cost.

The City of Northampton adopted a PACE program in 2011 for commercial and multifamily properties, whereby owners will be able to borrow money from the City and repay the loan via a special assessment on their property taxes over a period of years (up to 20 years).

The City of Berkeley, California was the first to offer financial support for residential renewable energy systems, specifically for solar energy sources in a pilot district. They now offer this assistance through the City's PACE financing program.



LINKS TO MODEL BYLAWS OR MORE INFORMATION

HG&E PROGRAM

http://www.hged.com/html/incentive_programs.html#RECProgram

COLUMBIA GAS PROGRAM:

<https://www.columbiagasma.com/en/ways-to-save>

PACE FINANCING INFORMATION:

<http://pacefinancing.org/>

NORTHAMPTON PACE ORDINANCE:

<http://www.northamptonma.gov/1051/PACE-Ordinance>

BERKELEY RENEWABLES FINANCING:

<http://www.ci.berkeley.ca.us/ContentDisplay.aspx?id=26580>

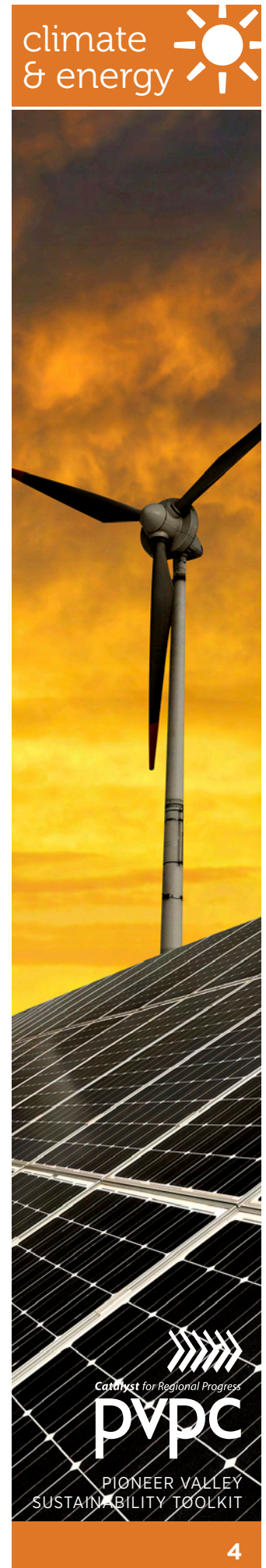
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environment

TOOLKIT FOR

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SUSTAINABILITY TOOLKIT

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Community Preservation Act



Green Development Performance Standards



River Protection Bylaws



Site Plan Review



Transfer of Development Rights



Water Supply Protection Overlay Districts



Wetlands Bylaw



MODEL ENVIRONMENT BYLAWS



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PIONEER VALLEY SUSTAINABILITY TOOLKIT

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.

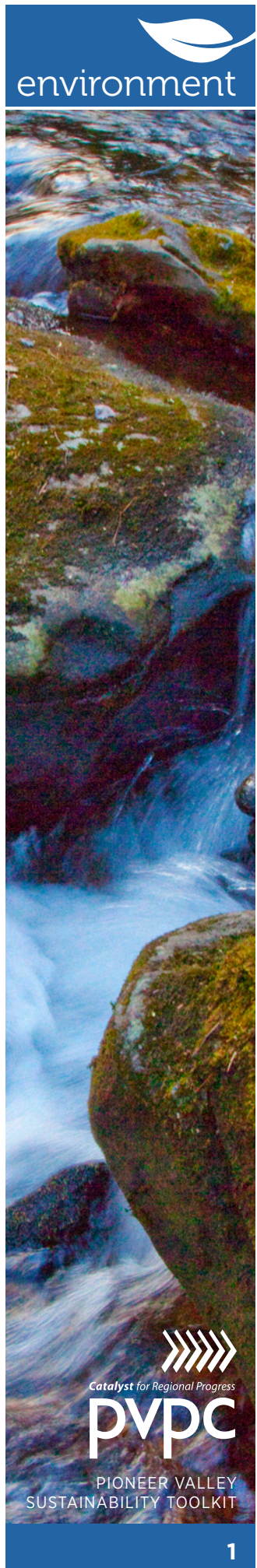
<http://www.mass.gov/dep/water/grants.htm#sums>

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/>

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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 on the right side of the page. It features a close-up of a stream flowing over large, moss-covered rocks. The water is clear and blue, creating a sense of movement. The rocks are dark and covered in vibrant green moss. At the top of the banner, there is a blue header with a white leaf icon and the word "environment" in white lowercase letters. At the bottom of the banner, there is a logo for "Catalyst for Regional Progress" with the acronym "PVPC" in large white letters, and the text "PIONEER VALLEY SUSTAINABILITY TOOLKIT" below it. The page number "2" is located in the bottom right corner of the banner.

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

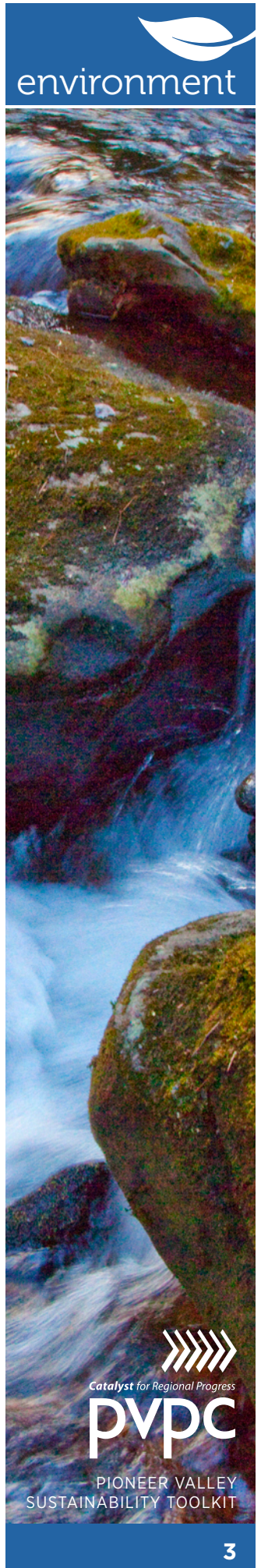
Massachusetts

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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/



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

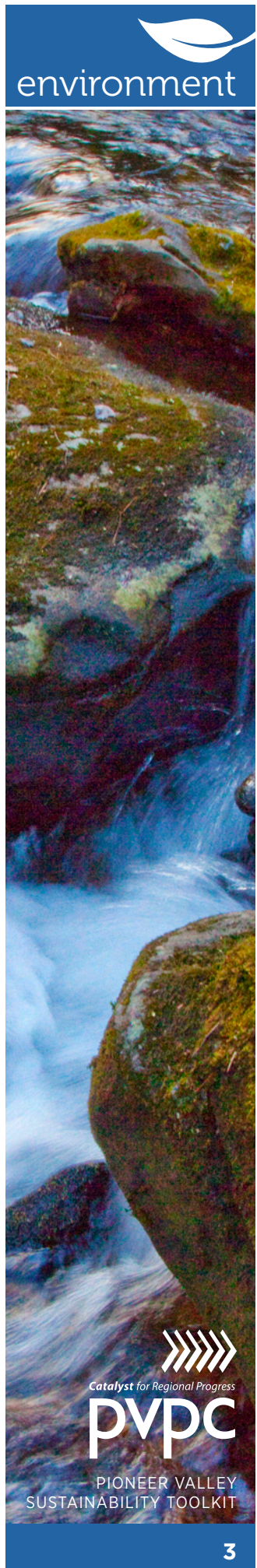
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Household Hazardous Waste Collections

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.

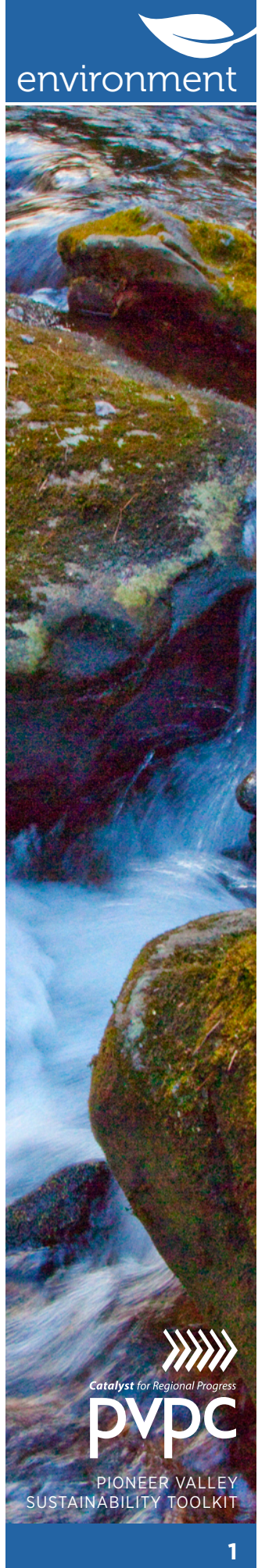
The average home can accumulate 100 pounds of HHW in the basement, garage, and storage cupboards. Improper disposal of household hazardous wastes can include pouring them down the drain, on the ground, into storm sewers, or in some cases putting them out with the trash. The dangers of such disposal methods 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?

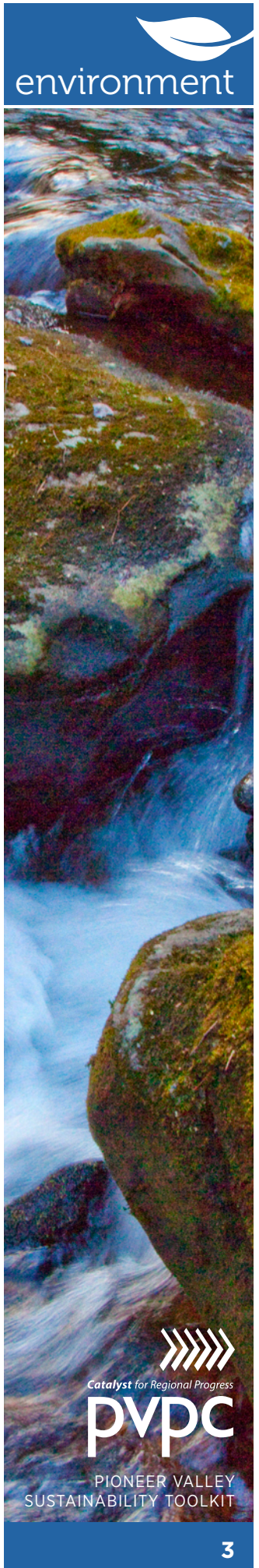
There are several options for managing HHW. The first as with all waste is to discourage purchasing it to begin with. Educate people about non-toxic alternatives, especially for cleaners. And if hazardous products are purchased, they should be used up rather than becoming waste. Educate your community 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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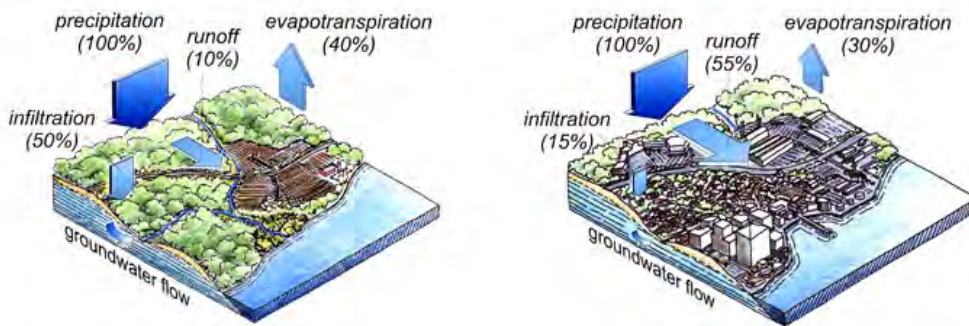
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Low Impact Development (LID)

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

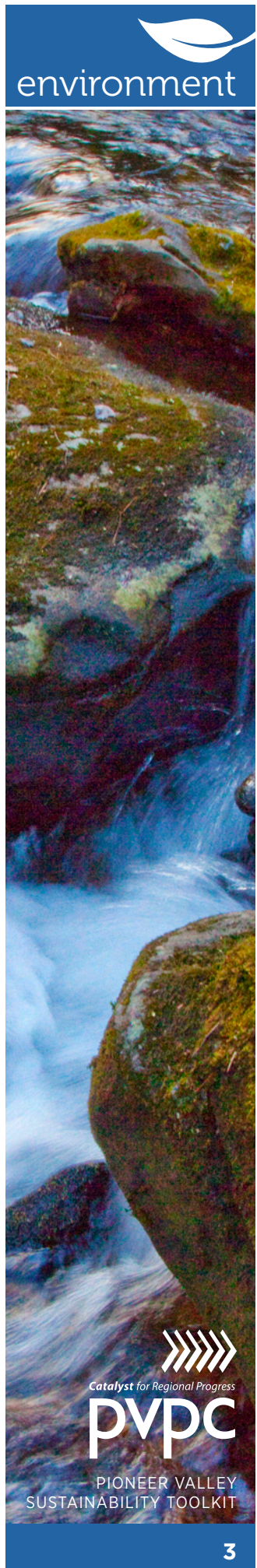
With a Smart Growth Technical Assistance Grant from EOE, PVPC worked with the Pelham Growth Study Committee to draft a Low Impact Development (LID) zoning bylaw utilizing the LID Bylaw from EOE's Smart Growth Tool Kit as a model template. Given the largely rural and residential nature of Pelham, the 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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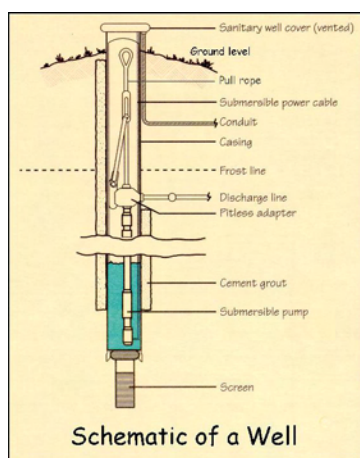
Private Wells

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.

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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

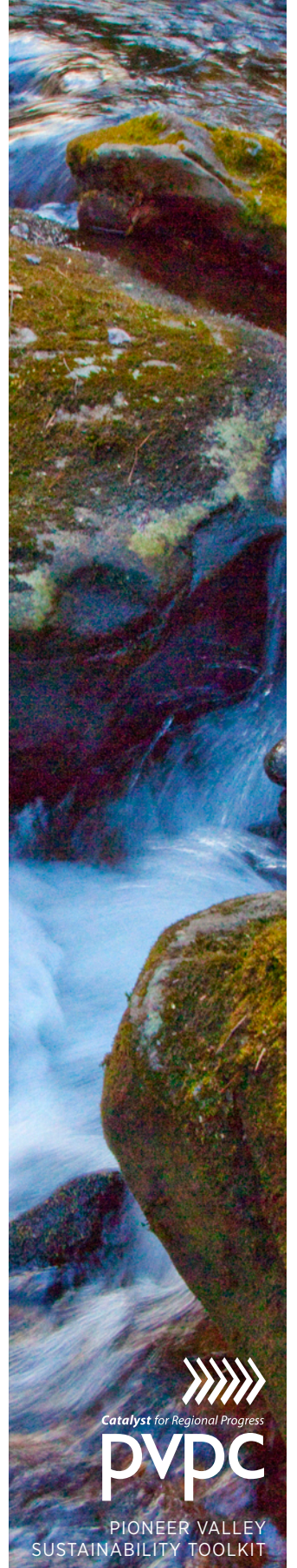
Pioneer Valley Planning Commission
413-781-6045

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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.

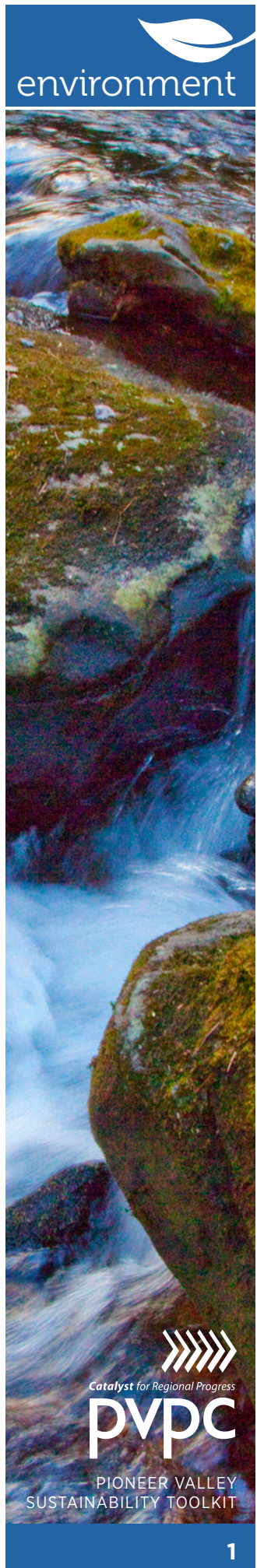
HOW DO BEST MANAGEMENT PRACTICES FOR ROAD CREWS WORK?

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.



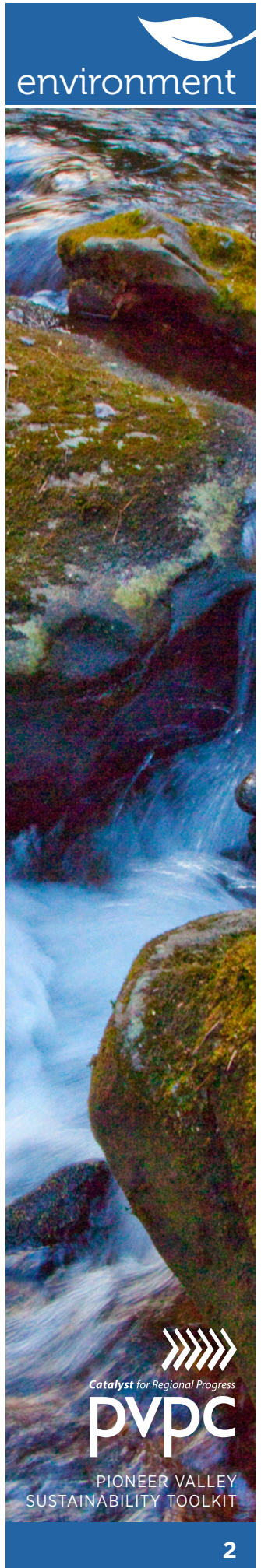
Municipalities should re-visit best management practices on a one to five year time frame to ensure that up-to-date methods are being implemented.

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:

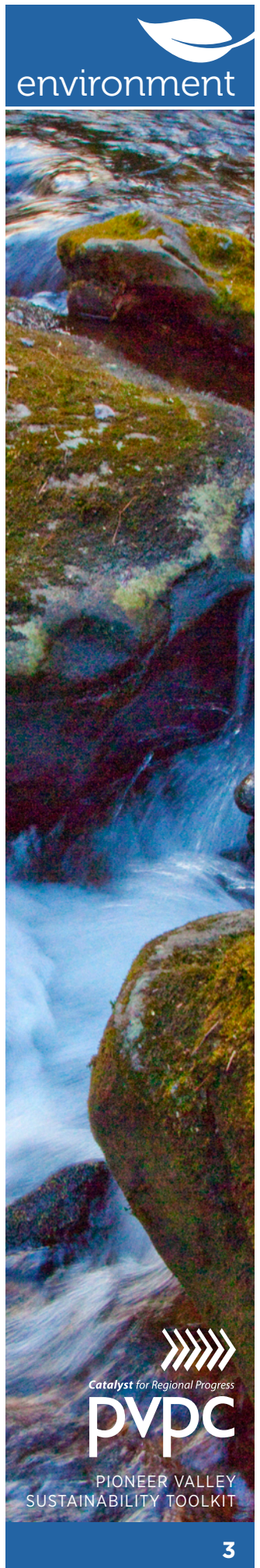
<http://www.environment.transportation.org/>

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.

A vertical banner image showing a stream flowing over mossy rocks. The water is clear and blue, and the rocks are covered in green moss. The banner has a blue header with a white leaf icon and the word "environment" in white text.

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

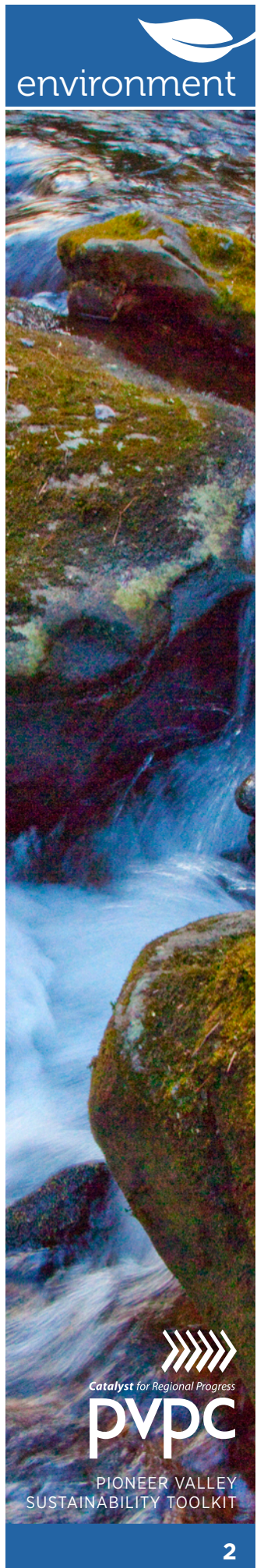
- » Salt application quantities should be determined by the temperature of the road surface.
- » Road salt should be properly handled and stored to reduce potential contamination and eliminate loss to runoff.
- » Evaluate salt alternatives and seek to use alternative road treatment chemicals in the most 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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413-781-6045

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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.

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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

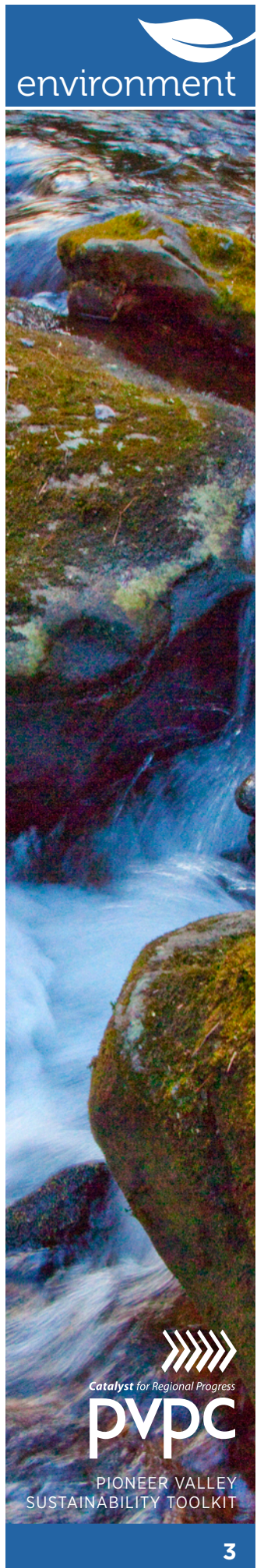
Each state has different resources that can help you understand stormwater management including publications, workshops, websites and circuit riders. For the big picture, explore the EPA web site at

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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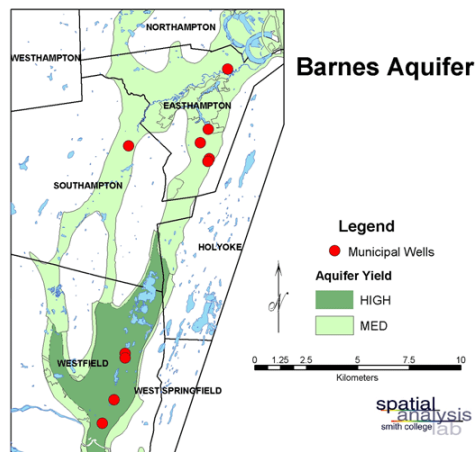
Memorandums of Understanding

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.

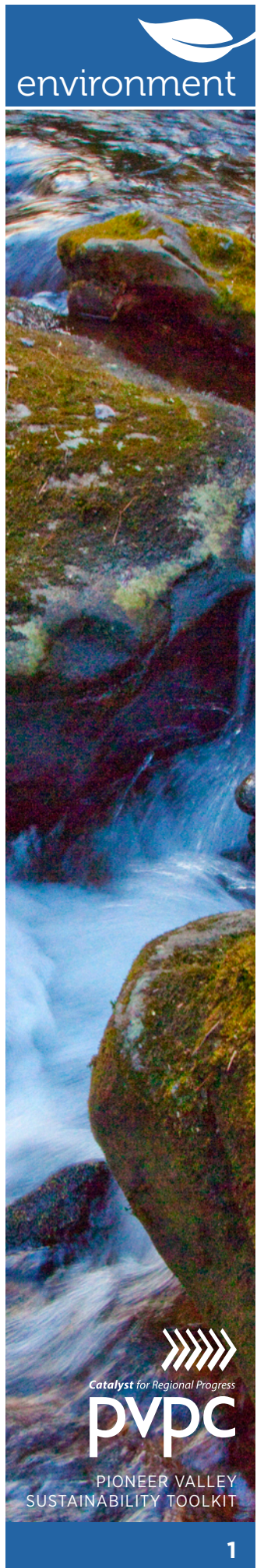
HOW CAN MY COMMUNITY ENACT THE COMMUNITY PRESERVATION ACT?

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.

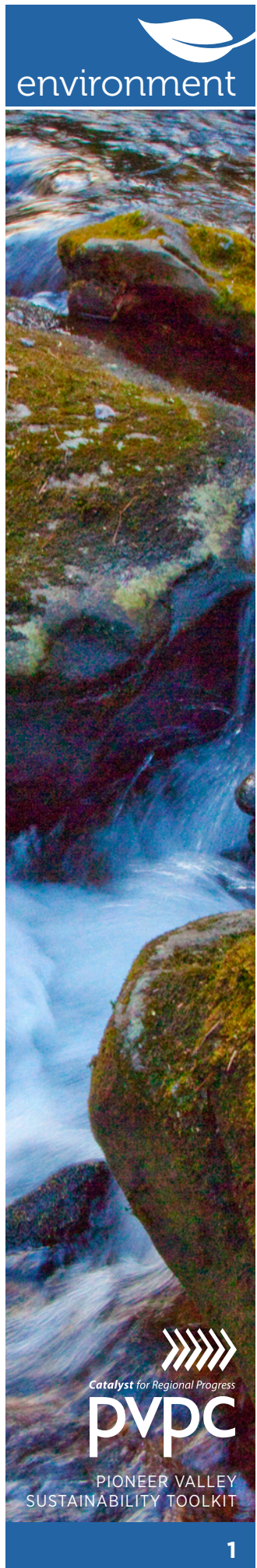
WHY DO WE NEED GREEN DEVELOPMENT PERFORMANCE STANDARDS?

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.

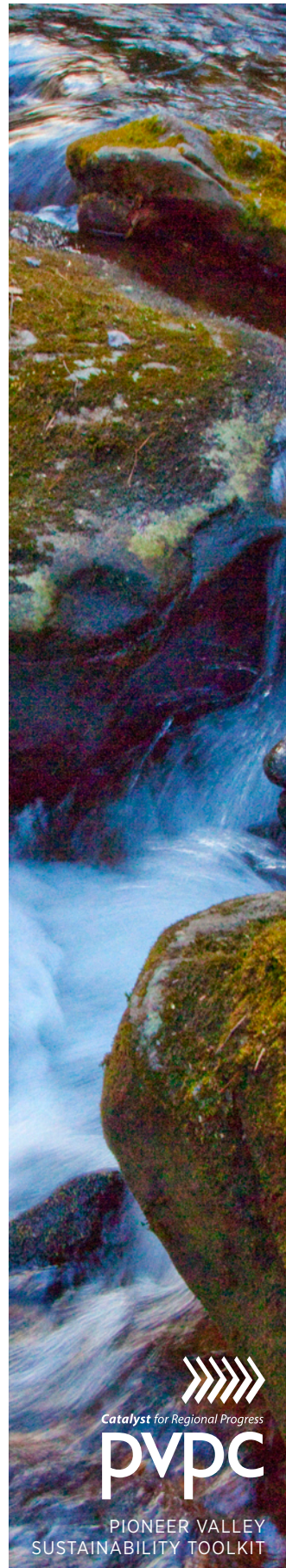


Westfield River, Chester, MA

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.

A vertical banner image on the right side of the page. It features a close-up, artistic shot of water cascading over dark, moss-covered rocks. The water is blurred, creating a sense of motion and texture. The colors are rich, with deep blues and greens. At the top of the banner, there is a blue header with a white leaf icon and the word "environment" in white lowercase letters. At the bottom of the banner, there is a logo for "Catalyst for Regional Progress" consisting of five white chevrons pointing right, followed by the text "Catalyst for Regional Progress" in a small font, and "PVPC" in a large, bold, white font. Below that, it says "PIONEER VALLEY SUSTAINABILITY TOOLKIT" in a smaller white font. At the very bottom right corner of the banner, the number "2" is displayed in white.



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.

FOR MORE INFORMATION, PLEASE CONTACT

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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?

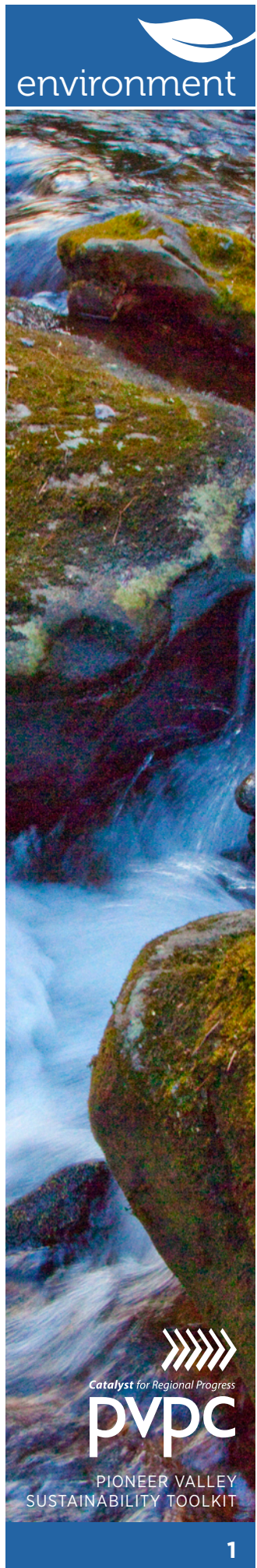
Protecting the quality and quantity of clean drinking water is important to all communities. Many different methods of protecting and conserving clean drinking water have been used throughout history. One technique used in many communities throughout New England today is the “Site Plan Review” process 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.virtuالتownhall.net/public_documents/LebanonNH_PlanDocs/SPREGS.PDF

LEBANON, NH SITE PLAN REVIEW CHECKLIST:

http://lebanonnh.virtuالتownhall.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

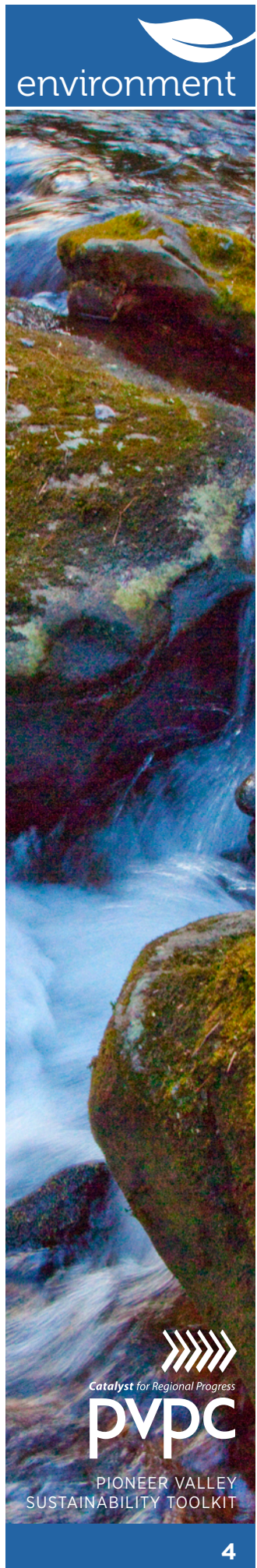
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Transfer of Development Rights

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

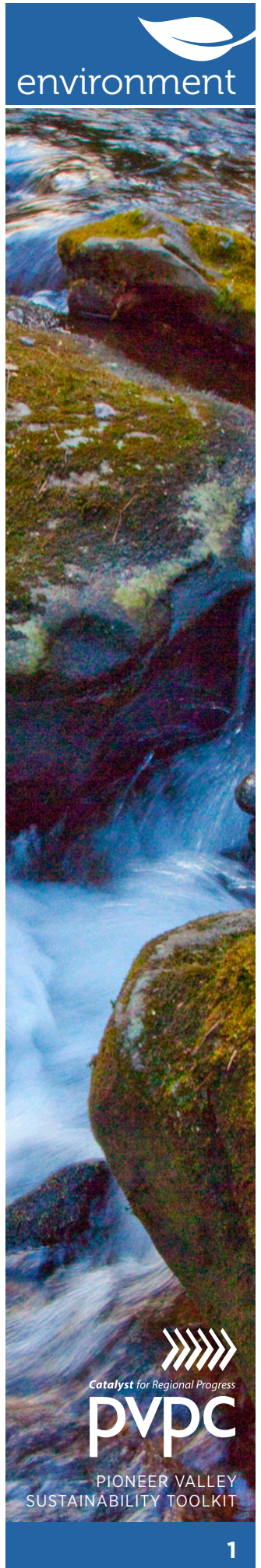
With the adoption of a Transfer of Development bylaw, communities can preserve farmlands, open space and environmentally sensitive areas such as aquifer recharge areas by directing growth away from lands that should be preserved, to areas well suited for higher density development, such as village centers 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 over ten TDR projects, generating a total of over \$400,000 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 350 acres, valued at over \$4 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.

FOR MORE INFORMATION, PLEASE CONTACT

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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.

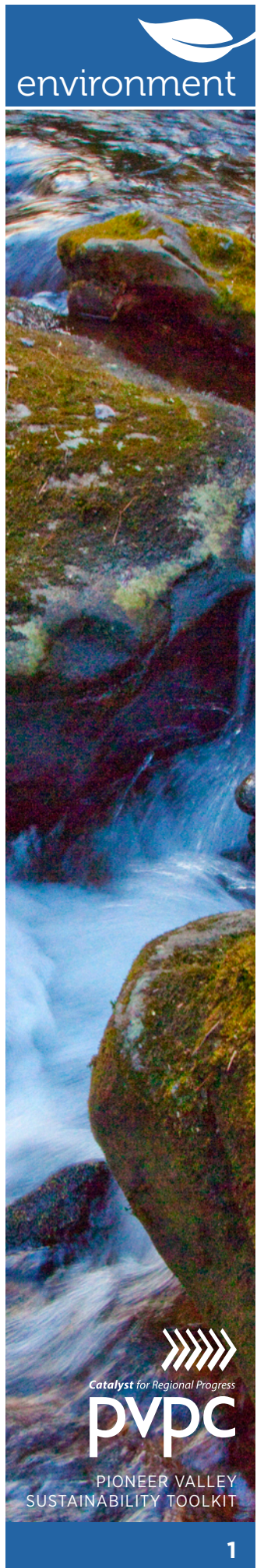
WHY DO WE NEED A WATER SUPPLY PROTECTION OVERLAY DISTRICT?

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

FOR MORE INFORMATION, PLEASE CONTACT

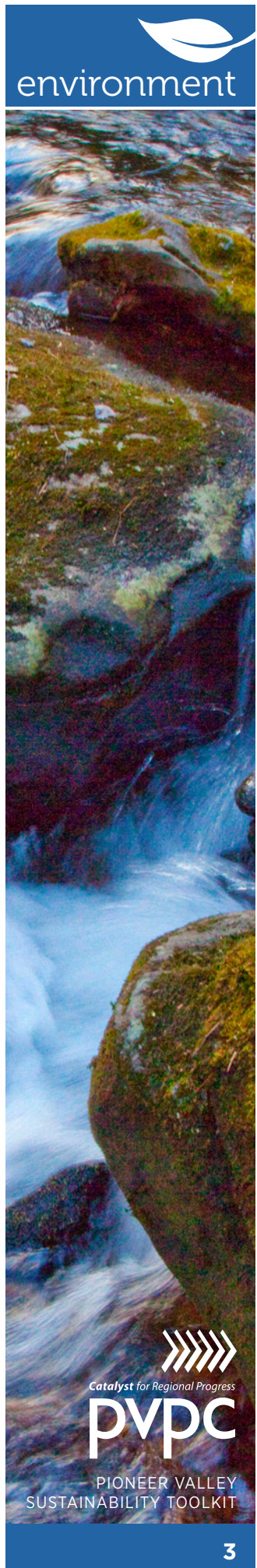
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Wetlands Bylaws

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.

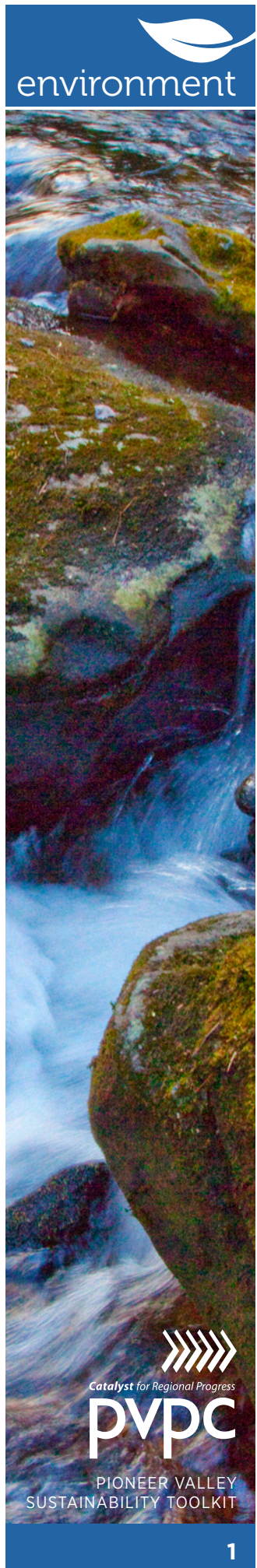
The Wetlands Protection Act is limited to protecting only eight wetland values and covers vegetated wetlands, flood prone areas and other listed resource areas if they border bodies of water. Vernal pools are protected only if they occur in resource areas. Communities usually wish to regulate work over 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

FOR MORE INFORMATION, PLEASE CONTACT

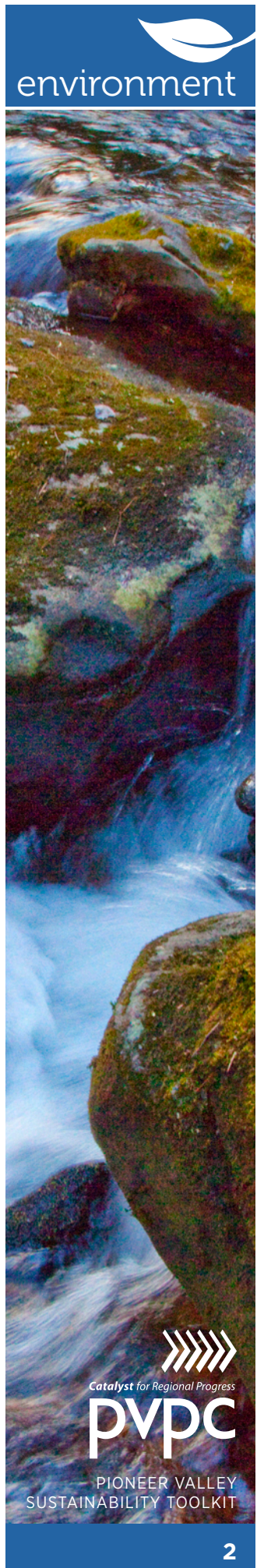
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MODEL ENVIRONMENT BYLAWS



MODEL 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 field 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 Land (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 information shall 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.

TOOLKIT FOR

Food Security



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PIONEER VALLEY
SUSTAINABILITY TOOLKIT

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PIONEER VALLEY SUSTAINABILITY TOOLKIT

Community Gardens

Community gardens are a resource that many cities and towns use to increase access to healthy food. These gardens not only are a way to provide local produce, but they increase social interactions and bring about other benefits. They may also assist in reducing blighted areas by creating an active use in an area that may be run down or vacant. Community gardens are run and managed in a variety of different ways. Some are municipally sponsored, some are organized by non-profits, others are associated with schools or daycare facilities. Food grown can be consumed by those associated with the garden, given to those in need, or be sold at local farmers markets. Community gardens can be either temporary or permanent. They can be used as an educational tool to teach community members and youth about the importance of local, healthy food.

HOW CAN THIS BE IMPLEMENTED?

Research your local zoning code to ensure that your targeted community allows community gardens.

Determine if a local community garden ordinance exists, and if so, follow it. If not, check out the City of Springfield's ordinance as a model to replicate:

https://www3.springfield-ma.gov/planning/fileadmin/Planning_files/Community_Gardens2-FINAL__2_x.pdf

Assessing best locations to create community gardens is a good next step. Some areas that should be considered are: low income neighborhoods, blighted areas, and schools zones. Pocket parks may be good locations for community gardens since a garden can bring more people to the area, and those already in the vicinity can learn about the community garden.

It is important that the land has access to water and adequate sun (at least six hours per day in summer). Water may be provided by a connection to municipal or household supply, rainwater catchment (typically off of a roof), or a new well (typically prohibitively expensive). It is best to locate a community garden in a location that has access to public water. Check with the local government to determine how to access water.

The quality of soil is a key factor in garden success. Soil should be assessed for fertility and prior contamination. Soil tests can be performed by UMASS. See their webpage at:

<http://soiltest.umass.edu/>

In urban locations that have previously been developed, clean soil is typically brought into the garden and placed in raised beds. In areas with clean soil, follow the recommendations of soil tests and begin building fertility as soon as possible.



Plot sizes vary from garden to garden. 20x20' is a typical size for a plot intended to feed a family in a location with plentiful land and adequate native soil. Raised beds are typically about 8'x4' or smaller.

CHALLENGES COMMUNITY GARDENS ENCOUNTER

Management

Community gardens are management intensive. They demand patience, time and the capacity to work with and organize people and projects. They also typically require systems to enforce rules and resolve conflicts.

Maintenance

Community gardens are maintenance intensive. Grass will need to be mowed, gardens weeded, equipment will need to be repaired, and plant debris will need to be composted, among other things.

Participation

From year to year, gardeners and garden leaders come and go from community gardens for a variety of reasons. Because of this, it can be challenging to maintain a sense of community and consistency at gardens.

Theft and vandalism

Theft and vandalism are commonplace at many community gardens. If the garden has a toolshed, it may need to be locked and the garden may need to be fenced.

Gardening skills

Many new and some returning gardeners don't know a lot about gardening. Gardeners who lack gardening skills and have poor gardening experiences may be more likely to give up. Successful community gardens partner beginning gardeners with more experienced gardeners and/or provide training.

Leadership skills

Like any community-based effort, community gardens require effective leadership. Successful gardens actively cultivate new leaders so that the organization can sustain itself.

Services and supplies

Plowing, tilling and the delivery of compost and mulch can be challenging and/or expensive services for gardeners to arrange for themselves, but their may be not-for-profit organizations or municipal services available to help.



Site tenure

Most community gardens are located on borrowed land that has been temporarily made available for garden use. Be sure that investments made in garden infrastructure are appropriate to the amount of time that the garden is guaranteed to exist. Gardens can negotiate leases or other agreements that ensure the garden will not be disrupted or displaced during the growing season.

TYPES OF COMMUNITY GARDENS

Traditional community gardens are large lots sub-divided into plots gardened separately by individuals or families. Each gardener decides what to grow and is responsible for planting, watering, weeding, harvesting, etc. Typically, gardeners are responsible for a certain number of community service hours to maintain the spaces between plots and help run the garden organization.

Youth/school gardens expose young people to gardening and nature, give them the opportunity to do some of their own gardening and/or educate them in a variety of subject areas. These gardens are typically associated with a formal or semi-formal program that incorporates classroom lessons with hands-on gardening activities. Gardens may be located on school grounds, at a community center, in neighborhoods or on other parcels of land.

Entrepreneurial/job training market gardens are typically established by non-profit organizations or other agencies to teach business or job skills to youth or other groups. They grow and sell the produce they raise. Proceeds from the sale of garden products are used to pay the participants for their work. Programs typically rely on outside sources of funding to offset costs.

Communal gardens are typically organized and gardened by a group of people who share in the work and rewards. Plots are not subdivided for individual or family use. Produce is distributed among group members. Sometimes produce is donated to a local food pantry.

Food pantry gardens may be established at a food pantry, food bank or other location. Produce is grown by volunteers, food pantry clients, or both and donated to the food pantry.

Therapy gardens provide horticultural therapy to hospital patients and others. A trained horticulture therapist often leads programs and classes. Gardens may be located at hospitals, senior centers, prisons or other places. Demonstration gardens show different types of gardening methods, plant varieties, composting techniques and more.

Demonstration gardens located at working community gardens are often open to the general public for display and classes. They may be managed and maintained by garden



members or a participating gardening group such as extension Master Gardeners, community members who receive training in home horticulture and then serve as volunteers to educate the public about gardening.

LINKS TO MORE INFORMATION

FOR MORE INFORMATION ABOUT ESTABLISHING A COMMUNITY GARDEN,
VISIT THE LINK BELOW

http://www.bostonnatural.org/cgOr_Resources.htm

<https://communitygarden.org/resources/community-garden-start-up-resources/>

<http://www.pvgrows.net/>

<http://www.growfoodnorthampton.com/>

FOR MORE INFORMATION, PLEASE CONTACT

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Food Hubs

PURPOSE

A regional food hub is an organization or business that actively manages the aggregation, distribution, and marketing of source-identified food products primarily from local and regional producers. Food hubs strengthen the producers' ability to satisfy wholesale, retail, and institutional demands.

CHARACTERISTICS OF A FOOD HUB

- » Carries out or coordinates the aggregation, distribution, and marketing of primarily locally/regionally produced foods from multiple producers to multiple markets.
- » Considers producers as valued business partners instead of interchangeable suppliers and is committed to buying from small to mid-sized local producers whenever possible.
- » Works closely with producers, particularly small-scale operations, to ensure they can meet buyer requirements by either providing technical assistance or findings partners that can provide this technical assistance.
- » Uses product differentiation strategies to ensure that producers get a good price for their products. Examples of product differentiation strategies include identity preservation (knowing who produced it and where it comes from), group branding, specialty product attributes (such as heirloom or unusual varieties), and sustainable production practices (such as certified organic, minimum pesticides, or “naturally” grown or raised).
- » Aims to be financially viable while also having positive economic, social, and environmental impacts within their communities, as demonstrated by carrying out certain production, community, or environmental services and activities.

Business structure classifications

- » Nonprofit food hubs may be tied more to a social mission than to business profitability. Therefore, nonprofits may emphasize products that are more expensive to source, such as organic and fair trade products, but are valued by its consumer base. The focus on, and ability to cultivate, programs that respond to community and producer needs isn't as widely seen in other business models.
- » Cooperative food hubs, whether producer-led, retailer-led, or with consumer members, there are several advantages to the cooperative business structure that make it a good fit for an emerging food hub. The cooperative structure is a well-known and established community entity with strong roots in agriculture that is owned and democratically controlled by its members. The membership



fees provide working and investment capital for the food hub, and any surplus revenues are returned to the members.

- » A co-op is managed by a board of directors elected by the members, which – in the case of a food hub – may be made up entirely of producers who will manage the organization to meet their members’ needs, such as providing a fair return on products sold, arranging transportation of goods to end consumers, promoting a certain production practice, or serving a certain geographic area.
- » Public run food hubs are often a city-owned public market or farmers market that is carrying out food hub activities. They play a “matchmaker” role, helping farmers connect to a market outlet and sell their food products. Entrepreneurs and established businesses have pursued local food hubs as a potential area for profits.

Primary service markets

- » Farm to business or institution food hubs sell to wholesale market buyers, such as food cooperatives, grocery stores, institutional foodservice companies, and restaurants. Under this model, food hubs provide new wholesale market outlets for local growers that would be difficult for them to access individually.
- » Farm to consumer food hubs are responsible for marketing, aggregating, packaging, and distributing products directly to consumers. This includes multi-farm community supported agriculture (CSA) enterprises, online buying clubs, food delivery companies, and mobile markets.
- » There are also hybrid food hubs that focus on both markets.

BENEFITS OF A FOOD HUB

Overcoming Infrastructure Barriers

The lack of distribution and processing infrastructure of appropriate scale restricts many farmers and ranchers from better accessing retail, institutional, and commercial foodservice markets, where demand for local and regional foods continues to rise.

Regional food hubs have emerged as an effective way to overcome these infrastructural and market barriers. For those smaller and mid-sized producers who wish to scale up their operations or diversify their market channels, food hubs offer a combination of production, distribution, and marketing services that allows them to gain entry into new and additional markets that would be difficult to access on their own. For larger producers, food hubs can provide product-differentiation strategies and marketing services that ensure the highest price in the market place. Moreover, for wholesalers, distributors, retailers, and foodservice buyers who would like to purchase larger volumes of locally and regionally grown products, food hubs lower the transaction costs by providing a single point of purchase for consistent and reliable supplies of source-identified products from local and regional producers.



Fulfilling essential services

In many parts of the country, wide gaps exist in local distribution and processing infrastructure, making it difficult for small and mid-sized growers to gain access to markets where there is unmet demand for source-identified locally or regionally grown products. Regional food hubs are increasingly filling a market niche that the current food distribution system is not adequately addressing—the aggregation and distribution of food products from small and mid-sized producers into local and regional wholesale market channels (retail, restaurant, and institutional markets). Additionally, because food hubs provide a number of additional services that build the capacity of local producers and also engage buyers and consumers to rethink their purchasing options and habits, food hubs are emerging as critical pillars for building viable local and regional food systems.

Although regional food hubs are filling a market niche of small farm distribution, this does not mean they do not engage with conventional supply chains. In fact, many food hubs complement and add value to these more traditional distribution channels by enabling regional food distributors—and their national food distribution clients and partners—to offer a broader and more diverse selection of local or regional products than they would otherwise be able to source. In addition, they often add significant value to conventional supply chains by providing a reliable supply of source-identified (and often branded) local products that conform to buyer specifications and volume requirements and still enable their clients to “tell the story” behind the product. For this reason, regional distributors—and even broadline, full-service national distribution companies like Sysco—are beginning to view food hubs as critical partners instead of competitors to ensure they can meet the market demand for locally and regionally grown food.

Positively impacting the communities they serve

Even though many food hubs are relatively new, they demonstrate innovative business models that can be financially viable and also make a difference in their respective communities. Economically, they are showing impressive sales performance and help to retain and create new jobs in the food and agricultural sectors.

Many food hubs are also looking to leverage their economic impacts into wider social or environmental benefits for their communities.

Socially

Most food hubs are providing significant production-related, marketing, and enterprise development support to new and existing producers in an effort to increase the supply of local and regional food. In addition, quite a few food hubs make a concerted effort to expand their market reach into underserved areas where there is lack of healthy, fresh food.

Environmentally

There are some food hubs that are encouraging their producers to use more sustainable production practices, as well as finding innovative ways to reduce their energy use and waste in the distribution system. In summary, food hubs and those that operate them



represent a new kind of food entrepreneur, one that is increasingly demonstrating a financially sound business model that can be both market and mission driven.

LINKS TO MORE INFORMATION

FOR MORE INFORMATION ABOUT FOOD HUBS, VISIT THE LINKS BELOW.

<http://www.fccdc.org/about-the-center>

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

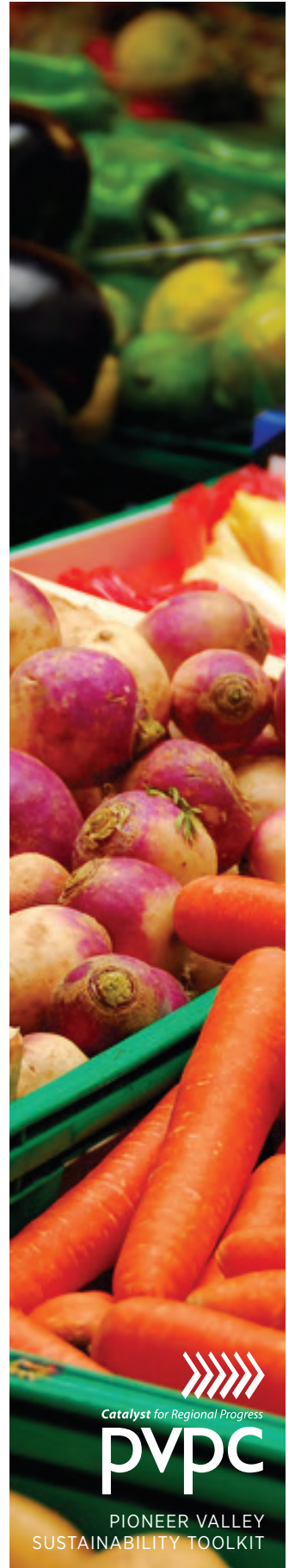
<http://www.wallacecenter.org/foodhubcollaboration>

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Farm to Institution

PURPOSE

By increasing the demand for fresh locally grown food by large institutions, and by making the procurement process easier and more manageable, farm to institution initiatives help keep farming viable, promote good jobs and a strong agricultural economy, and also improve people's health and well-being.

EXAMPLES

Massachusetts Farm to School Project

Mass Farm to School Project (www.massfarmtoschool.org) is one of the oldest Farm to Institution initiatives. Started in 2003 as a pilot project in 5 schools, the program now includes 114 Farmers working in 231 school districts and 89 colleges or individual schools. Mass Farm to School facilitates sustainable purchasing relationships between local institutions and local farms, promotes local food and agriculture education for students, and supports state, regional and national networking of farm to school practitioners. They offer technical assistance.

University of Massachusetts-Amherst

UMASS-Amherst offers an example of high volume, affordable sourcing of locally grown foods purchased direct from a farmer who aggregates products from neighboring farms. Through this streamlined supply chain as well as purchases from traditional distributors and on-campus production, the University has increased local procurement within their produce budget to over 30%, and has signed onto the Real Food Challenge Commitment to reach 20% Real Food in their overall food spending by 2020. Success with the local foods program has fostered more opportunities – securing private foundation funds to expand the program and document the structure as a model for other campuses, solidifying student support for and participation in campus dining, and expanding key partnerships across campus and the surrounding community to institutionalize local foods procurement through administrative policy.

LINKS TO MORE INFORMATION

FOR MORE INFORMATION ABOUT FARM TO INSTITUTION PROGRAMS, VISIT THE LINK BELOW.

<http://www.whyhunger.org/getinfo/showArticle/articleId/93> Policy and Advocacy on Farm to Institution

<http://www.localumass.com/> for more information on UMASS Dining Services' commitment to local food

<http://toolkit.centerfornutrition.org/> Nebraska-based toolkit for starting Farm to School projects

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Poultry And Small Livestock Regulations

Allowing poultry and other small livestock to be raised in residential areas is another strategy for increasing access to food. Chickens, rabbits, goats and other small animals provide eggs, milk, and meat. Plus, they enhance gardens and farms by eating bugs, managing brush and generally improving biodiversity. And of course, their manure helps complete the natural nutrient cycle so things grow better.

Some communities in Massachusetts and the Pioneer Valley already have effective regulations for keeping chickens and other small livestock in residential neighborhoods. Typically, controls are placed on the type and number of animals allowed (often based on lot size), the size and setbacks of animal enclosures, and clear procedures for handling complaints from neighbors.

Other communities, especially those that are more rural in character, may address small livestock regulation through a “right to farm” bylaw, which typically offer greater flexibility in the keeping of small farm animals.

EXAMPLES OF POULTRY AND SMALL LIVESTOCK REGULATIONS

Arlington, Massachusetts

Up to six (6) hens—and no roosters—are allowed in residential districts by right. Hens and eggs cannot be sold commercially, and must be kept at least 25 feet from residences on adjacent lots. Owners must obtain a permit from the local Board of Health.

Northampton, Massachusetts

The City established two categories of animals which are allowed as accessory uses. The first category covers animals which are considered pets. It allows up to six rabbits, and up to six chickens or three ducks per parcel or per structure. The number of chicks and ducklings is not limited. Coops must be at least 4 feet from property boundaries and at least 10 feet from existing residential structures on abutting parcels. All stormwater runoff from coops, runs and compost areas must be contained on site. The second category covers “farm animals and exotics” and sets more restrictive standards. It requires a minimum lot size of 30,000 square feet to keep animals including sheep, goats, and llamas. Three animals are allowed for the first 30,000 square feet, with an additional animal allowed for each additional 10,000 square feet of lot area. Other types of animals require an additional 15,000 square feet for each animal beyond the first three. Animals



under six months are not counted toward the limits. Stables must be at least 100 feet from a street lot line and 30 feet from other lot lines. Stables, corrals and yards must be kept clean without excessive odor, dust or mud.

Easthampton, Massachusetts

The City allows up to 25 hens or other poultry (but no roosters!) on lots that are at least one acre in most (but not all) residential districts. Up to six hens (again, no roosters) are allowed on lots of at least 15,000 square feet in more residential districts. Hens and small livestock are allowed by Special Permit on lots smaller than 15,000 square feet.

IMPLEMENTING REGULATIONS FOR POULTRY AND SMALL LIVESTOCK

When it comes to regulations for poultry and small livestock for food, every community is different. Many communities regulate small animal keeping through zoning bylaws; other towns do it primarily with board of health regulations. Some key factors to keep in mind when deciding whether a new or improved regulation for poultry and small livestock include:

- Should there be different rules about small livestock for outlying areas versus more densely settled areas of the community?
- Should the regulations apply only to animals kept for “personal” use in residential areas—and be structured to make sure that commercial livestock operations are kept in agriculturally or commercially zoned areas?
- Should residents be required to register small livestock, the way many communities require dog licenses?
- How are large livestock, like cows, bison, and horses, regulated?
- Who will inspect animal facilities, enforce regulations, and handle complaints?

LINKS TO MORE INFORMATION

FOR MORE INFORMATION ABOUT KEEPING CHICKENS, VISIT THE LINK BELOW

<http://pioneervalleybackyardchickenassociation.weebly.com/index.html>

<http://www.backyardchickens.com/>

<http://www.backyardpoultrymag.com/>

FOR MORE INFORMATION, PLEASE CONTACT

Pioneer Valley Planning Commission
413-781-6045

60 Congress Street, Floor 1
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UNDERSTANDING

Urban Agricultural Districts

Urban agriculture is an increasingly popular and common sense way to grow more fresh food in cities and suburbs—closer to people who will buy and eat it. Urban agriculture includes community gardens, where individuals tend their own plots, as well as small farm operations that may have small fields. Many people are familiar with the idea of urban agriculture from the “victory gardens” that were numerous during World War II. Today, urban agriculture offers many benefits beyond the obvious benefit of producing more healthy fresh food, from education about where food comes from, to creating centers of community activity where residents to come together, to making productive use of vacant or under-used land that enhances neighborhoods.

Communities can encourage more urban agriculture by designating a zoning district in which standards apply for how the garden or farming areas are laid out and maintained. Unlike rural farms, urban farms and gardens have many neighbors. By setting out clear definitions and expectations, urban agriculture can fit well with its context. In fact, various studies show that many communities with urban agricultural districts have less crime, better economic development prospects, higher adjacent property values, significant health benefits, and improved food security.

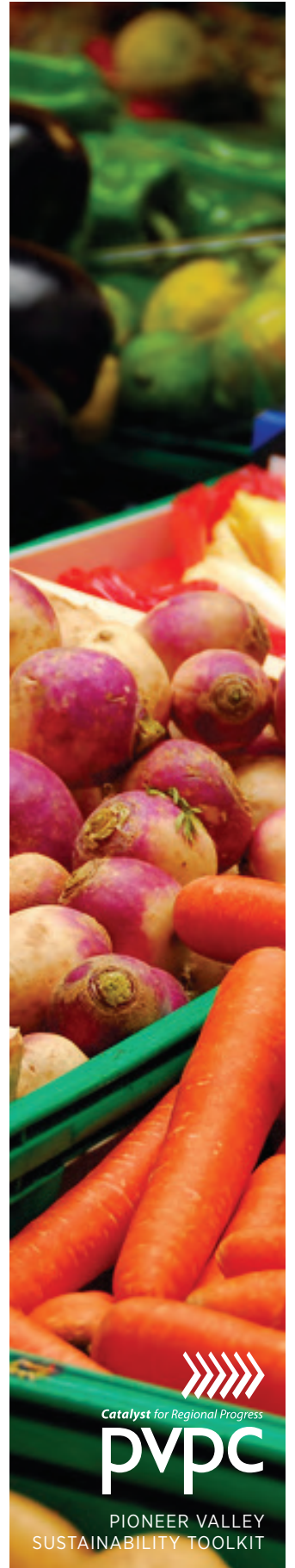
DEFINITIONS

Many urban dwellers are unfamiliar with the structures and equipment used in farming. Therefore, zoning regulations for a good urban agriculture district should include some clear definitions of common urban agriculture items, such as:

Greenhouses: Buildings with large translucent roofs and walls in which plants are cultivated. Typically has a heating system.

Hoop houses: Temporary structures similar to greenhouses with a lightweight frame in a “half-round” or “hoop” shape that is covered with translucent plastic. May be heated.

Cold frames: Unheated outdoor wooden or concrete frames with top that is covered with glass or clear plastic, usually used to protect seedlings and extend seasons for leafy crops during cold months.



PERMITTED USES

It's important for a community to clearly understand the reasons why they want to have an urban agriculture district. Is it only to grow fresh food for home use of the gardeners or farmers—or should sales to the public be allowed? Is agriculture a desired permanent use in the district—or is it more of a transitional use until other development of the land becomes more viable and beneficial to the community? Will poultry or small livestock be allowed? What about large animals? Is education a component? What about space for community gatherings?

Answering these questions will help everyone decide what the principal uses should be in an urban agriculture district. Some typical principal uses include:

“Community gardens” typically less than 5 acres in size that may have occasional sales of items grown at the site only.

“Market gardens” which include the sale of crops produced on the site, as well as a defined percentage of supplemental products that may be brought in to meet demand.

“Urban Farming” which can be up to 10 acres, typically owned and operated by a nonprofit or community-based organization with professional farmers and support of members or volunteers.

ACCESSORY USES

Once the principal uses are established, the community needs to decide what supporting, or “accessory” uses need to be allowed so those uses can be fully realized. Typical accessory uses include:

- Greenhouses, hoop houses, cold frames, and similar structures used to extend the growing season
- Compost bins, fences, rain barrel systems, chicken coops, beehives, and other structures typically associated with growing and agriculture.
- Open space associated with and intended for use as gardens, staging and resting.
- Farm stands, usually seasonal only, with limited hours.
- Signs, typically limited to informational and directional.
- Benches, bike racks, shade shelters, picnic tables, and children’s play areas and other facilities for farmers and gardeners.
- Raised and accessible planting beds
- Rest-room facilities with composting toilets.
- Off-street parking and walkways.



STANDARDS FOR THE URBAN AGRICULTURE DISTRICT

Based on the principal and accessory uses, the community may then turn to some of the more specific details, or “standards,” for how the structures and lay out of farms and gardens in the Urban Agricultural District should be configure. Standards may vary, depending on the character and density of development in the district. Some typical standards include:

- **Setbacks:** Buildings should be no closer than five (5) feet from a residential property line.
- **Height:** No buildings or other structures should be higher than twenty-five (25) feet.
- **Building coverage:** The combined area of all buildings, excluding greenhouses and hoop houses, should not exceed fifteen percent (15%) of the total lot.
- **Parking and walkways:** Off-street parking should be allowed only for gardens or urban farms that are on lots larger than 15,000 square feet, and then should be no more than ten percent (10%) of the lot. It is also preferable that parking lots and roads on the site be either unpaved or surfaced with gravel to reduce stormwater runoff. Similarly, walkways should also be unpaved, except as necessary to meet the needs of people with disabilities.
- **Signs:** Should not exceed four (4) square feet in area per side and shall not exceed six (6) feet in height.
- **Seasonal Farm Stands.** Farm stands should be removed from the premises or stored in a building on the site during the off season when sales to the public are not available.
- **Fences:** Should not be higher than six (6) feet. If they are taller than four (4) feet, they should be at least fifty percent (50%) open (slatted) and should be made of wood, chain link, or ornamental metal.



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LINKS TO MORE INFORMATION

METROPOLITAN AREA PLANNING COUNCIL: ZONING FOR LOCAL FOOD PRODUCTION

http://www.mapc.org/sites/default/files/Food_system_guide_3-18-14.pdf

ON THE GROUND: BOSTON URBAN AGRICULTURE ZONING AMENDMENT QUICK FACTS

<http://www.bostonredevelopmentauthority.org/getattachment/8a1e3014-d6c7-42ac-969f-c9bb12ccf955>

CITY OF MINNEAPOLIS, MINNESOTA URBAN AGRICULTURE POLICY PLAN

http://www.minneapolismn.gov/cped/planning/plans/cped_urban_ag_plan

POLICY LINK FACT SHEET: URBAN AGRICULTURE AND COMMUNITY GARDENS

<http://www.policylink.org/find-resources/library/urban-agriculture>

FOR MORE INFORMATION, PLEASE CONTACT

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Bioretention Areas

WHAT IT IS

Bioretention facilities (also known as rain gardens) are landscaped depressions designed with soils and a variety of plants to receive and treat stormwater through the use of natural processes. These natural processes include the uptake of water by plants and transfer of water to the atmosphere, and infiltration (or soaking up) of water into the soils where microbial action helps to breakdown pollutants and gravity pulls water further down through the soil layers to recharge groundwater. (See Figure 1)

Bioretention facilities can be used in a variety of settings: along a street edge or as an island in a parking lot to capture storm flow from asphalt or concrete surfaces; and near residential or commercial buildings to capture storm flow from roofs. Bioretention facilities are often designed with an underdrain or an overflow that directs flow to the municipal storm drain system.

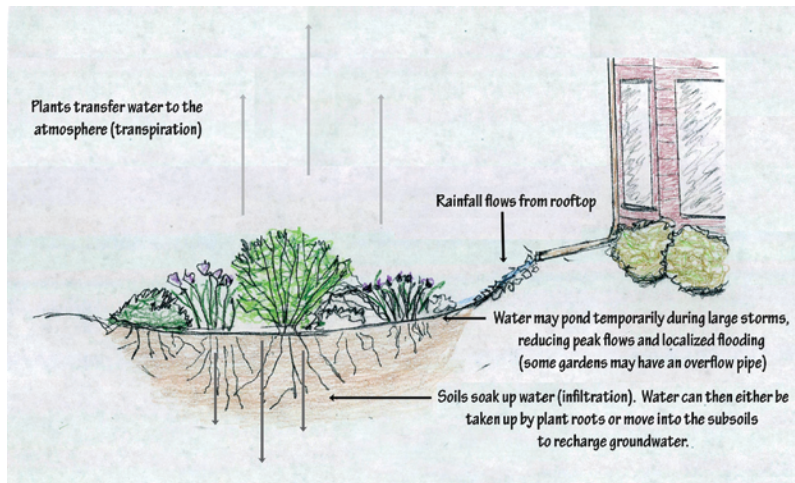


Figure 1: How a Bioretention Facility Functions

WATER QUALITY TREATMENT

When a bioretention facility is designed with an underdrain that ultimately delivers flow to surface waters, the capacity of a facility to treat stormwater is critical. Bioretention systems have proven effective at removing many pollutants associated with stormwater: suspended solids, including particulate phosphorous, petroleum hydrocarbons, and heavy metals. The table below shows water quality treatment in the four bioretention facilities tested to date by the University of New Hampshire Stormwater Center.



A rain garden along Route 9 in Hadley, captures storm flow from a drive and parking lot. This photo is taken just after installation and before plants are really established.

Photo courtesy of Berkshire Design Group, Inc.

Pollutant Removal in Four Bioretention Facilities at the University of New Hampshire Stormwater Center

System	Pollutant					
	Total Suspended Solids (TSS)	Total Petroleum Hydrocarbons in the Diesel Range	Dissolved Inorganic Nitrogen (NO3)	Total Zinc	Total Phosphorous	Average Annual Peak Flow
					% Removal	% Reduction
Bio I-48" depth (42" filter depth)	97	99	44	99	-	75
Bio II-30" depth (24" filter depth)	87	99	NT	73	34	79
Bio III-30" depth (24" filter depth)	91	64	44	75	NT	84
Bio IV-37" depth (24" filter depth)	83	65	42	67	NT	95

NT = no treatment | Source: University of New Hampshire Stormwater Center 2012 Biennial Report

To boost the ability of bioretention facilities to manage for nitrogen and dissolved phosphorous, researchers have been experimenting with optimizing soil mixtures and design. See discussion under “Design considerations.” Furthermore, Allen Davis of the University of Maryland has noted that bowl volume, media composition, media depth, underdrainage configuration, and vegetation type, all have roles in effectively helping to address objectives, depending on needs, be they hydrologic (peak flow mitigation, infiltration, annual hydrology, and stream stability) and/or water quality (total suspended solids and particulates, pathogen-indicator species, metals, hydrocarbons, phosphorus, nitrogen, and temperature). Information on how best to design systems according to these needs is evolving.

DESIGN CONSIDERATIONS

For the Pioneer Valley, major design objectives for bioretention involve flow reduction and nutrient reduction. Following is some brief guidance on design considerations relative to these objectives. As noted above, bioretention design objectives that aim to address specific target pollutants are emerging. Some of the listings below under “Links to more information” provide some resources that will be useful in this regard.

Flow reduction

Maximum volume reduction comes when bioretention facilities are located in soils that provide for good infiltration and the use of fines in the soil mix are kept to a minimum (the entry of fines into the facility should also be limited through a pretreatment element that allows for settling of particles).

Research is showing that infiltration in soils can be enhanced and preserved over time through the use of dense vegetative cover. The University of New Hampshire Stormwater Center (UNHSC) reports that of the four bioretention facilities it has studied, infiltration rates over time were optimal in the basin (Bio III) where they used a continuous dense vegetative cover. They report, "Previous studies have indicated that plant roots generally experience a 30% die back each year which aids in the development of macropores that keep soil surface infiltration capacity high over time. The data from this study suggests that the dense vegetative cover is more important than plant type for maintaining infiltration rates in vegetative systems."

Nutrients

In designing bioretention facilities for nutrient removal, fill media selection is critical. As it breaks down organic matter typically leaches nitrogen and phosphorous and can exacerbate water quality issues. It is important to have some organic matter to aid plant growth, but limiting its use is critical for successful bioretention facilities.

Nitrogen

Research out of the University of Maryland points to two major considerations for promoting nitrogen removal:

Creation of an anaerobic zone where microbes can use forms of nitrogen (NO_2 and NO_3) instead of oxygen for respiration – Use of a deeper media layer (3 feet minimum), media with a less permeable bottom soil layer, lower infiltration rates (1 to 2 inches per hour), and design for internal water storage, (a subsurface portion of the media that provides some storage volume) are all important design components. In a 2003 study, he found that adding a suitable carbon source, particularly newspaper, to the gravel layer provides a nutrition source for the microbes, enables anaerobic respiration, and can enhance the denitrification process. Davis et al noted that while organic matter should be kept to very modest amounts to avoid leaching of nitrogen as it breaks down, there should be about 5% of total weight or 10% of total volume of organic matter to provide carbon sources. Postconstruction carbon can be supplied from plant roots, leaf litter, and of course the mulch as it breaks down.

More dense planting of vegetation with sizeable root masses (but not so aggressive so as to pose a threat to clogging underdrains) – Deeply rooted grasses, notes Davis et al, are expected to provide good performance. Note that in research at the UNHSC, nitrogen removal was poorest in the bioretention system that had a 60% sand mixture and wooded vegetation as compared to the sister system that had an Eco-Lawn.

Phosphorous

Media selection is the major considerations for promoting phosphorous removal in bioretention facilities. While modest amounts of mulch can be used, Davis et al recommend selecting media with high P-sorption potential, including iron and aluminum rich soils and iron and aluminum based water treatment residuals (a byproduct of drinking water treatment), which could be used as amendments.

Inclusion of vegetation within a bioretention facility also helps to promote phosphorous removal.

RELATED CONSIDERATIONS

General design considerations noted by the U.S. EPA National Pollutant Discharge Elimination System (NPDES) Stormwater Menu of BMP's include:

Drainage Area – Bioretention facilities should usually be used on small sites (five acres or less). When used to treat larger areas, they tend to clog. In addition, it is difficult to convey flow from a large area to a bioretention facility.

Pretreatment – Incorporating pretreatment helps reduce the maintenance burden of bioretention and reduces the likelihood that the soil bed will clog over time. Several mechanisms can be used to provide pretreatment in bioretention facilities. Often, runoff is directed to a grass channel or filter strip to filter out coarse materials before the runoff flows into the filter bed of the bioretention facility. Other features include a pea gravel diaphragm, which acts to spread flow evenly and drop out larger particles.

Slope – Bioretention facilities are best applied to relatively shallow slopes usually at five percent. A sufficient slope is needed at the site to ensure that water that enters the bioretention area can be connected with the storm drain system. These particular stormwater management practices are most often applied to parking lots or residential landscaped areas, which generally have shallow slopes.

Landscaping – Landscaping is critical to the function and aesthetic value of a bioretention facility. Native vegetation is ideal for planting. Another important feature is to select species that can withstand the type of hydrologic system it will experience. At the bottom of the bioretention facility, it is important to have plants that can tolerate both wet and dry conditions. Along the edges, it will remain primarily dry, so upland species will be the most resilient to this type of condition.

MAINTENANCE CONSIDERATIONS

When properly designed, maintenance of these systems is minimal. UNHSC notes, “... the highest maintenance burden occurs during the first two years of operation as the vegetation grows and the system begins to stabilize.” Once vegetation is established, maintenance is comparable to what is required for standard landscaping. (UNHSC, 2012 Biennial Report)

Systems with fine soils may need more cleaning due to obstruction from sediment. Long-term maintenance mainly requires inspection and scraping of surface pollutants.

PERMITTING CONSIDERATIONS

In the Massachusetts Stormwater Handbook, Volume 1 under Stormwater Management Standard #6, stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply. Discharges within Zone II require the use of a treatment train that provides 80% TSS removal prior to discharge. Bioretention facilities are a good fit for discharges within Zone IIs as they have a TSS removal rate of 90%. In addition, under the Massachusetts Stormwater Handbook, Volume 2, Chapter 2, bioretention facilities are a good option for discharges near cold-water fisheries. However, these should not be developed near bathing beaches and shellfish growing areas.

BARRIERS TO USE

Concern	Experience
Cost	<p>The cost of installing a bioretention facility can vary greatly. A “do it yourself” bioretention facility that captures flow from the roof of a single family home and where soils are well draining can cost as little as a hundred dollars with a simple planting scheme.</p> <p>Engineered systems can cost \$4 to \$6 per square foot, including the grading, underdrain, stone, and plants. An estimate from the University of New Hampshire Stormwater Center (UNHSC) provides a cost based on per acre of impervious surface draining to the facility that ranges from \$14,000 and \$25,000 per acre, not including design, permitting, or construction oversight costs.</p> <p>UNHSC further notes that in 2007 they installed a bioretention system in a parking lot median strip as a retrofit. It cost a total of \$14,000 per acre, including \$8,500 per acre for labor and installation, and \$5,500 per acre for materials and plantings. “These finding indicate that for municipalities with equipment and personnel, the retrofit costs are nearly \$5,500 per acre of drainage.” (University of New Hampshire Stormwater Center 2012 Biennial Report)</p>
Accumulation of toxics	<p>Stormwater flow from roadways and parking lots typically carries a mix of pollutants. Where bioretention facilities are used to receive, capture, and treat these flows, do facilities become toxic? Lisa Stiffler, a researcher with the Sightline Institute, a Seattle based think tank, has been investigating. She has found the following:</p> <p>Petroleum pollutants/PAHs: Studies from the field and laboratory find that rain gardens do a great job of capturing petroleum pollution, and that the chemicals are largely eliminated when they are destroyed by bacteria in the soil.</p> <p>Heavy metals: Soil and mulch in rain gardens contain particles that will adsorb and hold metals including copper, cadmium, lead, and zinc. A small fraction of the metals are sucked into plant roots and vegetation. When Northwest counties test for metals in the sediment that is scooped from the bottom of stormwater ponds or rain gardens that drain parking lots and other city surfaces — material that would likely have higher levels of metals than your average residential rain garden — they found that the contamination levels were still below soil and compost standards meant to protect human health.</p> <p>Bacteria and viruses: While some research has found bacteria and viruses in stormwater that can cause disease in humans, sunlight as well as other microorganisms in the runoff and soil of rain gardens can destroy the pathogens. Also, most of the microorganisms present come from animal waste and are less likely to cause illness in people.</p> <p>The bottom line is that the soil in rain gardens is safe for kids and pets. That said, people are advised to wash their hands after working or playing in any soil, which can contain naturally occurring metals, fecal waste from pets, or any number of compounds one would not want to ingest.</p>



<p>Snow management</p>	<p>If used in conjunction with parking lots or roadways, bioretention facilities should be designed to make for easy movement of plows. Planning a plow path and telling snow plow operators where to push the snow is important in keeping snow out of bioretention areas.</p> <p>According to the Massachusetts Stormwater Handbook (Vol. 2, Ch. 2), never store snow in bioretention facilities. The operation and maintenance plan must specify where on-site snow will be stored. A major reason for this is that infiltrating capabilities will become impaired due to fines that remain once snow melts.</p>
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EXAMPLES OF WHERE STRATEGY HAS BEEN IMPLEMENTED

Veterans Affairs Medical Center, Northampton, MA

Three rain gardens at the Northampton Veterans Affairs Medical Center enhance drainage through infiltration of rainfall and snowmelt, and improve aesthetics and habitat values with extensive native plantings. The three rain gardens are part of a campus rain garden master plan.

The rain garden below on the right captures flow from a 1,200 square foot area of roof. The rain garden shown below, includes a “level spreader” built of stone at the top of the system to ensure that storm flow distributes evenly across the basin and does not cause gullies or erosion. This garden below receives flow from a 1,600 square foot area of roof.



Photos courtesy Thomas Benjamin

Downspout Disconnection

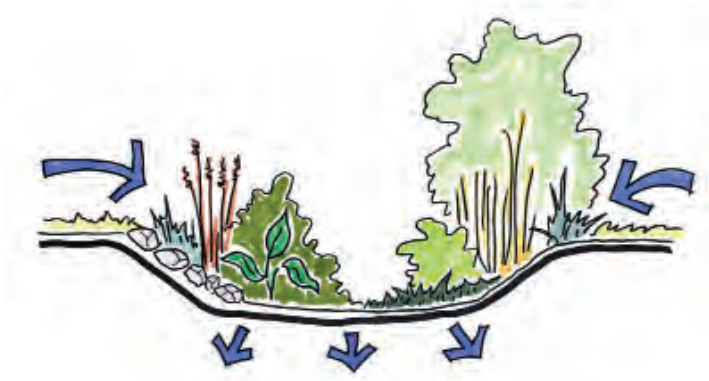
PURPOSE

Establishing a municipal downspout disconnection program provides support for a simple, low cost and low maintenance green infrastructure practice to reduce the amount of runoff entering the municipal storm or combined sewer system, thus reducing the occurrence of combined sewer overflows and associated water pollution.

The purpose of a municipal downspout disconnection program is to identify and disconnect those downspouts (also called roof leaders) that discharge into the sanitary sewer system, thereby reducing peak storm flows and associated combined sewer overflows (CSO). Sometimes, downspouts may not be directly plumbed into the sewer, but flow onto contiguously connected impervious areas such as driveways and parking lots, which drain to storm drains in the street. Under both circumstances (direct connection or overflow), redirecting downspouts to vegetated areas such as lawns or rain gardens is a recommended best practice.

In a 2011 study conducted by the Center for Watershed Protection, researchers evaluated runoff reduction at downspout disconnections to six urban residential lawns in the City of Baltimore, Maryland with C-type soils (less cohesive granular soils). On average, runoff reduction was high with an average reduction of 95% for the 1-inch rainfall event, and an average reduction of 90% for the 2-inch rainfall event. Numerous factors affect runoff reduction including soil type, age of lawn, slope, organic matter content, and management practices. The study noted that D-type (or compacted soils) would have resulted in less runoff reduction.

Rain gardens are an attractive alternative to lawn and allow 30% more water to soak into the ground than a conventional lawn (Wisconsin Department of Natural Resources, 2003). In addition to their ability to retain and infiltrate runoff, they provide important habitat for bees, butterflies and birds in urban and suburban areas.



SOURCE: www.GroundworkAppliedDesign.com

DESIGN CONSIDERATIONS

The physical disconnection is relatively simple as illustrated below, however there are a number of design considerations that need to be factored into a project.

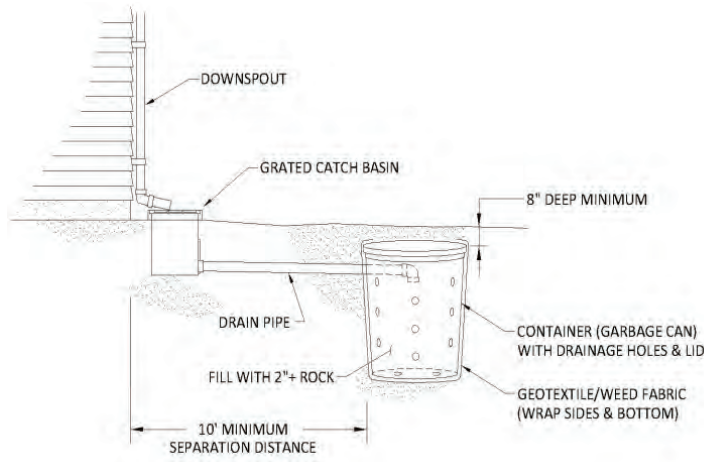
- » Evaluate soil type at the site to determine the type of on-site infiltration that will be most effective. Small highly compacted sites, or sites underlain with clay may not be feasible for on-site infiltration.
- » Direct downspout disconnections away from the basement foundation. Make sure downspout extensions end at least three feet away from basement foundations, and water is being directed on ground that slopes away from the building, however do not disconnect downspouts on slopes greater than 10%.
- » Downspout disconnections can redirect flows to vegetated areas such as a lawn or rain garden where there is the capacity for water to infiltrate into the ground.
- » Alternatively, a disconnected downspout can be plumbed into an underground drywell, gravel pit or trench where water is stored and slowly infiltrates into the ground.
- » Do not allow water to splash or pond on adjacent property. Infiltrate all water on site.
- » Do not redirect water to paved walkways and driveways as it will cause icing in the winter and unsafe conditions for pedestrians.



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A subsurface infiltration chamber can be built from a variety of materials. Key components include pipe, a perforated storage chamber, stone, and filter fabric.

SOURCE: Fairbanks Green Infrastructure Group www.fairbankssoilwater.org

HOW TO DISCONNECT A DOWNSPOUT

Step 1: Observe Your Site

It is important to understand where runoff from your downspouts go, including your house, garage, and other covered surfaces. Identify the location of downspouts and roof line, and estimate the square footage of your roof area. Map out areas in your yard for infiltration down slope of structures where you might disconnect downspouts.

Step 2: Design Your Disconnection

Make sure you have enough landscaped area for rain to soak safely into the ground. The ground area must be at least 10% of the roof area that drains to the disconnected downspout.

roof area	sizing factor	landscapes area size
500 sq. ft.	X 10% =	50 sq. ft. (5'x10')

Step 3: Disconnect and Redirect

Cut off the downspout above the old connecting pipe. Cap or plug the top of the pipe. Fittings can be either approved adapters or blind plugs. These are available at most plumbing supply stores. Secure the cut downspout to the wall with a bracket. Next, install an elbow and extension to carry water away from the house. Add a concrete “splash pad” at the ground where the water spills from the downspout onto the lawn to prevent erosion, or landscape the area with stone, or install a rain garden to infiltrate the runoff water.



Step 4: Maintenance

Proper maintenance of your gutters, downspouts, and landscaping can reduce problems.

- » Clean gutters at least twice a year, and more often if you have overhanging trees.
- » Make sure gutters are pitched to downspouts, and repair low spots.
- » Check and clear elbows or bends in downspouts to prevent clogging.
- » The ground should slope away from the structures. Don't build up soil, mulch, or other landscaping materials against the foundation and siding.
- » Avoid draining water onto impermeable plastic weed block or cloth.
- » Maintain healthy vegetation (lawn or rain garden plants) in the drainage area to minimize erosion and promote optimum infiltration.

DEVELOPING A MUNICIPAL DOWNSPOUT DISCONNECTION PROGRAM

Some examples of successful municipal downspout disconnection programs are provided below. However, it is important to understand key program components so that a missing element does not become a barrier to program implementation.

Local Policies and Regulations

Municipalities should adopt a local policy or regulation prohibiting downspout connections and establishes a local program with standards and incentives for downspout disconnection and on-site infiltration. Such a program may not be appropriate in neighborhoods where soils are not suitable for infiltration. Neighborhoods with combined sewers are high priority areas for downspout disconnection programs. Soil suitability for infiltration should be assessed in these neighborhoods prior to implementing a program.

Stormwater plumbed into the sanitary sewer can not only cause combined sewer overflows, but it increases the volume of water to be treated at the waste water treatment plant at an expense to the municipality. Clean roof runoff does not need the level of treatment sewage receives at a treatment plant. By reducing the volume of water being treated at the plant, the municipality saves money that can be used to support other infrastructure needs.

See local examples below for more information on funding and operating a downspout disconnection program.

Education and Outreach

Public service announcements, community meetings, YouTube videos, brochures, and financial incentives have proven very important to successful programs. Ongoing education to residents about the benefits of disconnection and redirection, and alternative uses of stormwater such as rainwater harvesting for irrigation or greywater, cannot be overlooked. This means adequate funding is needed for dedicated staff, outreach materials, and possibly materials such as a downspout disconnection kit or a drywell for infiltration.

Technical Support

All successful downspout disconnection programs provide a licensed plumbing contractor to perform the work at no cost to the homeowner. Alternatively, the homeowner can do the work themselves or hire a licensed plumber at their own expense, sometimes from a pre-approved list of contractors provided by the City. If a homeowner chooses not to use a city contractor, or a pre-approved contractor, a site inspection is performed upon completion to ensure compliance with local sewer regulations and/or plumbing codes. In some cases, dye testing may be needed to determine if a downspout is connected to or has been properly disconnected from the sanitary sewer.

Funding Sources

Funding sources are typically derived from one of the following or a combination thereof: sewer rates, stormwater utility fees, and State Revolving Fund (SRF). Dedicating funding to downspout disconnection from any of these sources is identified in planning phases such as I/I studies and master plans, capital improvement plans, or through enforcement proceedings such as Administrative and Court Orders.

DISCONNECTION PROGRAMS – LESSONS LEARNED

City of Portland, Oregon

The City of Portland, Oregon's Department of Environmental Services operated a very successful downspout disconnection program from 1993 to 2011, disconnecting more than 58,000 downspouts at a total cost of \$13 million, inclusive of disconnection construction, staffing, and outreach materials and media. The program was funded solely from their sewer and stormwater utility fee, established in 1977. Some key lessons learned include:

- » **Scale Matters** – The program targeted a large geographic area to reduce CSOs to the Columbia, Slough and Willamette Rivers. To do this successfully, they used a simple technique for disconnection that was conservatively applied to only downspouts that could be disconnected safely.
- » **Downspout Disconnections Only Tool in the Toolbox** - They did not build rain gardens or other systems, seeking as much benefit as simply as possible. If a downspout disconnection could not be done safely, they didn't do it.

- » **Build Trust with Consistent Messaging** – Consistent and persistent messaging through targeted and direct outreach to homeowners helped build trust in the community and grow the program. Homeowners were slow to sign up at first, but the programs reputation for working well with property owners and careful attention to site details encouraged others to participate.
- » **Financial Incentives are Important** - Homeowners could earn \$53 for each downspout disconnection toward the stormwater portion of their city utility bill. Homeowners could have their downspouts disconnected for free by a licensed and bonded plumber under contract with the City, do it themselves, or utilize one of the volunteer community groups trained by the City. All sites were inspected after disconnection by the City. Later, the City also established the Clean River Rewards program which offered on-going discounts on utility bills for other on-site stormwater management options.
- » **Keep Risk Low** – High safety standards meant some downspouts could not be disconnected without risk of onsite flooding or harm to workers performing disconnection.

Boston Water and Sewer Commission

The Boston Water and Sewer Commission's (BWSC) downspout disconnection program was established 25 years ago as a component of their combined sewer separation. Through numerous Infiltration and Inflow Studies, the Commission identified neighborhoods and individual properties with downspouts connected to the combined or sanitary sewer, and initiated direct outreach to property owners about disconnecting their downspouts. Homeowners may choose to allow a contractor hired by BWSC to disconnect the downspouts at no cost to the homeowner, or the homeowner may hire a licensed plumber to disconnect at the owner's expense. The program has disconnected downspouts on 39,000 buildings, and estimates to have disconnected over 75,000 downspouts.

Funding sources have varied over the course of the program. In general, funding has been provided by the Metropolitan Water Resources Authority (MWRA), which gets its funding for sewer separation projects from SRF. MWRA operates the regional Deer Island Waste Water Treatment Plant. The funding structure has varied from full coverage to a cost share depending on different factors over time including the phase of separation, funding levels, and whether the project was located in a combined or separated sewershed. BWSC's portion of the cost share structure has come from their sewer rates revenue.

To support the sewer separation program, the City adopted a Sewer Use Regulation in 1998 prohibiting downspout connection to the combined sewer and requiring disconnection. The program saves BWSC money by reducing the volume of water it sends to the Deer Island Wastewater Treatment Plant, and supports MWRA's mandates to eliminate CSOs. More about this program can be viewed here:

<http://www.bwsc.org/SERVICES/Programs/downspout/downspout.asp>

REFERENCES AND RESOURCES

CITY OF PORTLAND, OREGON ENVIRONMENTAL SERVICES. HOW TO MANAGE STORMWATER: DOWNSPOUT DISCONNECTION.

www.cleanriverspdx.org

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UNIVERSITY OF CONNECTICUT. RAIN GARDENS: A DESIGN GUIDE FOR CONNECTICUT AND NEW ENGLAND HOMEOWNERS.

www.nemo.uconn.edu/raingardens/

UNIVERSITY OF WISCONSIN EXTENSION. RAIN GARDENS: A HOW-TO MANUAL FOR HOMEOWNERS. 2003

<http://dnr.wi.gov/topic/shorelandzoning/documents/rgmanual.pdf>

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Catalyst for Regional Progress

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PIONEER VALLEY
SUSTAINABILITY TOOLKIT

Green Roofs

PURPOSE

Green roofs decrease greenhouse gas emissions caused by heating and cooling systems by making buildings more energy efficient through the installation of roofs with vegetation, soil, and membrane layers.

In recent years, green roofs have gone from a horticultural curiosity to a booming growth industry, primarily because the environmental benefits of extensively planted roofs are now beyond dispute. Whether for industrial or governmental complexes or private homes, in urban or suburban settings, green roofs provide many benefits to buildings, neighborhoods and municipalities including:

- » Reduce stormwater infrastructure needs and costs by retaining 25 to 90% of precipitation (seasonally dependant).
- » Insulate buildings by reducing heat loss (winter) and heat gain (summer) through the roof.
- » Provide new opportunities for urban agriculture, or the creation of community gardens.
- » Significantly reduce sound levels from sources such as traffic or airplanes.
- » Protect roof membrane resulting in longer material lifespan and decreased maintenance and savings in replacement costs.
- » Provide amenity space for day care, meetings, and recreation.
- » Provide aesthetic appeal, increasing property value and the overall marketability of the building, particularly for accessible green roofs.
- » Reduce 'urban heat island effect' in the summer

PROMOTING GREEN ROOFS IN THE PIONEER VALLEY

Communities can adopt local zoning incentives or provide financial incentives through municipal stormwater fee reductions, tax credits and grant programs to encourage the installation of green roofs on new and existing buildings. Examples of zoning incentives include density bonuses (typically in the form of floor area ratio (FAR) bonuses) or a reduction in parking requirements. Some cities in the United States have taken steps to mandate that all new privately-owned large buildings (typically over 50,000 sq/ft) meet LEED Certified standards, which require green roofs. Few municipalities actually require projects to achieve LEED certification.

The U.S. is far behind other countries in adopting strategies to support the installation of green roofs. Germany has emerged as the world leader not only in developing green roof technologies and systems, but in passing federal and state legislation to mandate green roofs under specific conditions and offering economic incentives to install them. The state of Nordrhein-Westfalen, for example, pays €15.00 per square meter (\$19.40/10.8 square feet) to individuals who install them, while other states offer similar programs. (Snodgrass, 2006)

ENVIRONMENTAL BENEFITS

Improved air and water quality are two important environmental benefits to green roofs. The plants and growing medium of a green roof absorb water that would otherwise become runoff, thereby reducing peak storm flows and reducing associated water pollution. Research indicates that peak flow rates are reduced by 50% to 90% compared to conventional roofs. The characteristics of the soil substrate have a major influence on the effectiveness of a green roof. The soil layer traps sediments, leaves and other particles, thereby treating the runoff before reaching an outlet. The water retention capacity of the soil is dependent upon both the properties of the soil substrate and the vegetative cover. For example:

- » 1-inch deep moss and sedum layer over a 2-inch gravel bed retains about 58% of the water
- » 2.5-inch deep sedum and grass layer retains about 67% of the water
- » 4-inch layer of grass and herbaceous vegetation retains about 71% of the water

When incorporated into a combined sewer overflow abatement strategy, green roofs can reduce the need for sewer separation or storage projects required to reduce the volume and frequency of combined sewer overflows. (MA DEP and Low Impact Development Center)

The insulation provided by a green roof improves the cooling and heating efficiency of a building. By reducing energy demand for these functions, green roofs reduce air pollution and greenhouse gas emissions associated with energy production. Additionally, by reducing roof temperatures, green roofs slow the formation of ground-level ozone. Vegetation on a green roof can remove particulate matter and gaseous pollutants including nitrogen oxides, sulfur dioxide, and carbon monoxide from the air. They also remove carbon dioxide and produce oxygen. (MA DEP)

DESIGN CONSIDERATIONS

What is the purpose of the green roof?

Identifying a green roof's purpose and incorporating that into the early stages of planning and design is critical. All of the end uses may be compatible (stormwater retention, temperature management, community garden), but each requires different design and structural emphases and will significantly impact how the roof looks and functions, including what vegetation will cover it.

Load-bearing Considerations

Load bearing is the most critical consideration for any green roof. There are no regulatory barriers to building a green roof per se. Structural engineers assess loads from two general perspectives: dead and live loads. Local building codes usually specify a roof's required live load, which includes snow, water, wind, and safety factors required for the building's performance. Live load also includes human traffic, temporary installations such as furniture or maintenance equipment, and anything else transient in nature. Dead load includes the weight of the roof itself, along with permanent elements that make up the roof's structure, including roofing layers, any permanent installations for heating and cooling, and the projected wind or snow loads. Green roofs must be designed to withstand both live and dead loads. Additionally, because extensive green roof systems must be evaluated while fully saturated – which adds from 15 to 25 pounds per square foot – this must also be factored in. (Snodgrass, 2006)

Components of the Green Roof

The term green roof actually denotes a system of comprising several components, or layers, that work together to function as a single combined unit. While a green roof can be built on a variety of decking surfaces including concrete, steel, wood, and composite, the system is only possible when other components are added to ensure that the roof is protected against collapse and degradation and several other conditions are met. The basic components include: decking, waterproofing layer, and insulation layer, a root barrier, a drainage layer, a filter layer, and a substrate or medium layer.

Vegetation and Plant Selection

The act of growing plants under atypical conditions necessarily influences their selection and maintenance in ways that differ from considerations for ground-level plants. Selecting the right plants is one of the foremost challenges. For example, without irrigation and at least 8 inches of mostly organic medium, most green roofs in North America cannot sustain a wide variety of plant species that appear in traditional gardens. (Snodgrass, 2006) Solar orientation will affect plant growth, and may be particularly important on sites with extreme slopes that have the potential to shade a roof.

Jones Ferry River Access Center Green Roof, Holyoke, MA

This green roof includes is 13,000 square foot roof built to reduce and treat stormwater runoff, improve energy efficiency within the building lowering heating and cooling costs, reduces rooftop noise and improve air quality. The building was designed to accommodate the roofing system, including a sturdier roof framing, a thick EPDM membrane for waterproofing the roof.

The six inches of growth media is an engineered blend of carefully selected materials designed to be light weight while providing superior moisture retention. It's superior to regular soil because it is lighter, free from pathogens, undesirable insects and weeds. The roofing system will weigh between 20-25 pounds per square foot saturated with water. On an annual average, 50%-80% of all stormwater that falls on the roof is retained and not released to the storm sewer system.

In a completely dry state, the R-Value of the roof garden is approximately 6. However, the higher the moisture content of the assembly, the lower the R-Value, as thermal conductivity increases. Plants function as small water pumps operating at high pressure and low volume. When materials experience a phase change from liquid to vapor, they absorb a large of amount of heat energy from the surrounding environment. In the case of water, every gallon transpired by the plants absorbs roughly 8,000 BTU's of heat energy. As a result, during hot summer days, the roof membrane temperature is typically 5-10°F cooler than the ambient air temperature. The plants, mostly sedum acclimated to grow in this area, also stabilize the growth media and absorb stormwater.

MUNICIPAL INCENTIVE PROGRAMS FOR GREEN ROOFS

Portland, Oregon

The City of Portland offers a Floor Area Ratio (FAR) bonus to developers who build rooftop gardens or Ecoroofs in certain districts of the city. The ratio of the FAR bonus varies, depending on the percentage of the total building roof that the Ecoroof or rooftop garden covers. The City also funds up to \$5 per square foot of an 'ecoroof' project through their Ecoroof Incentive Program, which runs to 2013.

Chicago, Illinois

The City of Chicago's "Green Permit Process" offers qualifying projects, such as green roof projects, an expedited permit process and possible reduction of the permit fees.

Minneapolis, Minnesota

The City of Minneapolis charges property owners for management of stormwater based on the degree to which their property is covered by impervious surfaces. Property owners could qualify for fee reductions of up to 100% by establishing onsite water-quality and/or quantity treatment systems, such as rain gardens, detention ponds and green roofs.

Toronto, Canada

The City of Toronto instituted a "green roof bylaw" that requires green roofs for all new development above 21,500 sq/ft. Coverage requirement range from 20-60% of the available roof space depending on the size of the development.

Acton, Massachusetts

The Town of Acton adopted a zoning by-law allowing for a density bonus for buildings achieving LEED certification in the East Acton Village District.

Portsmouth, New Hampshire

The City of Portsmouth adopted a density bonus for private projects that use LEED in the central business district by which a project benefits from a 0.5 increase in FAR if it meets appropriate open space requirements and build to LEED Certified standards.

Los Angeles, California

The City of Los Angeles requires all privately owned buildings in the city with more than 50 units or over 50,000 sq/ft to meet LEED Certified standards. Additionally, all City of Los Angeles building projects that are 7,500 sq/ft or larger are required to meet LEED standards.

REFERENCES AND RESOURCES

U.S. GREEN BUILDING COUNCIL, GREEN BUILDING INCENTIVE STRATEGIES:
www.usgbc.org/DisplayPage.aspx?CMSPageID=2078

TOWN OF ACTON ZONING BYLAW (SECTION 5.5B.2.2.D):
<http://www.acton-ma.gov/>

CITY OF PORTLAND ECOROOF PROGRAM:
<http://www.portlandonline.com/bes/index.cfm?c=44422>

CITY OF LOS ANGELES GREEN LA INITIATIVE:
www.ladwp.com/ladwp/areaHomeIndex.jsp?contentId=LADWP_GREENLA_SCID

CITY OF CHICAGO GREEN PERMIT PROCESS
www.cityofchicago.org/city/en/depts/bldgs/supp_info/overview_of_the_greenpermitprogram.html

CITY OF MINNEAPOLIS STORMWATER PROGRAM:
<http://www.ci.minneapolis.mn.us/stormwater/green-initiatives/>

CITY OF TORONTO GREEN ROOFS PROGRAM:
<http://www.toronto.ca/greenroofs/>

Snodgrass, Edmund C. and Lucie L. Snodgrass. *Green Roof Plants: A Resource and Planting Guide*. Timber Press, 2006.

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Green Streets

PURPOSE

Green streets are designed to treat and infiltrate stormwater close to its source while creating more vibrant and livable communities.

Stormwater runoff from streets, roads, parking lots, roofs and other impervious surfaces is a significant source of water pollution to our rivers, streams and ponds, as well as a major contributor to combined sewer overflows. Green streets can provide cost effective infrastructure solutions to reduce and manage stormwater runoff and flooding through the use of green infrastructure facilities – small, decentralized, natural or engineered systems that utilize soils and vegetation as a primary treatment mechanism. This approach integrates the built and natural environment, introducing park-like elements that enhance the pedestrian experience.

GREEN STREETS PRINCIPLES

Green streets are designed utilizing three guiding principles:

Green Infrastructure – Use naturalized systems to treat and manage stormwater close to its source.

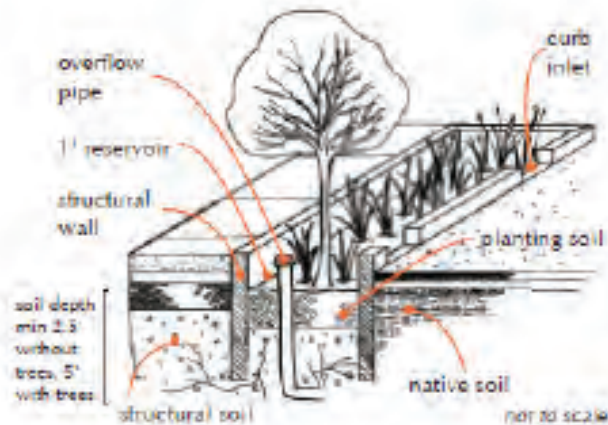
Green infrastructure (GI) uses naturalized systems to infiltrate, evapotranspire, and/or recycle stormwater runoff close to its source. Rain gardens, bioretention areas, tree box filters/trenches, green roofs, bioswales, permeable pavement, and street trees are some common GI practices. In addition to vegetation and engineered soils, GI uses permeable surfaces to intercept rain and snow melt close to the source, reducing the burden on traditional grey infrastructure systems. GI facilities seek to complement rather than replace existing grey infrastructure to achieve some of the additional benefits green streets have to offer a community.

Complete Streets – Create bicycle and pedestrian friendly streets.

Complete Streets are designed for all users regardless of age, ability, income, or mode of transportation, and prioritize the health, safety, and comfort of residents and visitors. Through the use of designated bike lanes, safe pedestrian crossings, traffic-calming elements, and accessible transit systems, Complete Streets create healthier, more pleasant streetscapes that offer opportunities to walk and bicycle safely every day.

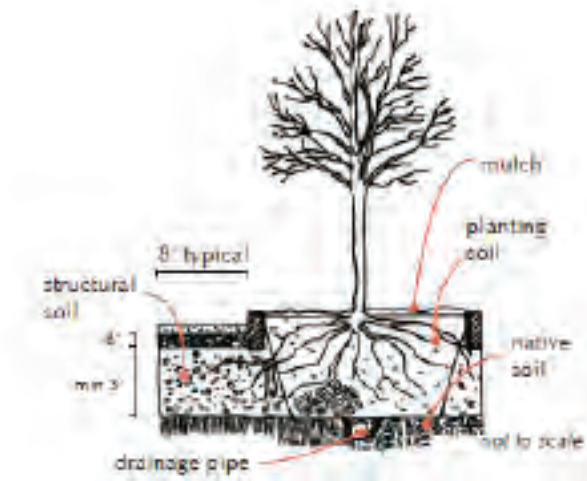
Placemaking – Generate a strong sense of place.

Placemaking is about strengthening the connection between people and the spaces they share. In this way, spaces are created that reflect the identity and history of residents, taking a number of forms from pocket parks to participatory art projects to human-scale built environments. Good public spaces can be both temporary and seasonal, as in a Saturday morning farmer’s market on a local street closed to vehicular traffic, to permanent parks, plazas and boulevards. Placemaking can increase positive interactions between people, instill community pride, improve quality of, beautify a place, and support economic growth.



STORMWATER PLANTER

A stormwater planter is usually a rectangular, vegetated planter, sometimes planted with trees. Its four concrete sides double as a curb and structure for the planter and allow water to pool up to 1' before overflowing into another planter or the grey infrastructure system, storing and infiltrating water over time.



BREAKOUT

Break-outs are excavated areas filled with structural soil, often under sidewalks or roads. Used in combination with other green infrastructure tools such as tree trenches or stormwater planters, break-outs provide more room for tree roots to grow in tight spaces, increasing the longevity and survival rate of urban trees.



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ADOPTING A GREEN STREETS POLICY

Adopting a municipal Green Streets Policy demonstrates a community's commitment to achieving the principles identified above in both private and public projects. The following are examples of Green Street Polices from cities around the country:

Northampton, Massachusetts – Green Streets Policy

Northampton has developed a Green Streets Policy statement which promotes the use of green streets facilities and green infrastructure in public and private development, including:

- » Road reconstruction, new road development and bicycle and pedestrian projects;
- » Stormwater projects, and;
- » New development and redevelopment projects

through regulation, capital investment and management mechanisms as a cost effective and sustainable practice for stormwater management.

Prince George's County, Maryland – Complete and Green Streets Policy

The County requires road, sidewalk, trail, and transit related construction/reconstruction projects to include environmental site design where practicable.

District of Columbia – Green Streets Policy

The District of Columbia's stormwater rules and the Department of Transportation's Low Impact Development Action Plan inform the City's Green Streets Policy.

Cleveland, Ohio – Complete and Green Streets Ordinance

The purpose of the ordinance is to the creation of a network of Complete and Green Streets that will improve the economic, environmental, and social well-being of the city.

Tucson, Arizona – Green Streets Policy

Tucson's policy requires stormwater harvesting features to be integrated into all publicly funded roadway development and redevelopment projects.

Holyoke, Massachusetts – Green Streets Guidebook

The City's Guidebook is intended to introduce city planners and policy makers to Green Streets, advocate for Green Streets implementation in Holyoke, and serve as a preliminary set of design guidelines to transform Holyoke's streets into more ecologically, socially, and economically positive spaces. The Guidebook includes a Toolbox with design standards for Green streets strategies; nine design templates representative street characteristics in Holyoke that can be applied to future projects; a site-specific application of Green Street design principles in downtown Holyoke; an exploration of relative costs and benefits; and recommended next steps for the city to implement Green Streets.

Edina, Minnesota – Living Streets Policy

The policy enables the City to implement their Living Streets Plan for safe walking, bicycling and driving, reduced stormwater runoff, reduced energy consumption, and promoting health.

REFERENCES AND RESOURCES

CITY OF SEATTLE, RIGHT OF WAY IMPROVEMENTS MANUAL: GREEN STREETS
http://www.seattle.gov/transportation/rowmanual/manual/6_2.asp

CITY OF PORTLAND, GREEN STREETS CONSTRUCTION GUIDE
<http://www.portlandoregon.gov/bes/45379?>

CITY OF PHILADELPHIA'S GREEN CITY CLEAN WATERS,
GREEN STREETS DESIGN MANUAL
http://www.phillywatersheds.org/what_were_doing/gsdm

U.S. ENVIRONMENTAL PROTECTION AGENCY, EFFECTIVE GUIDE TO GREEN STREETS
http://water.epa.gov/aboutow/eparecovery/upload/2009_09_10_eparecovery_EPA_ARRA_Green_Streets_FINAL.pdf

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Porous Asphalt

WHAT IT IS

With roads and parking lots accounting for a high percentage of impervious surface, porous asphalt can be an ideal Best Management Practice in the right location. It essentially eliminates the impervious surface that would otherwise be created. Porous asphalt uses a standard asphalt mix with no sand or fines and a polymer binder to provide strength and stability. The void spaces of this mixture allows rain and snowmelt to pass through to a subbase of stone aggregate that both supports the asphalt layer and provides storage for and treatment of rainfall or snowmelt.

Unlike many other stormwater management facilities, porous asphalt requires no additional land or space, functioning within the footprint of the roadway, parking lot, alley, or sidewalk. By promoting infiltration, filtration, and recharge of groundwater, porous asphalt significantly reduces runoff volume and peak flows, decreases runoff temperature, and improves water quality. The University of New Hampshire Stormwater Center (UNHSC) reports that it also speeds snow and ice melt, reducing the salt required for winter maintenance. While porous asphalt is most recommended for low volume and low speed applications, U.S. Environmental Protection Agency has noted that porous asphalt has performed well in all highway pilot projects in the United States. Maine DOT has recently used porous asphalt on a high volume road in South Portland (see more information about this project under Examples).

WATER QUALITY TREATMENT

The porous asphalt design tested at UNHSC, being widely promoted now in New England, uses coarse sand as a subbase filter course that enhances effectiveness in pollutant removal rates. The facility at UNHSC has demonstrated the following:

Pollutant	% Removal
Total Suspended Solids (TSS)	99
Total Petroleum Hydrocarbons in the Diesel Range	99
Dissolved Inorganic Nitrogen (NO3)	No treatment
Total Zinc	75
Total Phosphorous	60
Average Annual Peak Flow Reduction	82

Source: University of New Hampshire Stormwater Center 2009 Annual Report

DESIGN CONSIDERATIONS

Stormwater design parameters – Three to five feet of vertical separation is needed from seasonal high groundwater. U.S. EPA also notes, “The load bearing and infiltration capacities of the subgrade soil, the infiltration capacity of the porous asphalt, and the storage capacity of the stone base/subbase are the key stormwater design parameters. To compensate for the lower structural support capacity of clay soils, additional subbase depth is often required. The increased depth also provides additional storage volume.”

Quality control – Careful assessment of site conditions, and quality control for material production and installation methods are essential to success.

Protect porous surface from sediment and fines – To minimize clogging and promote continued good infiltration rates over time it is critical to protect the surface and base from sediment and fines during and after construction. Pretreatment BMPs, such as filter strips and swales, may be important considerations where water is flowing from upland areas onto the surface. Devices such as chatter strips at parking lot entries can also help reduce clogging. Sanding during the winter months should be discouraged.

Specifications - For guidance on design, see specification provided by UNHSC at: <http://www.unh.edu/unhsc/sites/unh.edu.unhsc/files/UNHSC%20PA%20Spec%20update-%20FEB-2014.pdf>.

The specification shown in Figure 1 (at right) is intended for:

1. porous asphalt pavement in parking lot applications;
2. a cold climate application based upon the field experience at the UNHSC porous asphalt parking lot located in Durham, New Hampshire. They note that the can be adapted to projects in other climates provided that selection of materials and system design reflects local conditions, constraints, and objectives.

The mix for porous asphalt requires a polymer binder, which may be difficult to acquire for small scale projects. For

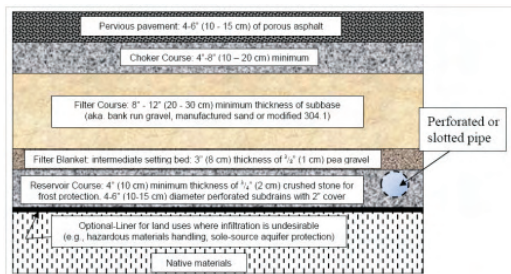


Figure 1: Typical Parking Area Cross Section for Porous Asphalt
 Courtesy: University of New Hampshire Stormwater Center



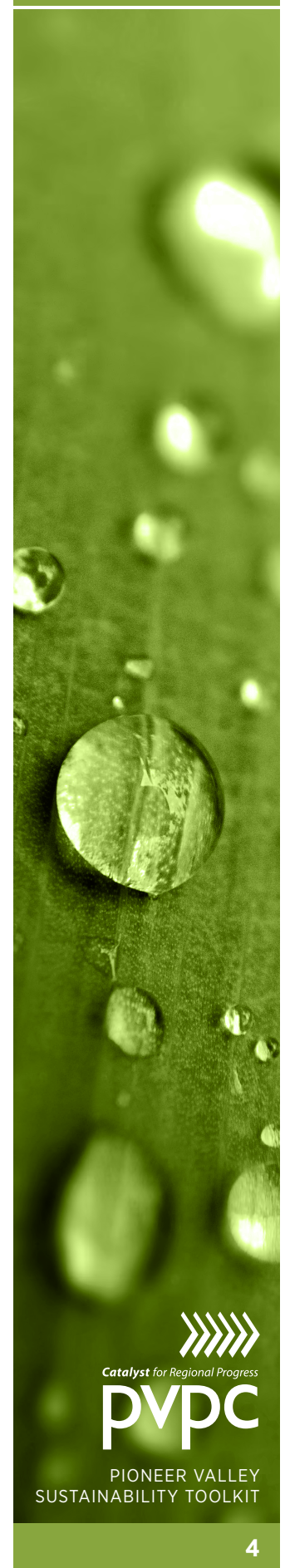
example, when New England Environmental, Inc. in Amherst, MA constructed its porous asphalt parking lot in 2009 it found that the binder specified by UNH for the asphalt mix is only appropriate for larger-scale jobs, because it is only sold by the trailer truckload. New England Environmental, Inc. found a substitute binder that includes polymer fibers, much like what is used for asphalt curbing, that could be acquired by the barrel.

PERMITTING CONSIDERATIONS

The Massachusetts Stormwater Handbook currently does not allow for porous asphalt in Zone IIs, or near any other critical areas, including Outstanding Resource Waters and Special Resource Waters (see Stormwater Management Standard #6). While the stormwater management standards relate to jurisdictional areas under the Wetlands Protection Act, these standards have been applied by reference through local bylaws and ordinances to upland locations as well. MassDEP is currently proposing a revision to its guidance about porous asphalt, and porous pavements generally, as new information has become available on its treatment capabilities. Until this recommendation from MassDEP is accepted, however, any legal actions will be based on the current guidance within the Stormwater Handbook.

BARRIERS TO USE

Concern	Experience
Cost	<p>\$10 to \$12 per square foot based on costs for MassDOT Park and Ride facility in Whately, MA, including 16 inches of stone for subbase and 5 inches of surface mix. Note that the scale and size of a project can also affect price, with lower per square foot costs on larger projects.</p> <p>The UNH Stormwater Center notes that material costs alone are about 20 to 25 percent more than traditional asphalt, but total project cost for porous asphalt is comparable to those for conventional asphalt projects if one accounts for the stormwater infrastructure costs that are required to manage runoff from conventional asphalt. The University of Rhode Island in building their porous asphalt parking lots in 2002 and 2003 found that the construction costs were comparable to equivalent sized conventional parking lots.</p> <p>While initial costs of a porous asphalt facility may be slightly higher than a facility that uses conventional asphalt, the lifespan of a porous asphalt parking lot can be more than 30 years compared to 15 years for a conventional parking lot. (See: "Pervious Pavements: New findings about their Functionality and Performance in Cold Climates" by J. Gunderson, Stormwater, September 2008.)</p>
Winter performance	<p>Given the well draining stone bed and structural support of porous asphalt, the freeze thaw cycle tends to produce fewer cracks and potholes than on conventional asphalt pavement. (University of New Hampshire Stormwater Center)</p> <p>"Because of the well-drained nature of the porous pavement and reservoir base, issues related to frozen media were minimized. Significant frost penetration was observed up to depths of 71 cm without declines in hydrologic performance or observable frost heave." (Results of a study published in Journal of Environmental Engineering in January 2012 notes)</p> <p>Low to no black ice development, allowing for reduced salt application rates of up to 50 to 75 percent. Best not to use sand at all to avoid clogging of pours. (University of New Hampshire Stormwater Center)</p>
Maintenance	<p>Requires vacuuming twice each year (spring and fall), and perhaps more frequently depending on use, to prevent clogging of pores with sediment and fines. Several contractors in the region offer vacuuming services. Typically, per square foot costs will be lower with larger jobs. A municipality for example may see better value in hiring to have several lots vacuumed at once rather than each vacuumed on separate occasions.</p> <p>Repairs can be made with standard asphalt, not to exceed 10 percent of surface area. (University of New Hampshire Stormwater Center)</p> <p>For winter maintenance tips, see UNHSC recommendations related to plowing and use of salt for general maintenance, during a storm event, and between storm events. See: http://unh.edu/unhsc/sites/unh.edu.unhsc/files/docs/UNHSC%20porous%20winter%20maintenance%20fact%20sheet_1_11.pdf</p>
Clogging	<p>Studies of the long-term surface permeability of porous asphalt and other permeable pavements have found high infiltration rates initially, followed by a decrease that then levels off with time. With initial infiltration rates of hundreds of inches per hour, the long-term infiltration capacity remains high even with clogging. See: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=135&minmeasure=5</p>
Durability	<p>The University of New Hampshire Stormwater Center acknowledges that while porous asphalt is weaker than conventional asphalt pavements, durability can be greatly improved with the proper admixtures and design. It has been effective for both commercial and roadway applications. (UNHSC 2012 Annual Report)</p>



EXAMPLES OF WHERE STRATEGY HAS BEEN IMPLEMENTED

New England Environmental, Inc. headquarters, Amherst, MA

As part of developing their new LEED platinum rated office building, New England Environmental, Inc. included porous asphalt in a suite of stormwater management strategies that also includes rain gardens and grass pavers. They used porous asphalt for all travel lanes (about a 10,000 square foot area), while grass pavers were used in all parking stalls. The porous asphalt has been in place since 2008 and is performing beyond expectations with vacuuming occurring twice each year to remove sediment and fines. Owner Mickey Marcus reports that the cost for the parking lot as a whole was equivalent to the cost of a conventional parking lot with attendant stormwater management facilities. For the future, Marcus discourages the use of grass pavers in combination with porous asphalt as the pavers become too easily damaged with winter plowing. See figure 2.



Figure 2: New England Environmental, Inc. with porous asphalt drive in foreground and grass paver parking stalls in middle ground | Courtesy: Mickey Marcus, NEE

MassDOT Park and Ride facility, Routes 5 and 10, Whately, MA

At the request of the local conservation commission, which was concerned about the parking facility's proximity to a wetlands area, MassDOT used porous asphalt in the 40 parking stalls at this new Park and Ride facility in Whately, MA. The porous area has 16 inches of stone in the subgrade and 5 inches of surface mix. Construction costs ran \$10 to \$12 per square foot for the porous asphalt area. MassDOT used traditional asphalt in the travel lanes for this facility.

Maine Mall Road, South Portland, ME

Maine DOT used porous asphalt on this four lane (75-foot wide) high-volume road (16,750 AADT) as part of a larger effort to restore a local creek to its water quality classification. They installed porous asphalt on 850 linear feet and used a specification that included a 3-inch open graded friction course, followed by 6 inches of asphalt treated permeable base, 15 inches of stone reservoir, and 6 to 12 inches of porous filter material (see project location in Figure 3 and cross section in Figure 3 below.) Total project costs were \$90 per square yard and the project was funded entirely through the American Recovery and Reinvestment Act monies.¹

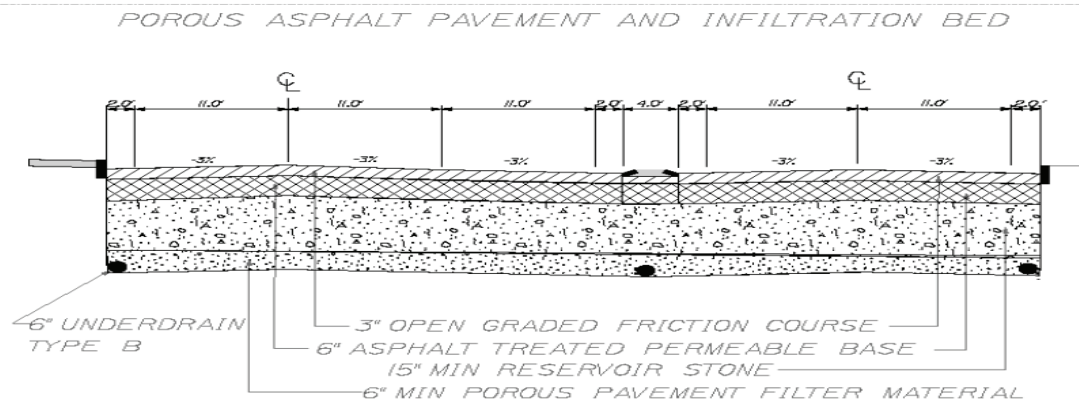


Figure 4: Cross section of porous asphalt system on Maine Mall Road | Source: Maine DOT

University of Rhode Island, Kingston, RI

In 2002 and 2003, the University of Rhode Island built two porous asphalt parking lots over a sole source aquifer. One lot is 5.5 acres and accommodates 800 vehicles while a smaller 1.47 acre lot accommodates 200 vehicles. Due to concerns of potential groundwater contamination and compaction of the asphalt, commercial and industrial vehicles are not permitted to park on these lots. In addition the recharge bed was designed to be 6 to 6.5 feet above seasonal high groundwater. Design of the facility includes a 2.5 thick porous asphalt surface layer, a 1-inch layer of choker course, and 3 to 3.5 feet of crushed rock to temporarily store and infiltrate rainfall and snowmelt. The crushed rock storage reservoir is separated from underlying soils and adjacent subsurface materials by a layer of geotextile filter fabric. Intended to prevent movement of fine soil particles up into the overlying reservoir, the fabric instead captured fines moving down from the overlying layers and became clogged so that water cannot infiltrate and moves laterally across the barrier.

Entrance areas of the parking lots are paved with conventional asphalt to accommodate heavier use and to better receive sediment deposition from tires as vehicles enter the lot. Landscaped parking lot islands act as bioinfiltration areas throughout the parking areas to provide a secondary route of infiltration during intense rainfall and in case the pavement surface gets clogged up. The outer areas of the lot are landscaped with trees and grass to keep windblown dust from nearby agricultural activities from accumulating on the porous asphalt.

During the summer of 2005, a new porous asphalt parking area was constructed expanding the existing lot and increasing the capacity from 814 to 1582 spaces. The new lot covers 5.8 acres. Several changes were made to the new lot to allow for simpler maintenance. They are:

1. Fewer, wider infiltration islands
2. Curb cuts for water entry to island bioinfiltration areas
3. Mowed grass, not meadow grass for islands
4. Fewer wheel stops, where possible, due to wheel stops being moved by cars and plowing

LINKS TO MORE INFORMATION

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[onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP25-25\(82\)_FR.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP25-25(82)_FR.pdf)

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Rain Water Harvesting

PURPOSE

Rainwater harvesting is a means to capture runoff from rooftops and store it for non-potable uses such as irrigation and greywater plumbing. In addition to reducing the demand on public water supplies by replacing potable water with rainwater, rainwater harvesting can reduce peak stormwater flows, potentially reducing combined sewer overflows and other pollution associated with stormwater runoff.

Rainwater harvesting – collecting rainwater from impervious surfaces and storing it for later use – is gaining in popularity as communities, businesses, and homeowners seek ways to affordably manage stormwater, and address the potential for increasingly limited water resources caused by climate change. The many benefits of rainwater harvesting and reuse include:

- » Provides inexpensive supply of water for outdoor water use and non-potable indoor uses
- » Reduces stormwater runoff and associated pollution by reducing peak flows
- » Helps reduce peak summer water use demand by creating alternative water supplies

RAINWATER HARVESTING SYSTEMS

Rainwater harvesting systems typically divert and store runoff from residential and commercial roofs. Often referred to as ‘clean’ runoff, roof runoff does contain pollutants (metals or hydrocarbons from roofing materials, nutrients from atmospheric deposition, bacteria from bird droppings), but they are generally in lower concentrations and absent from many of the pollutants present in runoff from other impervious surfaces. Installing a rainwater collection system requires diverting roof downspouts to cisterns or rain barrels to capture and store the runoff. Collection containers are constructed of dark materials or buried to prevent light penetration and the growth of algae.

From the storage container, a dual plumbing system is needed for indoor uses and/or connection to an outdoor irrigation system.

DESIGN CONSIDERATIONS

Every rainwater harvesting system, from a single 60-gallon rain barrel to a 1,400-gallon underground cistern, is custom tailored to site features, intended water use, budget, whether it is new construction or a retrofit, and how much space is available for storage capacity. Points toward LEED project certification are also available for a properly designed rainwater harvesting system.

Some general design considerations for every project include:

- » The earlier rainwater harvesting is incorporated into a new building design process, the more efficient and cost effective-it will be.
- » The largest and often most expensive system feature will be the storage tank, also called a cistern.
- » Storage tanks can be installed above or below ground.
- » Storage located high on the building or the site saves energy and costs (no pumps = zero energy use).
- » Elevated storage requires structural and seismic engineering.
- » Above ground storage structures can serve additional beneficial purposes as shade or privacy structures, and as heat sinks.
- » If space permits, size the cistern to capture the occasional really large storm, and have water available for extended dry periods.
- » Cisterns designed for full time domestic water use should be sized based upon a minimum of 30 gallons per day per person. <http://www.saveourh2o.org/water-use-calculator>
- » Underground storage tanks must be anchored to keep from floating when empty.
- » Use gravity as much as possible for the movement of water in the system.
- » Plumbing, backflow, overflow, and air gaps are important design features, and may require a licensed plumber depending on local code requirements.
- » Above ground tanks must be drained completely before freezing temperatures, and thus are seasonal applications.
- » Maintenance depends on intended reuse of water. Typical maintenance includes keeping gutters and cistern screens clean as well as periodic inspection and replacement of any water treatment components and equipment, including pumps and backflow prevention devices. The tank will require cleaning annually for potable water sources.
- » Rain barrel costs, including installation, range from \$60-\$150.
- » Underground storage systems range in cost depending on the size of the cistern and the water reuse application. For example, a buried 1,800 gallon storage tank with overflow directed to a drywell recharge area, including submersible pump for supply to an irrigation system, costs \$5,000-\$6,000, including installation.

How to Size a Rain Barrel

Rain barrel volume can be determined by calculating the roof top water yield for any given rainfall, using the following general equation:

$$V = A2 \times R \times 0.90 \times 7.5 \text{ gals./ft.}^3$$

V = volume of rain barrel (gallons)

A2 = surface area of roof (square feet)

R = rainfall (feet)

0.90 = losses to system (no units)

7.5 = conversion factor (gallons per cubic foot)

Example: One 60-gallon barrel would provide runoff storage from a rooftop area of approximately 215 square feet for 0.5 inch (0.042 ft.) of rainfall.

REGULATIONS

Massachusetts has no statutes or regulations concerning rainwater harvesting. Consequently, greywater requirements are often used to govern rainwater harvesting systems, resulting in requirements that are more stringent than necessary for outdoor water use. In 2010, the International Association of Plumbing and Mechanical Officials (IAPMO) published the first of its kind Green Plumbing and Mechanical Code Supplement (GPMCS). The supplement is a separate document from the Uniform Plumbing and Mechanical Codes and establishes requirements for green building and water efficiency applicable to plumbing and mechanical systems. In addressing “Non-potable Rainwater Catchment Systems”, the GPMCS specifically identifies provisions for collection surfaces, storage structures, drainage, pipe labeling, use of potable water as a back-up supply (provided by air-gap only), and a wide array of other design and construction criteria. It also refers to and incorporates information from the ARCSA/ASPE Rainwater Catchment Design and Installation Standard, a document published in 2008 under a joint effort by the American Rainwater Catchment Systems Association (ARCSA) and the American Association of Plumbing Engineers (ASPE). (EPA, 2013)

CROSS-CONNECTIONS WITH MUNICIPAL WATER SUPPLY AS BACKUP SOURCE

State code allows the direct plumbing of municipal water supply to a RWH system as a back-up water supply provided an approved reduced pressure backflow preventer (RPBP) is installed and included under a required maintenance plan. These fixtures have a physical air gap internal to the device that separates “unregulated” harvested water from the municipal supply. A standards model of an RPBP is approved by MA DEP for use in cross-connections.

WATER RATES

Water rates are perceived as irresponsibly low by many water sustainability professionals and researchers, and seldom reflect the true costs of its use. Many communities also have a decreasing block rate structure wherein water becomes cheaper on a unit basis the more one uses. Low rates are perhaps the largest impediment to rainwater harvesting systems, since under current rate structures one would never build a harvesting system to save money on water usage, except in a rare case where a site is particularly water constrained.

TREATMENT REQUIREMENTS

Since no standards exist for secondary exposure to contaminants or bacteria from use of harvesting systems (e.g spray irrigation, toilet use, etc.), municipalities often use primary exposure thresholds (e.g drinking the water) to set water quality requirements for harvesting systems since no scientific basis for assessing risk exposure exists today. Or, greywater reuse code provisions are applied which are not necessarily appropriate and are typically considered over treatment which results in increased costs to a project limiting implementation of these systems.

CONSIDERATIONS FOR ESTABLISHING A MUNICIPAL RAINWATER HARVESTING PROGRAM

- » **Establish specific codes or regulations for rainwater harvesting** – Local codes should define rainwater harvesting and establish its position as an acceptable stormwater management and water conservation practice.
- » **Identify acceptable end uses and treatment standards** – Consider and identify acceptable uses for harvested rainwater and the required treatment for specific uses. Rainwater is most commonly used for non-potable uses and segregated by indoor and outdoor use.
- » **Detail required system components** – Delineate between rain barrels and cisterns. Needed system requirements include: pre-filtration (screens, etc.), storage containers, back-flow prevention, dual piping system, cross-connection prevention, and signage for locations of potable and non-potable water within the system. Refer to the UPC's Green Plumbing and Building Code Supplement for guidance.
- » **Permitting** – Rain barrels should not require local permitting. A building permit may be required for cistern systems used for non-potable water uses. If harvested rainwater is used for potable water, the collection and treatment system should be inspected and approved by the local Board of Health.
- » **Maintenance** – Adequate design and maintenance of the cistern and piping system is the responsibility of the cistern owner.

- » **Rates of use** – To be used efficiently for maximum stormwater retention, rainwater needs to be used in a timely manner to ensure adequate storage capacity for subsequent rain events. Municipalities should engage in outreach and education about best practices. Harvesting programs targeting combined sewer areas should promote post-storm slow draw down of rain barrels and cisterns to delay stormwater release to the sewer system and ensure maximum storage for the next storm.



LOCAL RAINWATER HARVESTING PROJECTS

Center-Pepin School, Easthampton, MA

A 305-gallon storage tank collects rainwater from a 670 square foot roof and serves as a source of irrigation water for the school yard garden. The cistern does not fully capture the first one inch storm, and overflow is directed to an existing ground level concrete channel along the building which drains to the municipal storm sewer. The system cost \$308 plus \$125 for delivery, and was installed by volunteers at the school.

MassMutual Financial Group, Springfield, MA

Roof water reclamation serves as a reservoir for on-site irrigation. 60-inch diameter HDPE piping provides 200,000 gallons of storage. An independent pumping system pressures water for irrigation system. There is automated conversion to domestic water during dry periods, and a smaller infiltration system for winter.



A similar system to the one in the photo was installed at MassMutual.

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Tree Box Filters

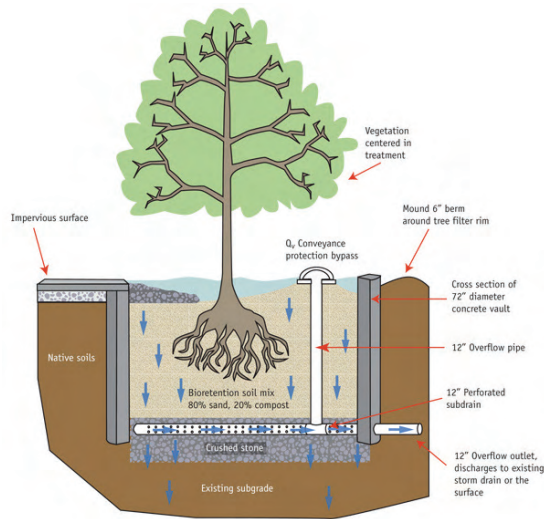
WHAT IT IS

Tree box filters are typically installed along roadways to act as mini bioretention systems. They are particularly useful in urban settings where space is limited and where traditional street tree plantings can be converted to provide stormwater management functions. A tree box filter involves a prefabricated concrete box that can be bottomless to promote infiltration or closed bottomed where soils are not conducive to infiltration. The box typically contains a metal grate at the surface to protect the integrity of the tree's roots and soils, a soils mix designed to both promote tree growth and stormwater function, a tree species (tolerant of road salt and the varying cycles of inundation and drought), and a perforated subdrain located within a bed of crushed stone at the very bottom.

Storm runoff from adjacent roadways and sidewalks enters the box through an inlet along the curbing and then soaks into and gets filtered by the soil mix. Stormwater is then taken up by tree roots, or soaks deeper into the subgrade to recharge groundwater, or collects in a perforated subdrain to discharge to the storm sewer system or to the surface.

WATER QUALITY TREATMENT

Like other bioretention systems, the tree filter box retains, degrades, and absorbs pollutants as stormwater filters through layers of mulch, soil, and plant roots. The University of New Hampshire Stormwater Center (UNHSC) installed its first tree box filter



Source: University of New Hampshire Stormwater | Center, 2009 Biannual Report

Tree box filter boxes are prefabricated bioretention cells that can be integrated into existing curb and catch basins drainage systems along streets to receive runoff from adjacent impervious surfaces.

in 2004 and reports, “Their water quality treatment performance is high, often equivalent to other bioretention systems, particularly when well distributed through a site.” UNHSC’s 4-foot deep, 6-foot diameter facility demonstrated the following:

Pollutant	% Removal
Total Suspended Solids (TSS)	93
Total Petroleum Hydrocarbons in the Diesel Range	99
Dissolved Inorganic Nitrogen (NO ₃)	3
Total Zinc	78
Total Phosphorous	NT
Average Annual Peak Flow Reduction	NT

Source: University of New Hampshire Stormwater Center 2009 Biannual Report

During a two-year study at the University of Virginia using a manufactured tree box filter called Filterra made by Americast, Inc. researchers found “...pollutant removal rates vary as a function of the filter surface area to drainage area.” At the minimum of .33% filter surface area to drainage area ratio filtering 90% of the annual runoff (calculations that involved the rainfall distribution and frequency data from the mid Atlantic region) the expected pollutant removal rates are as shown below. They note that higher pollutant removal rates are made possible by increasing the ratio of filter surface area to drainage area.

Total suspended solids: 85%

Total phosphorous: 74%

Total nitrogen: 68%

Metals: 82%

Peak Flow Reduction

UNHSC notes in its 2009 Biannual Report that, “Without additional engineering, the tree box filters can do little to reduce peak flows unless sited in appropriate soils, such as those in groups “A” (sand, loamy sand, or sandy loam with high infiltration rates) and “B” (silt loams or loams with moderate infiltration rates).”

A technical bulletin from the Virginia Stormwater Manual notes that while tree box filters are not used generally for the attenuation of runoff for stream channel erosion control and flood control purposes, “...some degree of volume/flow reduction can be achieved

by combining this filter system with an adjacent [downstream] underground storage / detention system (gravel trench or pipes). Such a combined system may be useful for urban retrofit projects to address problems associated with combined sewer overflows or for stream protection.”

DESIGN CONSIDERATIONS

There are numerous prefabricated tree box filter structures that are commercially available. They are generally sized and spaced much like catch basin inlets. Design variations are abundant and as mentioned above, the functionality of the tree box filter can be augmented for volumetric control with adjacent underground storage or given naturally well draining soils (Groups A and B). Design (sizing, spacing, installation, and location) are done in accordance with manufacturer’s specifications.

While drainage areas may range in size from one-quarter to a half acre, there is an optimum ratio between filter surface area to drainage area that brings together cost effectiveness



Source: Neponset River Watershed Association

The Neponset River Watershed Association worked with the Town of Milton to retrofit an existing “curb and catch basin” drainage system in the Central Crossing neighborhood with tree filter boxes. The project reduced bacterial loading to Pine Tree Brook and the Neponset River while raising awareness of these facilities as a cost effective approach to stormwater management.

with pollutant removal effectiveness. The two-year study at the University of Virginia, which used the tree box filter manufactured by Filtterra and rainfall distribution / frequency for the Mid Atlantic region, found that the optimum ratio between filter surface area to contributing impervious surface drainage area is 0.33% (36 ft²) of filter surface for every ¼ acre of drainage area. This would require a 6 by 6-foot filter box.

For locating tree box filters, the State of Virginia Stormwater Management Program offers the following guidelines. Tree box filters are,

...best incorporated into the overall site, or streetscape or parking lot landscaping plan. The individual box locations represent a combination of drainage considerations (based on final grades and water quality requirements), desired aesthetics, and minimum landscaping requirements, and must be coordinated with the design of the drainage infrastructure.

Because proper functioning of the soil media is so critical (as with other bioretention facilities), there are several additional consideration worth noting:

- » **Tree box filters are installed after site work is complete and stabilization measures have been implemented. It is important to protect the filter media from premature clogging and failure.**
- » **Exposing the soil, microbes, and plants to prolonged and frequent flooding and wet conditions will significantly change the hydrologic regime reducing the effectiveness of the media to capture pollutant and the microbe's/plant's abilities to cycle nutrients, break down organics and uptake heavy metals. If the filter media remains water logged for 3 or 4 days anaerobic conditions will develop, dropping both oxygen and pH levels which may kill desirable soil microbes and plants. As such, runoff should not be detained and stored in a holding tank to be metered out to the filter media over a long period of time and frequent flows (such as from basement sump pumps) must be excluded.**

BARRIERS TO USE

Following are possible concerns that may serve as barriers to use of tree box filters.

Concern	Experience
Cost	<p>There are a variety of costs described in the available literature on tree box filters, ranging from \$1,500 to \$10,000. Recent quotes from manufacturers of these systems provide perhaps a more realistic range: \$7,000 to \$12,000, depending on size and not including installation. For public projects, installations can be done by municipal public works department or they might be bid out as part of a larger construction project.</p> <p>Annual maintenance cost for an owner has been reported at approximately \$100 per unit. Annual maintenance by the manufacturer is \$500 per unit.</p>
Winter performance	<p>University of New Hampshire Stormwater Center found, "The tree box filter's ability to treat water quality remained relatively stable in all seasons... While some seasonal variation in infiltration capacity and nitrogen removal does occur, cold conditions do not seem to warrant significant design alterations."</p>
Maintenance	<p>Once the tree is established, annual maintenance is typically minimal. In UNHSC's five-year experience with the tree filter box (installed in 2004), they note that maintenance entailed only routine trash removal and periodic inspections to ensure that the bypass and soils are adequately conveying water. In 2008, they also removed the top two inches of surface fines accumulation to restore infiltration capacity (due to an accumulation of sealcoat fines and flakes which caused a noticeable reduction in infiltration). Periodic removal of surface fines (similar to that of deep sump catch basins) may be useful over the long term to support infiltration.</p> <p>Manufacturers may provide services for inspection, care, and maintenance of the tree box filter for the first year or two after installation.</p> <p>Charles River Watershed Association notes that maintenance entails the following: periodic inspection of plants and structural components, periodic cleaning of inflow and outflow mechanisms (the system comes with an observation well that can be used as a clean out), periodic testing of mulch and soil for buildup of pollutants that may be harmful to the vegetation. Biannual replacement of mulch.</p>

LINKS TO MORE INFORMATION

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Code Review Checklist

PURPOSE

The Code Review Checklist is a tool for assessing the capacity of local regulations to support green infrastructure options in new development and redevelopment within a community.

There are many reasons why a community should support the development of green infrastructure in both new development and redevelopment. In addition to the effectiveness of the many structural practices designed to manage and treat storm water close to its source through natural or engineered systems, green infrastructure facilities can be beautiful, compatible with the pedestrian environment, and support place making design elements at almost any site. The pending reissuance of the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit will also require regulated communities to assess their local regulations and policies for compatibility with green infrastructure practices.

HOW IT WORKS

The Code Review Checklist is divided into several easy to follow sections that allow a community to determine:

- » if their local regulations are compliant with the draft 2010 NPDES MS4 Permit;
- » the degree to which their street design, parking lot and other local requirements affect the creation of impervious cover;
- » and the extent to which a Low Impact Design (LID) approach is integral to site planning and development.

The checklist does not offer a ranking or final score but rather identifies specific areas of local regulations that can be improved upon to better support green infrastructure and LID site planning.

NPDES MS4 Permit Compliance – Based on the draft 2010 permit, the Code Review Checklist asks a series of questions that allow the municipality to determine if their local bylaws or ordinances meet permit requirements for stormwater management program funding, illicit connections, erosion and sediment control at construction sites, and post construction stormwater management in new development and redevelopment.



Street and Parking Lot Standards in Subdivision Regulations and Zoning – Once completed, these sections of the Code Review Checklist offer a comparison between existing code requirements and LID standards for road width and length, rights of ways, sidewalks, cul de sacs, stormwater management facilities, and landscaping requirements.

Feasibility of Green Infrastructure in Other Local Regulations, Policies, and Programs

This section of the Checklist seeks information about other zoning tools such as open space or cluster development, Board of Health and wetland regulations, street tree policies and programs, and local building/plumbing codes relative to programs such as rain water harvesting.

RESOURCES

The Pioneer Valley Green Infrastructure Code Review Checklist is a compilation of guidance drawn from several resources including The Center for Watershed Protection's Code and Ordinance Worksheet, the U.S. Environmental Protection Agency's Water Quality Scorecard, and the Metropolitan Area Planning Council's Low Impact Development Toolkit Checklist for Regulatory Review.

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Green Infrastructure In Zoning

PURPOSE

Measurable standards can be adopted within municipal zoning codes, and subdivision and stormwater regulations, to promote a comprehensive approach to Low Impact Development and the integration of green infrastructure in community development.

There are many opportunities within local zoning codes and subdivision and stormwater regulations to promote Low Impact Development (LID) standards and green infrastructure including the use of incentives, code requirements with standards, and a well-defined planning process that promotes coordination between preliminary plans, site plans, and stormwater management plans. Examples include incentives such as density bonuses, infiltration requirements with design standards, and planning for multipurpose functionality of design elements such as buffers and screening for landscaping and stormwater management. Rather than adopting a separate bylaw that may conflict with other sections of the zoning code, integrate green infrastructure throughout such that it becomes the norm not an exception.

Many green infrastructure strategies have multiple benefits and offer a more comprehensive approach for addressing a range of issues and challenges. For example, a green roof takes up no extra space at all, manages storm water by reducing peak flows, improves the heating and cooling efficiency of a building, and has the potential to be a source of food production. Techniques such as bioretention areas, grass filter strips, and swales can also meet landscaping and open space requirements while addressing stormwater treatment and infiltration.



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Green Infrastructure

Communities are exploring strategies that promote capture and control of rain water near where it falls. This includes the use of natural or engineered systems – such as green roofs, rain gardens, or cisterns. In these facilities, stormwater can be cleansed as it moves through soils and plant roots (treatment), returned to groundwater (infiltration), returned to the air (evapotranspiration), and/or captured to irrigate plants or flush toilets (reuse). This approach is called “green infrastructure” because of the use of plants to enhance and/or mimic natural processes. Green infrastructure contrasts with traditional “gray infrastructure” which is typically built to capture and retain large volumes of stormwater collected over a large area, and convey it to the nearest waterway.

Source: Pioneer Valley Green Infrastructure Plan, February, 2014

AN EFFECTIVE PERMITTING PROCESS IS CRITICAL

Critical to effective implementation of green infrastructure facilities is the site inventory and analysis process which should occur before any design work. Existing site conditions may offer opportunities to minimize impacts as well as the costs of stormwater management and can be identified through careful site analysis. Local zoning and permitting can promote a thoughtful process by defining the planning process, and providing standards for green infrastructure.

Town of Franklin, Massachusetts – Best Development Practices Guidebook

Franklin, Massachusetts’ commitment to expedited permitting resulted in creation of their Best Development Practices Guidebook to take the guess work out of permitting requirements for developers. Critical to smooth and successful permitting is their four step process for site plan and subdivision applications that begins with an existing site conditions map and an initial pre-development meeting, held every Wednesday at 3 PM, with representatives from all town boards, the police and fire departments, and Town Counsel. Developers are offered guidance on how to meet multiple permit requirements and community planning objectives with the least amount of time and expense. Through this process, LID and green infrastructure strategies are coordinated with other project requirements early in the planning process.

http://www.town.franklin.ma.us/Pages/FranklinMA_planning/initiatives/bestdevelopment.pdf

INTEGRATING GREEN INFRASTRUCTURE STANDARDS

Drainage

A best practice for eliminating conflicting standards is to reference the local stormwater bylaw or regulation within needed sections of the zoning code for appropriate drainage standards, thereby keeping all drainage standards and specifications in one section of the local code. All zoning standards for drainage should be consistent with the purpose and standards identified in any local stormwater management bylaw, regulation or policy to provide a seamless process for promoting LID site planning. Conserving the natural hydrologic function of a site, reducing impervious surfaces and preventing runoff are key principles in ensuring post development peak flows do not exceed predevelopment peak flows. Green infrastructure facilities should be explicitly encouraged for treatment, attenuation, and infiltration of stormwater at decentralized locations around a site to capture stormwater at its source.

Dimensional and Density Regulations

Explicitly allow bioretention areas, rain gardens, filter strips, swales, and constructed wetlands within required setback areas.

Allow reduction in frontage (and corresponding road length/paved area) where appropriate, such as in Open Space Residential Developments, at the outside sideline of curved streets, and around cul-de-sacs. Removal of all frontage requirements for open space developments allows greater flexibility for such projects.

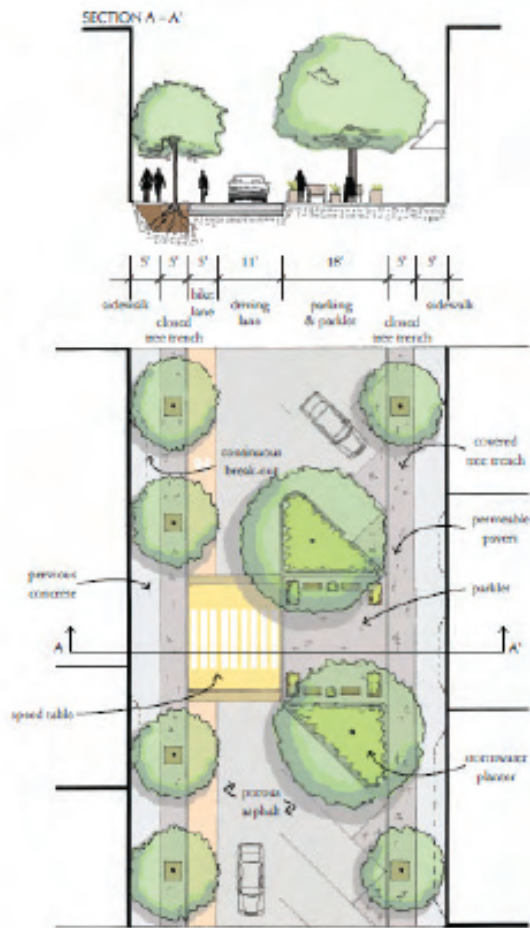
Setbacks for front, rear, and side yards should promote a walkable streetscape and support community character which means they will likely vary based on land use. In a mixed use district, setbacks should include enough space to comfortably design a pedestrian sidewalk against the building, a single lane automobile access lane or driveway, and a substantial vegetated buffer adjacent to the residential use as a screening buffer that can also serve as stormwater green infrastructure. A rear setback of 30-50 feet maybe required to ensure that loading, trash removal and other similar activities have adequate room. Flexibility in these standards due to lot configuration is important.

Site Preparation, Landscaping, Screening and Buffers

Landscaping requirements and objectives vary as a function of land use and activity. Emphasize native vegetation preservation on-site, and note that screening and buffer areas can be used for stormwater management provided that screening functions are not compromised. Consider including design standards for landscaping and screening that encourage the use of green infrastructure facilities. In the same way that architectural design standards serve a town, design standards for landscaping can support place-making within neighborhoods and across a community.

Roads

Roadways should be designed to be as narrow as possible while still wide enough to accommodate travel lanes, regular on-street parking (where required), and the passage of emergency vehicles, school buses, and the occasional delivery truck. Many local standards will specify that local urban roads be paved to a width of between 28 and 32 feet, while local rural roads might have a standard of only 22 feet in width. These guidelines are appropriate for high density development or higher vehicle volumes but are generally excessive for most suburban and rural developments. At a minimum, local codes and regulations should not discourage or prohibit impervious cover reductions. Curbs should be eliminated wherever possible to allow road drainage into open channel systems or other green infrastructure facilities. Requirements for curb and gutter infrastructure (i.e. requirements for new subdivisions to connect to storm sewer infrastructure) can be replaced with requirements for "perforated curb and swale" infrastructure, or simply roads without curbs where appropriate.



In thriving commercial areas, shaded pedestrian seating areas and calmed vehicular traffic invite people out in the neighborhood. Covered tree trenches manage stormwater and landscape pedestrian paths between the sidewalk and road, guiding circulation in the commercial district.

SOURCE: Holyoke Green Streets Guidebook, 2014

Landscaping and street standards can work well together to support community development objectives such as an improved pedestrian experience with a downtown commercial shopping district as illustrated in the City of Holyoke’s Green Streets Guidebook (2014) image herein.

Example Road Travel Widths for Local Streets

Minimum Road	Parking	Average Daily Trips (ADT)	Number of Dwelling Units Served
20	Parking on both sides*	<200	20
22	Parking on one side*	200-400	20-40
26	Parking on both sides	400-2,000	40-200
28	Parking on one side	>2,000	>200
32	Parking on both sides	>2,000	>200

*Parking is restricted to one side during a snow emergency. No parking is designated of road is a designated fire lane. Source: Rhode Island Low Impact Development Site Planning and Design Guidance Manual. Horsley Witten Group and RI DEP, March 2011.

The standard ROW width of between 50-60 feet can also be excessive in many situations. Wide ROWs require more clearing and grading, potentially changing the ecological function of a site and creating more expense. The ROW need only be wide enough to contain all of the cross sectional elements including sidewalks, utility easements, parking lanes, drainage features, and travel lanes which depend on the size, density and location of the development. More moderate standards for ROW construction may include a 44- to 50-foot ROW width for 26- to 30-foot wide local urban and suburban streets. In a rural setting, a 40-foot ROW for 22-foot wide local roads might be more appropriate.

Also in subdivisions, there are opportunities to reduce the required radius of a cul-de-sac (down to an outer road radius of 30 to 40 feet), and to allow hammerhead turnarounds. On dead end streets, hammerhead turnarounds can provide a feasible way to reduce paved area while providing sufficient turnaround space for larger fire vehicles.

REDUCING IMPERVIOUS SURFACES IN PARKING REQUIREMENTS

Communities should establish both minimum and maximum parking ratios to provide adequate parking while reducing excess impervious coverage. Parking reductions could be allowed for factors such as: mixed land uses, access to alternative transportation, demographics, and utilization of Transportation Demand Management (TDM) Programs including subsidized mass transit and parking cash out programs. Flexibility is a key component to providing adequate but not excessive parking.

Off Street On-site Parking Requirements - Identify maximum parking spaces. Consider requiring a Special Permit for an increase in maximum parking allowance. Some on-site parking requirements could be met off-site particularly in redevelopment sites and compact mixed use centers.

Shared Parking and Other Opportunities to Reduce Parking Requirements - Establish formulas for the utilization of shared parking for uses with different peak demand periods (e.g. work day peak demand period 9am-5pm; housing peak demand period 6pm-8am). Provide a model shared parking agreement and facilitate implementation. An alternative to shared parking is increasing the number of zoning districts that have minimal parking requirements.

Parking and Loading Space Standards - Allow for smaller stalls for compact cars, up to 30% of total parking spaces. Allow pervious pavement driveways and parking stalls, soils permitting, in all zoning districts. Encourage pervious pavement in overflow parking areas and shoulders. Snow storage should not coincide with these areas as it may include sand which will clog pervious pavement and prevent infiltration. This is especially important if porous pavement is being utilized for stormwater management. Edging and curbing can be eliminated or perforated to allow stormwater flows into infiltration and bioretention areas. For larger parking lots, require separating parking rows with planting strips that may function to manage stormwater and shade the lot reducing the heat island effect. Shade tree requirements in planting strips should also take into consideration stormwater treatment.

On-Street Parking Demand - Wider residential streets are often justified by the need to provide on-street parking. However, providing a continuous parking lane on both sides of the street is usually an inefficient and expensive way to satisfy the required parking for residential areas, since most of the required parking per unit can be met in driveways or through shared parking. Consider using one or both of the on-street parking lanes as a traffic lane (i.e. a queuing street), both traffic movement and parking needs could be met with a narrower street.

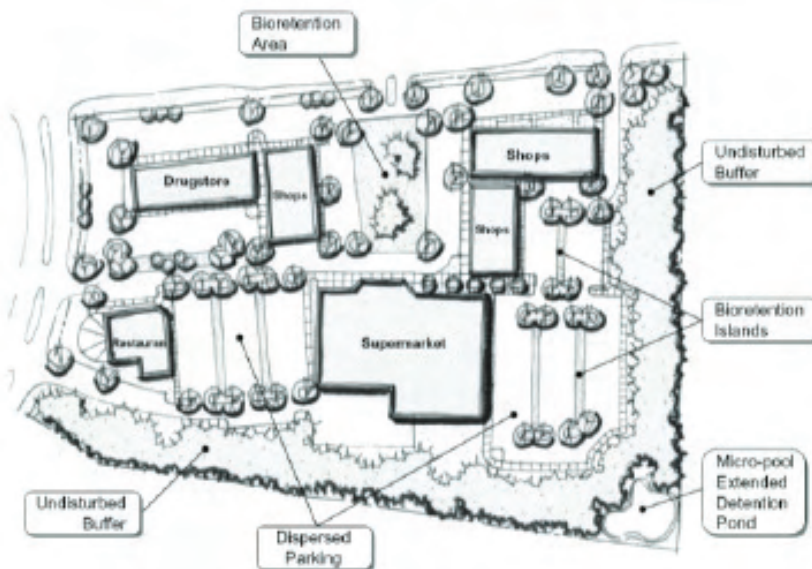
SIDEWALKS

Flexible design standards should be adopted that are based on safe pedestrian movement and limiting impervious cover. Constructing five-foot wide sidewalks on both sides of the street is not always appropriate, even in medium to high density developments. A three- or four-foot sidewalk on one side of the street is appropriate for many situations. Where practicable, sidewalks should be graded to drain into front lawns, reducing the total amount of runoff generated by the roadway. Consider permeable surfaces such as permeable asphalt or compacted aggregate where appropriate. Walkways may be removed from the roadway entirely and used to provide access to natural features or connect other destinations such as a playground, park or adjacent development.

The Town of South Hadley, Massachusetts allows subdivision developers to pay a fee in lieu of sidewalks in small developments where a sidewalk network may not serve a purpose. The fee contributes to bicycle and pedestrian projects in other areas of town.

OPEN SPACE PROTECTION IN ZONING

Open Space Residential Development (OSRD), Open Space Design (OSD), Conservation Development and Natural Resource Protection Zoning (NRPZ) are the current zoning models for what was previously called cluster or flexible development. This approach utilizes LID site design strategies for conserving natural hydrologic functions and reducing impervious surfaces for preventing runoff, integrating green infrastructure as a fundamental design element. These plans retain native vegetation and natural areas, and structure site layout to greatly reduce street infrastructure. The open space set aside should be based on resource values, not by formula such as X% of the development. The four step planning process reverses the typical subdivision planning process by first, designating open space based on an environmental analysis, siting houses next, layout of roads and trails, and last, lot lines are drawn.



This commercial shopping plaza set aside an undisturbed buffer and integrated green infrastructure facilities to reduce impervious coverage and provide a natural vegetated corridor around the site.
 Source: Rhode Island Low Impact Development Site Planning and Design Guidance Manual. Horsley Witten Group and RI DEP, March 2011.

REFERENCES AND RESOURCES

THE CONWAY SCHOOL. CITY OF HOLYOKE GREEN STREETS GUIDEBOOK.
MARCH, 2014.

Mass Audubon's Shaping the Future of Your Community Outreach and Assistance Program

<http://www.massaudubon.org/our-conservation-work/community-outreach/sustainable-planning-development/shaping-the-future-of-your-community-program/workshops/protecting-land-habitat>

Massachusetts Smart Growth/Smart Energy Toolkit

http://www.mass.gov/envir/smart_growth_toolkit/pages/how-to-SG.html

RHODE ISLAND LOW IMPACT DEVELOPMENT SITE PLANNING AND DESIGN
GUIDANCE MANUAL. HORSLEY WITTEN GROUP AND RI DEP, MARCH 2011.

www.dem.ri.gov/programs/bpoladm/suswshed/pdfs/lidplan.pdf

PIONEER VALLEY GREEN INFRASTRUCTURE PLAN, "TABLE 4.3 GREEN
INFRASTRUCTURE DESIGN RESOURCES". PIONEER VALLEY PLANNING
COMMISSION, FEBRUARY 2014.

www.pvpc.org/file/pvpc-green-infrastructure-plan-final-02-18-14pdf

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PIONEER VALLEY
SUSTAINABILITY TOOLKIT

Subdivision Regulations

What it is

Subdivision regulations guide the private development of new roads. They control layout and construction, specifying municipal requirements for location, width, and grades of proposed ways. They also specify requirements for public utilities. As streets typically account for 50 to 75 percent of impervious cover in the developed environment, it is critical that these regulations encourage and even require best practices for stormwater management. These regulations should also be consistent with requirements within a municipality's stormwater management bylaw/ordinance.

Cost Savings in a Subdivision Project



Photo: Nashua Telegraph

In Pelham, New Hampshire, a subdivision that took a low impact approach to site development and used green infrastructure stormwater management practices **realized a 6% savings on the total cost of stormwater infrastructure**¹ The road shown here makes use of porous asphalt, allowing rainfall to soak into the surface and filter through underlying soils.

For more on porous asphalt, see related fact sheet.



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Within subdivision regulations, best practices can be addressed in the early stages of the planning process itself, and within requirements for the following:

- » location and length of roadways
- » right of ways
- » paved roadway width
- » curbs
- » drainage
- » sidewalks
- » utilities
- » landscaping
- » cul de sacs

Planning process

Approval for a subdivision project typically begins with submission of a preliminary plan, which helps initiate a conversation about the project between the developer, planning board, and board of health. This early stage in the project provides communities with an opportunity to promote an integrated site design process and use of distributed stormwater management practices to best match the predevelopment hydrologic condition. This could include advancing provisions within stormwater management regulations and also within zoning regulations for: 1. Open Space Residential Development, which allows for a more compact development pattern to preserve open space and reduce the amount of paved surfaces through clustering of development to the least environmentally sensitive areas; or 2. where appropriate Traditional Neighborhood Development (TND), which involves the more traditional neighborhood pattern used prior to the automobile, and includes small lots and homes with porches oriented toward the street. TNDs typically have narrow roads and on-street parking coupled with reductions in required off-street parking.

For preliminary plan submission, municipalities could provide to developers a standard site analysis checklist to maximize design and functionality of best stormwater management practices. This could include many of the same steps within the conservation development process, beginning with a good site analysis to designate natural drainage areas, important conservation areas, and locating development areas. Applicants could bring the results of this analysis to a pre-application conference. As part of this analysis and reporting, the applicant could identify proposed best stormwater management practices. Soil testing for this site analysis could be for the site overall and not as rigorous as the more detailed soil work necessary to design a stormwater management facility.

It may be useful to include credits for improved stormwater management practices. The Massachusetts Department of Environmental Protection (DEP) stormwater standards as incorporated into the state's Wetlands Protection Act Regulations has established a "LID Site Design Credit" whereby in exchange for directing runoff from roads and driveways to vegetated open areas, preserving open space with a conservation restriction, or



directing rooftop runoff to landscaped or undisturbed areas, developers can reduce or eliminate the traditional BMPs used to treat and infiltrate stormwater.²

Location and length of roadways

Protecting important natural features and minimizing disturbance and amount of paved area is a first line approach to protecting hydrology on a previously undeveloped site. This can be achieved by identifying opportunities to reduce:

- » cut and fill, thereby minimizing disturbance of native soils
- » unnecessary contouring of the site, and
- » removal of native vegetation.

In addition, streets ought to be located in order to protect important natural features, avoiding low areas and steep slopes.

Developers should be encouraged to limit clearing within the right-of-way to the minimum necessary for constructing roadway, drainage, sidewalk, and utilities, and to maintaining site lines. During site development, permeability of soils for infiltration should be preserved. Where soils are compacted by construction vehicles, contractors should be required to reestablish permeability.

Alternative street layouts should be explored for options to increase the number of homes per unit length and minimize the length of the roadway. This might be achieved through clustering of the development or through Traditional Neighborhood Design as described above.

Right of ways

A right of way is the strip of land that contains all the elements of a roadway. At a minimum, this typically includes vehicle travel lanes, grading and drainage, and utilities. It also can include bike lanes, shoulders, on-street parking, curbs, sidewalks, and vegetated areas. Right of ways between 50 and 60 feet wide are standard, but this it has often led to overdesign with excessive clearing, grading and extensive use of the width for paving.

Good design has not so much to do with the width of the right of way itself, but considerations of context and what makes for efficient and effective use of the right of way. What makes sense for the elements of a right of way on a busy suburban road will likely not make sense for a low volume rural road.

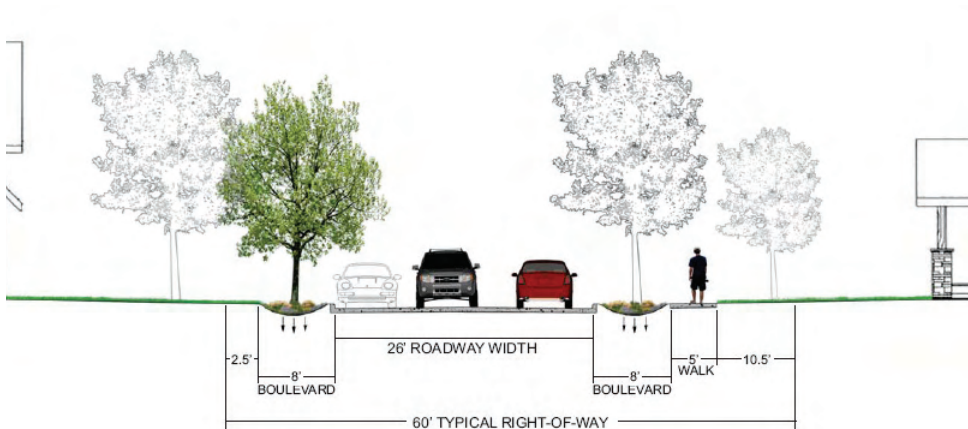
Several communities in Minnesota have developed “Living Streets” policies that take context into consideration. This policy brings together “complete streets” objectives of providing for multiple modes of transportation (vehicular, pedestrian, and bicycle) and “green streets” objectives of reducing environmental impacts (through reduced impervious surface and improved stormwater management). In thinking about how to accommodate these various objectives within the right of way, these communities have developed design options that can be deployed depending on what specific objectives there may be for a project. In Maplewood, Minnesota, there are three design options for

a local street with a 60-foot right of way (note that not all 60 feet in the right of way is used):

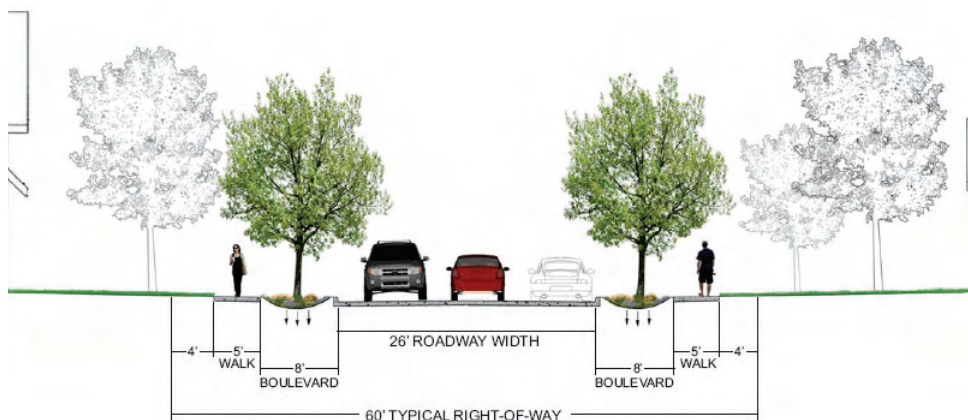
Guidelines from Edina, Minnesota’s Living Street Policy are useful in thinking about right of way use:

- » Provide bicycle accommodation on all primary bike routes.
- » Allocate right-of-way for boulevards (stormwater infiltration facility)
- » Allocate right-of-way for parking only when necessary and not in conflict with Living Streets
- » principles
- » Consider streets as part of our natural ecosystem and incorporate landscaping, trees, rain
- » gardens and other features to improve air and water quality

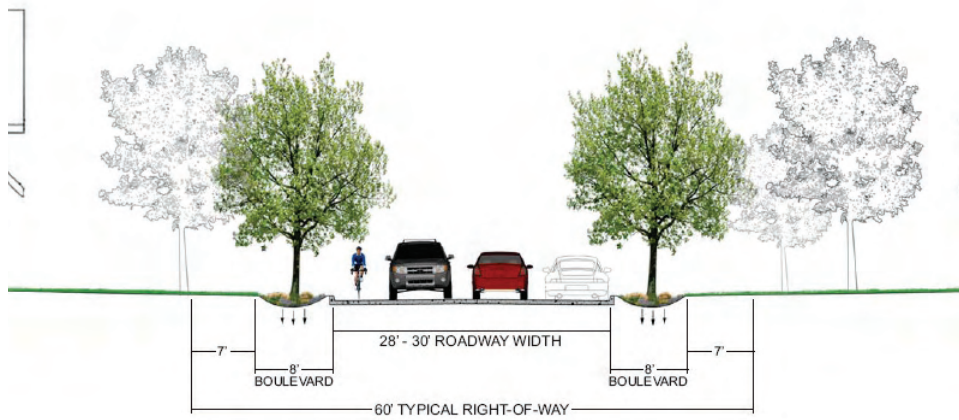
Municipalities ought to consider the use of drawings that show how the elements of a right of way cross section might vary given different contexts. Such drawings provide a clear understanding about objectives and efficient and effective use of the right of way area.



24 to 26-foot roadway width with parking on one side; 8-foot boulevard/ stormwater infiltration facility on each side; and 5-foot sidewalk on only one side



24 to 26-foot roadway width with parking on one side; 8-foot boulevard/ stormwater infiltration facility on each side; and 5-foot sidewalk on each side



28' to 30' roadway width with parking on one side; and 8-foot boulevard/stormwater infiltration facility on each side

Source: City of Maplewood, Minnesota, Living Streets Policy, Adopted January 28, 2013

Paved roadway width

Narrower road widths produce advantages not only in terms of reduced stormwater impacts, but also lower development costs, improved community character, and enhanced pedestrian safety. As a result, it is important for municipalities to revisit and update roadway width standards within subdivision regulations. Many existing standards are based on universal application of guidelines for highways or very large scale subdivisions planned more than 50 years ago. Revised standards should involve the minimum required pavement width and derive from careful considerations with public works and emergency response officials of traffic volume, on-street parking (where required), and passage of emergency vehicles and school buses. Typical road width reduction standards are shown on the following page.

Communities might also explore the use of permeable shoulders to reduce overall imperviousness of a roadway. This would involve combining a traditional asphalt surface for the travel lanes and an adjacent porous surface for the shoulder or bike lane area. Snow and ice management for the roadway must avoid sand so as to avoid clogging of the porous shoulder area. For more information, see a recent publication entitled, "Permeable Shoulders with Stone Reservoirs," referenced more fully in the Links to More Information Section below.

Emergency Vehicle Access

Emergency access considerations can have direct bearing on street width. Under the Massachusetts' fire marshal code, the minimum fire access lane width is 18 feet. Generally speaking, this can be met by two 9-foot travel lanes. The purpose of a fire access lane is to allow one fire truck to operate while allowing enough space for a second truck to pass by during the event of an emergency. Fire access lanes can be located on roads, but they must not be obstructed (i.e. by parked cars or snow).

While the state fire marshal code provides a minimum width, fire access lanes cannot be standardized across the state. Each community has different needs and fire apparatus that range in size. Communities may increase minimum fire access lane widths if required for their particular equipment. Alternatively, municipalities may select fire access equipment that allows for narrower lanes consistent with community design goals.

Table 5: General Parameters for Residential Road Design

Parameter	Single Use Residential Wide	Single Use Residential Medium	Single Use Residential Narrow	Single Use Residential Alley
Traveled Way				
Typical ADT	4,999 < 1,500	1,499 < 400	399 < 0	100 < 0
Design speed	25-30 mph	20 mph	20 mph	15 mph
Operating speed	20-25 mph	20 mph	15-20 mph	15-20 mph
Number of Through Lanes	2	2	2	1
Lane Width	10-12 feet	10-12 feet	10 feet	9-10 feet
Shoulder	2 feet	2 feet	2 feet	2 feet
Bike Lanes	Shared road Or 6 feet wide	Shared road	Shared road	Shared road
Utility Easement Width	----	----	10 feet	10 feet
Range of ROW Width	40-50 feet	36-40 feet	33-36 feet	20 feet
Roadside				
Desirable Roadside Width (pedestrian, swale, and planting strip)	5.5-12 feet	5.5-10 feet	5.5 feet	None
Grass Plot/Planting Strip	0-6 feet	0-6 feet	0-6 feet	None
Minimum Sidewalk Width	4 feet one side ok	4 feet/Shared road	Shared road	Shared road
Street Lighting	At intersections and pedestrian scale lighting at residential driveways.	At intersections and pedestrian scale lighting at residential driveways.	At intersections and pedestrian scale lighting at residential driveways.	At intersection with road
Intersections				
Traffic control	Stop signs, 4-way yield	4-way yield	4-way yield	Yield exiting alley
Curb Radii	15-25 feet	15-25 feet	15-20 feet	15 feet

Source: Sustainable Neighborhood Road Design: A Guidebook for Massachusetts Cities and Towns, May 2011, American Planning Association, Massachusetts Chapter and Home Builders Association of Massachusetts (page 27).

Cul de sacs

The required radius for a cul-de-sac also impacts the amount of impervious area. In the Pioneer Valley, minimum cul-de-sac radius requirements (at outer road edge) are typically set between 60 and 120 feet, and hammerhead turnarounds, which would greatly reduce impervious cover, are not typically allowed. Better stormwater management recommendations often call for cul-de-sacs to be designed with an outer road radius of 30 to 40 feet, as well as allowing for hammerhead turnarounds in lieu of cul-de-sacs.

Also in subdivision regulations, there are opportunities to reduce the required radius of a cul-de-sac (down to an outer road radius of 30 to 40 feet), and to allow hammerhead turnarounds. On dead-end streets, hammerhead turnarounds can provide a feasible way to reduce paved area while providing sufficient turnaround space for larger fire vehicles.

- » E. Cul de sac or dead end street -- Revise cul de sac requirements for granite curbing to allow bioretention area on landscaped island (soils permitting). This could entail curbing that is perforated to allow for the flow of runoff to the bioretention area;

- » Minimize the required radii for cul-de-sacs - radius of 35 feet is optimal, depending on emergency vehicles;
- » Minimize the number of residential street cul-de-sacs and incorporate landscaped areas to reduce their impervious cover. The radius of cul-de-sacs should be the minimum required to accommodate emergency and maintenance vehicles. Alternative turnarounds should be considered.



Cul-de-sac infiltration island accepts stormwater from surrounding pavement. Note flat curb.



The cross section drawing to left shows how a cul de sac can be designed to serve as a bioretention area for stormwater runoff. The photo to the right shows a bioretention cul de sac in Waterford, Connecticut, that is designed to collect and filter roadway runoff from a residential development.

Curbs

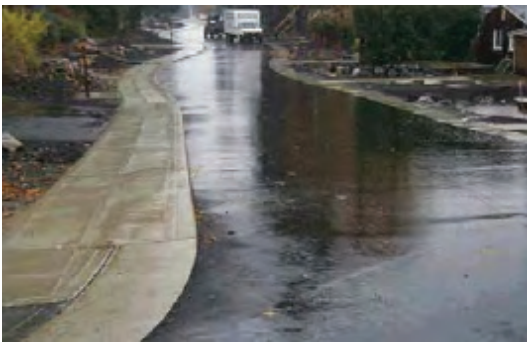
Currently subdivision regulations typically call for the use of curb and gutter infrastructure connected to storm sewer infrastructure. This traditional approach produces stormwater flows that have greater impacts on local rivers and streams. As an alternative, regulations can promote roads without curbs where appropriate or the use of “perforated curbs.” Perforated curbs are curbs with gaps that allow stormwater to move from the street through to a stormwater management facility that could include swales or planters, such as tree box filters. (See image on the following page.)

Another alternative involves the use of “invisible curbs.” Invisible curbs are granite curbs that are buried along the street edge so as to allow stormwater to flow over into a stormwater management facility. Invisible curbs provide the structural support needed to plow from curb to curb, thereby retaining the desired roadway width even in snowy conditions. (See images on the following page.)



Perforated Curbs

Perforated curbing allows stormwater to enter planters that are designed to soak up rainfall.



Invisible Curbs

"Invisible" curbs along the street edge allow runoff to move into bioretention swales.

Drainage

Standards for drainage within the subdivision regulations should encourage and even require better site design with a low impact development approach that includes:

- » conservation of open space, natural drainage systems, native vegetation and other resources on site;
- » minimizing and disconnecting impervious surfaces;
- » clustering, and eliminating impervious surfaces that are connected to the municipal stormwater system; effective BMP selection and placement

This section should also refer to and be consistent with the stormwater management bylaw/ordinance. It should identify which size projects require a stormwater management permit, and what are the design parameters for drainage (i.e., water quality volume treatment, which targets pollutant transport; channel protection volume, which targets erosion; and overbank and extreme flood protection). For communities that have adopted for upland areas the *Massachusetts Stormwater Handbook*, the design parameters with Standard 2 address downstream and off-site flooding. It requires that the post-development peak discharge rate is equal to or less than the pre-development rate from the 2-year and the 10 year 24 hours storms. The Model LID Bylaw prepared

by the Massachusetts Executive Office of Energy and Environmental Affairs suggests performance standards that go further, including treatment of discharges and protection for channels, overbank flooding, and extreme flooding.

The drainage section should also address requirements for bridge openings and major culverts. There are now important habitat preservation and climate change adaptation considerations that ought to be considered in the design of these facilities. *The Massachusetts River and Stream Crossing Standards* should be referenced as an important resource for design of these facilities.

Sidewalks

In addition to roadways, sidewalks provide another important opportunity to reduce impervious area or provide better management of stormwater runoff. Regulations can promote a variety of strategies for achieving this, including:

Use of porous surfacing material for sidewalks and bus waiting areas. A recent publication on complete streets by the City of Boston that promotes the use of porous materials in certain sidewalk zones describes the advantages of this choice in paving:

Permeable pavements provide increased traction when wet because water does not pool, and the need for salt, sand, and plowing is reduced during winter due to low/no black ice development. Compared to traditional paving methods, long-term maintenance costs may be lower in cold climates since permeable pavements resist cracking and buckling in freeze-thaw conditions. Nevertheless, permeable paving requires regular maintenance including: annual inspection of paver blocks for deterioration; periodic replacement of sand, gravel and vegetation; and annual industrial vacuuming of pavements to unclog sand and debris (Note: The use of sand in ice prevention should be avoided because it will clog pavement pores.)³

Flexibility in sidewalk standards to accommodate best management practices. This might include allowing alternatives to the minimum sidewalk standards or alternatives to sidewalk layout where pedestrian circulation makes use of common areas rather than street rights of way.

Grading of impervious sidewalk surfaces to direct stormwater runoff to bioretention areas or other such facility to eliminate or keep flow out of the municipal storm drain system

Utilities

Rather than require all electric, telephone, cable TV, fiber optic, and other conduits to be installed away from the road and its edge, allow placement of utilities under the paved section of the right of way. This creates essential space along the roadway edge for stormwater management facilities.

Often there is concern that such placement of utilities under the road will result in traffic delays and additional costs to utility companies. In the *Rhode Island LID Site Planning and Design Guidance for Communities*, however, authors from the Horsley Witten Group

note that the reality is, “The amount of pavement needed to be removed during such operations can be decreased through better diagnostic tests and trenchless technologies for utility construction and repair.”

If the idea of putting utilities under the road edge is too great a concern for Departments of Public Works, then the next best strategy is to place utilities directly abutting roadway pavement, within 1 to 2 feet.

Landscaping and trees

Trees, shrubs, and ground covers are essential to good stormwater management. Leaves, needles, branches, and bark intercept rainfall so that it can then evaporate to the atmosphere. Leaf litter and mulch on the ground creates a spongy surface for retention of stormwater. Rainfall that reaches the roots is taken up into plants and then transpired to the atmosphere. Roots also help to stabilize soils and prevent erosion.

Subdivision regulations can recognize these important benefits through the following:

- » Encourage both preservation of existing stands of trees and mature trees on site as well as plans that incorporate trees into stormwater management practices. This can be done through specific requirements and through a system of credits. Calculating stormwater benefits of certain species based on size can be done through the National Tree Benefit Calculator at: www.treebenefits.com/calculator/
- » Allow for bioretention areas or other vegetated stormwater facilities within treebelt areas and to count toward other required landscaping features, including site, parking or perimeter screening. This creates areas that function on several levels, including aesthetics and stormwater management.

LINKS TO MORE INFORMATION

AHBL FOR PUGET SOUND PARTNERSHIP. NOVEMBER 2011. INTEGRATING LID INTO LOCAL CODES: A GUIDEBOOK FOR LOCAL GOVERNMENTS. SEE:

http://www.psp.wa.gov/LID_GLG.php

AMERICAN PLANNING ASSOCIATION, MASSACHUSETTS CHAPTER, AND HOME BUILDERS ASSOCIATION OF MASSACHUSETTS. MAY 2011. "SUSTAINABLE NEIGHBORHOOD DESIGN: A GUIDEBOOK FOR MASSACHUSETTS CITIES AND TOWNS." SEE:

www.apa-ma.org/apa-ma_documents/.../NRB_Guidebook_2011.pdf

CENTER FOR WATERSHED PROTECTION AND USDA FOREST SERVICE. "USING TREES TO REDUCE STORMWATER RUNOFF." FOR THIS POWERPOINT PRESENTATION, SEE:

<http://www.slideshare.net/watershedprotection/using-trees-to-reduce-stormwater-runoff-formatted-presentation?type=powerpoint>

ALSO SEE WEB PAGE RELATED TO THIS COLLABORATION:

<http://www.forestsforwatersheds.org/reduce-stormwater/>

LAWRENCE, TIMOTHY AND MYERS, MONIQUE. 2009. "EMERGENCY SERVICES AND STORM WATER MANAGEMENT." CALIFORNIA SEA GRANT PROGRAM. SEE:

www-csgc.ucsd.edu/BOOKSTORE/Resources/LID_FACTSHEET.pdf

RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT AND COASTAL RESOURCES MANAGEMENT COUNCIL. MARCH 2011. "RHODE ISLAND LOW IMPACT DEVELOPMENT SITE PLANNING AND DESIGN GUIDANCE MANUAL." SEE:

www.dem.ri.gov/programs/bpoladm/suswshed/pdfs/lidplan.pdf

1 In his presentation, "Right Practice, Right Place: Green Infrastructure Technologies that Work in New England" at EPA's Growing Your Green Infrastructure Program, December 2012, Robert Roseen noted that in addition to reducing the number of acres to be cleared, the developer was able to avoid the use of 1,616 feet of curbing, 785 feet of pipe, 8 catch basins, 2 detention basins, and 2 outlet control structures.

2 Information on the LID Site Design Credit is found in Volume 3 of the Massachusetts Stormwater Handbook.

3 For more information, see the document from which this quote is drawn:
http://www.bostoncompletestreets.org/pdf/2/chap2_5_sidewalk_materials.pdf

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Paying for Green Infrastructure

WHAT IT IS

Paying for green infrastructure projects can happen in a variety of ways. Green infrastructure facilities can be integrated into projects where stormwater management is already a component. This often presents important savings in avoided costs. Green infrastructure can also be paid for through a variety of mechanisms, including: stormwater utilities, fees tied to permitting, connection fees, establishment of betterments and management districts, bonds and loans, and sponsorships. While stormwater utilities are covered in a separate fact sheet within this series, the other financing mechanisms are described in more detail below.

AN INTEGRATED APPROACH

Wherever there are considerations of stormwater management, as there are in most public development or redevelopment projects, there is a role for green infrastructure. Funding for green infrastructure work can come from a variety of sources already used to cover the costs of such projects, including roads, combined sewers, railways, sidewalks, and schools. See diagram below.



Opportunities for Integrating Green Infrastructure with Other Projects

Recognizing the full value of green infrastructure can be an important impetus for integration of such facilities in existing projects. These are often referred to as secondary benefits. These are not typically part of stormwater projects that rely solely on traditional “gray”/underground infrastructure. Secondary benefits include: social, such as avoided flooding and healthier neighborhoods; economic, such as job creation and increased property values; and environmental such as cleaner waters and improved air quality. This more comprehensive accounting method is known as the “Triple Bottom Line” of green infrastructure used most notably by Philadelphia in their planning for green infrastructure. (For more information on the Triple Bottom Line approach, see Philadelphia’s Long Term Control Plan Update (2009).) By integrating green infrastructure across the range of municipal projects while also accounting for all of the benefits to be derived, proponents can think more broadly and call on a far wider range of sources for project funding. (See Pioneer Valley Green Infrastructure Plan, page 82-84 for matrix showing Potential Sources for Enhanced Project Funding at: <http://www.pvpc.org/plans/pioneer-valley-green-infrastructure-plan> .

The City of Lancaster, Pennsylvania, accounted for these benefits in terms of “avoided costs or savings.” With a goal of reducing annual average stormwater runoff by 1.053 billion gallons within the next 25 years, the city developed a study—drawing from their green infrastructure plan and a national valuation guide. The study involved placing a value on practices, such as bioretention and other infiltration practices by monetizing the benefits of services, such as: improved water quality, increased groundwater recharge, reduced flooding, reduced energy use, and reduced atmospheric CO2. The result is projections showing significant annual avoided costs/savings at the end of the 25-year implementation period. See table below.

Projected annual avoided costs/savings in Lancaster, PA, case study (benefits accrued at end of 25-year implementation period)	
\$122.4 billion per year	Water - Avoided costs for wastewater treatment and the use of traditional “gray infrastructure” through green roofs, tree planting, permeable pavement, bioretention and infiltration practices, and water harvesting
\$2,368,000	Energy - Reduced electricity and natural gas usage due to green roofs, tree planting, water harvesting, providing insulation shading, wind blocking, and evaporation

\$1,023,000	Air quality - Reduced emissions of nitrogen dioxide, ozone, sulfur dioxide, and particulate matter due to uptake and absorption, reduced energy emissions, reduced ozone with trees, green roofs, permeable pavement, and bioretention and infiltration practices
\$786,000	Climate change-related benefits in reduced CO2 through direct carbon sequestration, reduced water and wastewater treatment, reduced energy production due to vegetation and permeability.

Source: Webinar presented by Hal Sprague of Center for Neighborhood Technology, Valuing Green Infrastructure: Economic, Environmental, and Social Benefits, September 26, 2013, for the Vermont Agency of Natural Resources.

Portland Takes Direct Approach

A national leader in green infrastructure, the City of Portland, Oregon, took a direct approach to integrating green infrastructure into projects as a way to abate stormwater flows into the combined sewer system. One strategy entailed adopting a green streets policy whereby all City of Portland funded development, redevelopment or enhancement projects meeting the threshold in their stormwater management manual (of developing or redeveloping 500 square feet of impervious surface) must incorporate green street facilities.¹ This policy led to what EPA has described as, “...a formal process to overlay multi-bureau project plans and scheduled capital improvement projects to identify how public and private projects can achieve multiple community and environmental benefits through green infrastructure.”² To cover the costs of green streets projects, Portland supplemented funds from general budget and capital improvement funds with innovation grants from EPA, revenue from a stormwater utility fee and from a one percent tax on construction projects that cannot meet the City’s stormwater management regulations. What they learned, as did other case study communities examined by EPA, is that the increased investment necessary to include green infrastructure in large undertakings is typically a very small percentage of the total project costs. In addition, the use of green infrastructure elements can also decrease overall project costs, particularly with reductions in use of concrete or asphalt. Portland’s story underscores how integrating or overlapping green infrastructure with street development, redevelopment, or enhancement can yield tremendous value. For Pioneer Valley cities and towns where might there be other possibilities of overlap that may be worth exploring?

STORMWATER PERMIT FEES

Stormwater permit fees address potential stormwater impacts related to new construction. The fees are typically site specific and can be an unreliable source of funding when development slows.

Currently, three communities in the region assess stormwater permit fees to review and permit new development projects (Agawam, Northampton, and Wilbraham). While there is no direct connection between these permit fees and funds to maintain the stormwater system, stormwater permit fees are paid into general funds, and most communities pay for stormwater system maintenance from the general funds. In a sense, then, some part of these permit fees may help to cover some stormwater system maintenance costs.

CONNECTION FEES

Northampton is one community that currently charges a fee for a property's initial connection to the stormwater system. Connection fees for stormwater might be augmented based on a practice in Westfield relative to wastewater. The City of Westfield established a connection fee associated with new sewer hook ups aimed at helping to increase capacity at the wastewater treatment plant (where the City was reaching capacity). For every new gallon of sewage to be generated, the customer pays a fee equivalent to the cost of fixing 5 gallons worth of infiltration and inflow. It may be worth exploring whether this same strategy could be applied to stormwater whereby new connections to the system help to mitigate other flows into the system, thereby preserving capacity and avoiding the need for costly expansion projects.

BETTERMENTS AND MANAGEMENT DISTRICTS

MGL Chapter 80 allows for the assessment of cost of public improvements by municipalities. Whenever a certain location or district receives exclusive benefit or advantage from a public improvement, betterments can be assessed in that area for the improvement. This could be the case where several neighborhoods in a town require improved stormwater infrastructure. The cost of improvements can be offset by charges to those properties located within that jurisdiction.

To implement the Long Creek Watershed Management Plan in Maine (the result of a citizen's lawsuit over impaired waters), landowners in four municipalities joined forces to create the Long Creek Watershed Management Plan District. The District collects fees from property owners and uses the money to restore Long Creek and install stormwater retrofits. The fee is \$3,000 per acre of impervious surface per year.



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BONDS AND LOANS

Bonds are useful to initiate large capital projects, but they involve borrowing money and accruing debt. MassDEP's Clean Water State Revolving Loan Fund (SRF) has been an important source for low interest loans for many water infrastructure projects in the Pioneer Valley.

A 2014 letter from MassDEP Division Municipal Services Director Steve McCurdy, notes that MassDEP will receive a \$47.6 million federal grant to subsidize the CWSRF program and that at least 10 % of these monies must be dedicated in 2014 to Green Infrastructure projects or components as defined by EPA. The 2014 Intended Use Plan lists 12 new Green Infrastructure construction projects in Massachusetts and 3 additional Green Infrastructure construction projects are on the 2014 Carry-Over list. "The exact monetary value of the Green components of these projects will be determined when project applications are submitted, but are expected to be well in excess of the \$4.76 million requirement," he concludes.

In addition, the SRF program has offered principal forgiveness for Environmental Justice projects, those projects occurring in areas defined to be a neighborhood with annual median household income (MHI) less than 65 percent of the state MHI.

SPONSORSHIPS

Several communities have been able to tap into local businesses to provide donations and sponsorships for green infrastructure projects.

In Portland, Maine, businesses helped to cover \$20,000 of the \$64,000 cost for a demonstration rain garden along the tidal Back Cove. The garden covers 2.5 acres of land adjacent to a popular recreational trail that is heavily used by walkers, joggers, and cyclists. The project's popularity led to the installation of a second rain garden adjacent to the trail's parking area, which was designed and funded by Stantec, a national engineering firm with local offices. Signage at the rain gardens highlights corporate sponsors.⁸ This idea builds on the successful Adopt a Trail corporate sponsorship program run by Portland's local land trust.

In Lynchburg, Virginia, a new corporate sponsorship program is drawing funding for the installation of demonstration rain gardens in prominent public places throughout the City. Each garden is sponsored by a local business, which is then credited with an attractive sign onsite. To date, this program has raised over \$1.6 million and established 50 gardens.

Virginia also has a related statewide program called Streetscape Appearance Green Enhancement (SAGE), a comprehensive roadside management program that has been in existence since 2006. Funded entirely by donations, but managed by municipalities, the program aims to beautify local streetscapes, boost civic and community pride, and facilitate future economic development. Municipalities manage the donations through a 501(c)3 non-profit and contributions are organized so as to cover construction, maintenance, and renewal, typically after 5 years.

OTHER POTENTIAL AND FUTURE SOURCES

Hazard Mitigation Funding

Though green infrastructure implemented area wide could help to mitigate natural hazards and build community resiliency, grant programs out of the Massachusetts and Federal Emergency Management Agencies do not as of yet provide opportunities for funding of green infrastructure stormwater management projects. The Massachusetts Emergency Management Grant Program's State Hazard Mitigation Officer Richard Zingarelli notes:

Standard hazard mitigation projects require a benefit-cost analysis that shows that the cost of the project is exceeded by the benefit as measured by direct reduction of damages from natural hazards. The difficulty is that it is difficult, if not impossible, to quantify a direct reduction in damage that results from measures like green roofs and porous pavement. As a result, any limited eligibility for funding in these programs would fall under the "5% Initiative" of the Hazard Mitigation Grant Program (HMGP), which allows for setting aside up to 5% of the total available HMGP funding for activities that are difficult to evaluate using traditional cost-effectiveness criteria.

It is important to know that the use of the word "mitigation" in emergency preparedness means avoidance and preparation (resiliency) and is more closely linked to the concept of "adaptation" in climate change.

WATER QUALITY CREDITS TRADING

Water quality trading is a market-based approach—an idea that has emerged from the energy market—that enables jurisdictions to achieve needed pollution controls through the purchase of credits for a particular pollutant. Landowners can produce water quality credits by implementing green infrastructure practices that reduce volume and pollutants, and typically at a much lower cost than a municipal treatment facility. EPA notes, "Through water quality trading, facilities that face higher pollutant control costs to meet their regulatory obligations can purchase pollutant reduction credits from other sources that can generate these reductions at lower cost, thus achieving the same or better overall water quality improvement. In most cases, trading takes place on a watershed level under a pollutant cap (the total pollutant load that can be assimilated by a waterbody without exceeding water quality standards) developed through the TMDL

process or a similar type of water quality analysis that produces information on pollutant loadings and resulting water quality conditions.”

For the Long Island Sound TMDL, the state of Connecticut adopted trading legislation. Public Act No. 01-180, which establishes the trading framework for a Long Island Sound Nitrogen Credit Exchange Program to be directed by a Nitrogen Credit Advisory Board appointed by the General Assembly and the governor. EPA notes, “The Nitrogen Credit Exchange Program establishes a well-defined trading structure supported and regulated by limits mandated in state law. The state legislation specifies trading ratios (e.g., delivery and location ratios) and accounting methodologies to formalize all calculations used in trading.”

LINKS TO MORE INFORMATION

ENVIRONMENTAL FINANCE CENTER UNIVERSITY OF MARYLAND. 2014. LOCAL GOVERNMENT STORMWATER FINANCING MANUAL: A PROCESS FOR PROGRAM REFORM. SEE:

[http://efc.umd.edu/assets/efc_stormwater_financing_manual_final_\(1\).pdf](http://efc.umd.edu/assets/efc_stormwater_financing_manual_final_(1).pdf)

NATURAL RESOURCES DEFENSE COUNCIL. FEBRUARY 2012. FINANCING STORMWATER RETROFITS IN PHILADELPHIA AND BEYOND. SEE:

<http://www.nrdc.org/water/files/stormwaterfinancing-report.pdf>

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY. 2013. COMMUNITY BASED PUBLIC PRIVATE PARTNERSHIPS FOR GREEN INFRASTRUCTURE-DRIVEN STORMWATER RETROFITS: A WEBINAR.

ENVIRONMENTAL FINANCE CENTER, UNIVERSITY OF NORTH CAROLINA. 2014. A CATALOG OF FINANCE PUBLICATIONS ON GREEN INFRASTRUCTURE APPROACHES TO STORMWATER MANAGEMENT. SEE:

<http://www.efc.sog.unc.edu/reslib/item/catalog-green-infrastructure-and-stormwater-finance-publications>

USEPA. 2009. FUNDING STORMWATER PROGRAMS FACTSHEET. SEE:

www.epa.gov/region1/npdes/stormwater/assets/pdfs/FundingStormwater.pdf

CHARLES RIVER WATERSHED ASSOCIATION FOR MA COASTAL ZONE MANAGEMENT. 2007. ASSESSMENT OF STORMWATER FINANCING MECHANISMS IN NEW ENGLAND. SEE:

www.crwa.org/projects/stormwater/Municipal%20SFM%20Case%20Studies%20Repo.pdf

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Stormwater Utilities

WHAT IT IS

For many cities and towns there are significant costs associated with operating, maintaining, and upgrading stormwater infrastructure. The municipal system for capturing and conveying stormwater from rooftops, driveways, and roadways can include the hundreds of catchbasins along street edges and miles of underground pipes.

Establishing a stormwater utility is one important strategy to creating a reliable funding source for this work. Currently there are between 1,500 and 2,000 stormwater utilities in the United States, 5 of which are located in Massachusetts (Fall River, Newton, Northampton, Reading, and Westfield).

Most municipalities in the Pioneer Valley rely on allocations from the general fund to service stormwater infrastructure. These allocations, however, are not keeping pace with actual needs for upgrading aging systems, reducing localized problems—such as flooding and erosion—and meeting regulatory requirements for environmental protection.

A stormwater utility operates much like an electric or drinking water utility. Fees collected from property owners go into a dedicated fund to pay specifically for the work of operating, maintaining, and improving stormwater infrastructure. This reinforces the idea that like other utilities, stormwater management is a public service. Monies can be used to pay for operation and maintenance expenses, project or capital-related expenditures, staffing, engineering, permitting, inspection, and program management costs.

In 1998, the City of Chicopee was the first municipality in Massachusetts to collect a fee for maintenance and upgrade of stormwater infrastructure, but the program is technically not a “stormwater utility” as funds go into a water pollution control account that also receives funding for projects that include the sanitary sewer system. So the program is referred to simply as a “stormwater fee.”

HOW IT WORKS

Since impervious surfaces (roofs, driveways, and roadways) are what produce the runoff from rainfall and snowmelt that must be managed, stormwater utility rates are most commonly based on the amount of impervious surface on a property. For residential customers, many municipalities set rates according to a method called Equivalent Residential Unit (ERU). This unit is derived from the impervious area footprint of a typical single-family home. The City of Newton, Massachusetts, for example, currently has an ERU of 3,119 square feet. Each residential property is thus billed \$25 per year based on this average of 1 ERU. Non residential

properties, including industrial and commercial properties are billed based on 6 ERUs or \$150 per year. The City has been exploring a different rate structure for residences of more than three households and commercial and industrial properties since the current flat rate of 6 ERUs has properties with small impervious areas (small downtown shops, etc.) paying the same as properties with large impervious areas (shopping malls). The new rate would assign a certain number of ERUs to a commercial and industrial property based on actual impervious area. Rates for larger properties in some municipalities are sometimes not based on ERUs, but rather a dollar per unit cost based directly on the area of impervious surface on a property.

A guidance document prepared by the National Association of Flood and Stormwater Management Agencies notes, “The fundamental objective of a stormwater utility/service fee is attainment of equity. Service fee rate methodologies are designed to attain a fair and reasonable apportionment of cost of providing services and facilities.”

Enabling Legislation

In Massachusetts there are two companion pieces of legislation that allow municipalities to set up stormwater utilities: MGL Chapter 83 Section 16 and MGL Chapter 40 Section 1A. The first, MGL Chapter 83 Section 16, is relatively new enabling legislation that allows municipalities to set up a stormwater management utility and charge utility fees for managing stormwater. The second, MGL Chapter 40 Section 1A, provides a definition of a district for the purpose of water pollution abatement, water, sewer, and/or other purposes. Together, these two pieces of legislation allow a municipality to set up an authority to manage stormwater and to charge utility fees for managing stormwater.



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WHERE THEY ARE USED CURRENTLY IN MASSACHUSETTS

Two of Massachusetts' five stormwater utilities are located in the Pioneer Valley. (See table below.) The cities of Northampton and Westfield are currently the only municipalities in the region with programs that collect fees specifically dedicated to maintenance and upgrade of stormwater infrastructure. Westfield instituted a stormwater utility in 2010 for the purpose of financing a stormwater management division, responsible for meeting federal requirements for stormwater monitoring and maintaining the City collection system. Northampton adopted a stormwater utility in 2014 to generate funding for meeting federal permit requirements and attending to aged stormwater and flood control infrastructure.

There are roughly 6,600 smaller residential properties (1-3 family) in Northampton. Under the billing formula these properties are divided into four groups based on the impervious surface area on each property. All properties within each group pay the same fee. This standard fee is calculated based on the average impervious and pervious areas for all properties within each group. Based on the annual budget of \$1,980,056, the annual residential fees are estimated to be:

Stormwater Utilities/Fees in Massachusetts

Community	Date Created	Equivalent Residential Unit (ERU)*	Fee	Annual Revenue
Chicopee	1998	2,000 s.f.	Single family residential at \$100 per year Multi family, industrial, commercial properties at \$1.80 per 1,000 square feet, with a minimum charge of \$100 per year and a maximum charge of \$640 per year	\$1,500,000 (2012)

Fall River	2008	2,800 s.f.	Residential: 1 to 8-family at \$140 per year Commercial, industrial and residential properties greater than 8 family at \$140 per year for 2,800 square feet of impervious surface	\$4,660,000 (2012)
Newton	2006	3,119 s.f. Proposed change: 2,600 s.f.	Residential at \$25 per year, with those receiving elderly discount, \$17.52 per year Non residential at \$150 per year (Proposed change involves replacing the flat fee with a fee based on area of imperviousness. This would include residences with 3 or more units.)	\$725,000 (2012)
Northampton	2014		1 to 3 family homes annual residential fee estimated to be: \$63.94 for impervious area <2,250 sq. ft. \$91.05 for impervious area 2,250 to 3,056 sq. ft. \$125.61 for impervious area 3,056 to 4,276 sq. ft. \$259.07 for impervious area >4,276 sq. ft.	\$2,000,000 (estimated)
Reading	2006	2,552 s.f.	Single and two-family residences at \$40 per year Multi-family, commercial, and industrial properties at \$40 per 3,210 square feet annually	\$357,000 (2012)

Westfield	2010	NA	Residential at \$20 per year Commercial properties at \$.045 per 1,000 square feet up to a maximum of \$600 per year	\$560,000 (2012)
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*Residential customers are typically billed for stormwater runoff based on the Equivalent Residential Unit (ERU). An ERU is based on the amount of impervious surface area or percent impervious area found at the typical single-family home within the municipality.

DISCOUNTS AND CREDITS

Local governments with stormwater utilities can encourage better practices on private property by reducing fees in exchange for facilities that reduce the need for service by the municipal stormwater system. Discounts and credits can be geared to promote impervious surface reductions, onsite management or volume reduction, or the use of specific practices, such as raingardens/bioretenion facilities, drywells, cisterns, or green roofs.

The City of Chicopee has just begun to implement a “Rain Smart Rewards” ordinance that offers a stormwater fee reduction of up to 50 percent in exchange for implementation of improved stormwater management practices by property owners.

In Minneapolis, Minnesota, 50 percent of the stormwater fee can be waived if the property owner can demonstrate that the runoff from a 10-year, 24-hour storm event can be managed on site. If a property owner can demonstrate that the runoff from a 100-year, 24-hour storm event can be managed on site, the entire stormwater fee is waived.

Portland, Oregon’s Clean River Rewards program provides stormwater utility fee discounts to encourage residential and commercial property owners to manage stormwater on site (35 percent discounts) and/or on the public right of way that serves their property (65 percent discounts). Partial credits are also given for ecoroofs, four or more trees over 15 feet tall, and for properties with less than 1,000 square feet of imperviousness. There is a Residential Discount Calculator and a Commercial Discount Calculator on the program’s website so that property owners can calculate what changes they might make to obtain certain savings.

Starting July 1, 2014, credits in Northampton will be available for small residential stormwater improvements (rain gardens and porous driveways), construction and maintenance of larger stormwater best management practices, protected open land, commonly owned undeveloped properties and educational programs. Senior (needs-based), low income, and protected land credits are automatically applied based on documentation by the Northampton Assessor’s Office. All other credits will require submission of an application and other documentation.

BENEFITS

Establishing a stormwater utility is no easy task. It requires tremendous effort in terms of education and politics. The process, however, helps everyone to understand the service provided by the municipal stormwater system and the significant costs of operating, maintaining, and improving this infrastructure. In the end, the utility provides a dedicated and stable source of funding to maintain and upgrade an aging system, reduce localized problems—such as flooding and erosion, and meet regulatory requirements for environmental protection.

A stormwater utility has other benefits as well:

- » **Creates an equitable way to pay for stormwater services, especially if the fee structure is based on the amount of impervious surface. Discounts or offsets can be provided to low-income residents or elderly, further ensuring the fee's equitability.**
- » **Tax-exempt properties like universities, hospitals, and places of worship are required to pay the fee, so that they help cover the cost of services they receive**
- » **Typically easier for the municipality to institute than other forms of funding. "In many communities, new taxes require a vote of approval by the public, while a fee is a charge that municipalities have the authority to leverage for the services they provide."**⁶
- » **May enable municipalities to consolidate or coordinate responsibilities previously dispersed among several departments and develop programs that are comprehensive, cohesive, and consistent year to year**
- » **Creates funding that can be leveraged to meet grant and bond requirements**
- » **If a credit or reduction is offered, the fee can become an incentive for improved stormwater management on private property thereby reducing the service demand on the municipal system**

IMPORTANT CONSIDERATIONS

To achieve desired objectives, several considerations should be taken into account when proposing and establishing a stormwater utility:

Start with a thoughtful outreach campaign that generates enthusiasm for the community's stormwater vision. If property owners understand the benefits they will receive, they are more likely to support the fee. As part of this, it is important to work in advance with religious institutions, private schools, hospitals, and non profits to be clear that the utility is like other utilities that they must pay. And education should be ongoing.

As part of setting rates and calculating bills, develop a sound methodology with rigorous quality assurance. GIS mapping should be integral to this method if area of impervious cover is a factor in setting rates.

Set rates so that the fee provides adequate revenue to achieve stormwater goals. If the fee is unreasonably high, it will not be supported. If it is too low, promised benefits will not materialize and public support is likely to erode.

Give some advance thought to determining how stormwater utility fees can be collected. Typically, they have been collected either on a separate bill, added to a water collection bill, or added to the property tax bill.

Be sure that the greatest costs are directed toward those who create the most runoff, particularly commercial and industrial facilities with large areas of impervious cover, rather than residential and other properties with low impervious cover.⁷ At the same time, municipalities should be sensitive to where residents may already be paying stormwater management fees through homeowner associations.

Ensure that fees do not harm low-income residents, as in Detroit, where an increase in stormwater fees caused some low-income residents to be unable to pay their water bill and have their water turned off. Sliding fee scales, bill discounts, crisis vouchers, and zero interest loans for qualified customers are options for offsetting the burden on lower income residents.

LINKS TO MORE INFORMATION

METROPOLITAN AREA PLANNING COUNCIL. 2013. STORMWATER UTILITY FUNDING STARTER KIT. SEE:

<http://www.mapc.org/stormwater-utility-funding-starter-kit>

(Note: A well done update of PVPC's 1998 kit called, "How to Create a Stormwater Utility.")

ROSS STRATEGIC AND INDUSTRIAL ECONOMICS, INC. FOR US EPA, REGION 1. 2013. EVALUATION OF THE ROLE OF PUBLIC OUTREACH AND STAKEHOLDER ENGAGEMENT IN STORMWATER FUNDING DECISIONS IN NEW ENGLAND: LESSONS FROM COMMUNITIES. SEE:

<http://www.epa.gov/evaluate/pdf/water/eval-sw-funding-new-england.pdf>

WESTERN KENTUCKY UNIVERSITY. 2012. STORMWATER UTILITY SURVEY. SEE:

<http://www.wku.edu/engineering/civil/fpm/swsurvey/>

ENVIRONMENTAL FINANCE CENTER, UNIVERSITY OF NORTH CAROLINA. 2012. STORMWATER UTILITY DASHBOARD. SEE:

http://efc.unc.edu/tools/NCStormwaterDashboard_2012.html

DELANY, JOE, K. HONETSCHLAGER, AND T. MCINTIRE. 2009. STRUCTURING A STORMWATER UTILITY. TOWN OF READING, MA. SEE:

<http://www.salemsound.org/PDF/ReadingStormwaterUtility.pdf>

USEPA. 2009. FUNDING STORMWATER PROGRAMS FACTSHEET. SEE:

www.epa.gov/region1/npdes/stormwater/assets/pdfs/FundingStormwater.pdf

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www.crwa.org/projects/stormwater/Municipal%20SFM%20Case%20Studies%20Repo.pdf

NEW ENGLAND ENVIRONMENTAL FINANCE CENTER. 2005. STORMWATER UTILITY FEES: CONSIDERATIONS AND OPTIONS. SEE:

<http://efc.muskie.usm.maine.edu/docs/StormwaterUtilityFeeReport.pdf>

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Green Roof Model Incentives

The following green roof model incentives are excerpted from municipal bylaws, regulations and policies from around the United States, and offer example language for customizing incentives to meet the needs of your municipality.

FLOOR AREA RATIO BONUS

City of Portland Zoning Code Title 33, Chapter 33.510 Central City Plan District

Rooftop Gardens Option In CX, EX, and RX zones outside of the South Waterfront Subdistrict, developments with rooftop gardens receive bonus floor area. For each square foot of rooftop garden area, a bonus of one square foot of additional floor area is earned. To qualify for this bonus option, rooftop gardens must meet all of the following requirements.

- a. The rooftop garden must cover at least 50 percent of the roof area of the building and at least 30 percent of the garden area must contain plants.
- b. The property owner must execute a covenant with the City ensuring continuation and maintenance of the rooftop garden by the property owner. The covenant must comply with the requirements of 33.700.060.

GREEN ROOF POLICY

City of Portland, Green Building Policy

NOW THEREFORE, BE IT RESOLVED that the Portland City Council amends the City of Portland's Green Building Policy to direct all City Bureaus and the Portland Development Commission to:

- » Require design and construction of all new City-owned facilities to include an ecoroof with at least 70% coverage AND high reflectance, Energy Star-rated roof material on any remaining non-ecoroof roof surface area; OR, Energy Star-rated roof material when an integrated ecoroof/Energy Star-rated roof is impractical;

GREEN ROOF BYLAW

Toronto, Canada Green Roof Bylaw

<http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=83520621f3161410VgnVCM10000071d60f89RCRD&vgnnextchannel=3a7a036318061410VgnVCM10000071d60f89RCRD>

Toronto Municipal Code Chapter 492, Green Roofs

The Bylaw applies to new building permit applications for residential, commercial and institutional development made after January 31, 2010 and will apply to new industrial development as of April 30, 2012. The full bylaw is available at the web link above.

§ 492-2. Green roofs required.

A. Every building or building addition constructed after January 30, 2010, with a gross floor area of 2,000 square meters or greater shall include a green roof with a coverage of available roof space in accordance with the following chart:

Gross Floor Area (Size of Building)	Coverage of Available Roof Space (Size of Green Roof)
2,000 — 4,999 m ²	20%
5,000 — 9,999 m ²	30%
10,000 — 14,999 m ²	40%
15,000 — 19,999 m ²	50%
20,000 m ² or greater	60%

GREEN PERMIT PROCESS

City of Chicago Green Permit Process

http://www.cityofchicago.org/city/en/depts/bldgs/supp_info/overview_of_the_greenpermitprogram.html

Projects meeting the following criteria are eligible for the Green Permit Process:

- » Permit applications that include green technologies such as green roofs, rainwater harvesting, solar panels, solar thermal panels, wind turbine and geothermal systems are **REQUIRED** to be submitted through a Green Permit Program Project Administrator.
- » Commercial project participant must earn certification within the LEED rating system
- » Smaller Residential Project participant must earn certification under the Chicago

Green Homes Program checklist based rating system or LEED for Homes.

- » Green Menu Items – All Green Permit Program participants must utilize certain green strategies or green technologies to receive incentives offered by the Green Permit Program.
 - » Green roofs improve the urban environment by combating the urban heat island, reducing stormwater runoff, and reducing the energy use of the building beneath.
 - » For projects with no other green roof requirement, provide 50% green roof. For projects with a green roof required by Department of Planning and Development, add 25% to the DPD green roof requirement.

GREEN ROOF FEE CREDIT

City of Chicago Green Roof Fee Credit

http://www.cityofchicago.org/content/dam/city/depts/bldgs/general/GreenPermit/Green_Roof_Checklistada.pdf

FEE STRUCTURE	
<input type="checkbox"/> Building Permit Fee	Building permit fee calculation is based on building occupancy and area of work. Please visit our website for additional information and to use the permit fee calculator. www.cityofchicago.org/buildings
<input type="checkbox"/> Green Roof Fee Credit	A credit of \$0.05 per square foot of green roof provided will be applied to your total permit fee.
<input type="checkbox"/> Building Permit Deposit	50% of total building permit fee due at permit submittal meeting. Please make checks payable to The City of Chicago Department of Revenue

Minneapolis Fee Reductions

http://www.minneapolismn.gov/publicworks/stormwater/fee/stormwater_fee_stormwater_mngmnt_feecredits

The Stormwater Credit system provides:

- » Up to 50 percent credit (reduction) in your stormwater utility fee for management tools/practices that address stormwater quality
- » 50 percent or 100 percent credit (reduction) in your stormwater utility fee for management tools/practices that address stormwater quantity

Below is a partial list of stormwater BMPs approved for use in the Quality Credits program:

- » Rain Gardens
- » Pervious Pavers
- » Wet Ponds
- » Dry Wells
- » Sand Filters

- » Filter Strips
- » Infiltration trenches
- » Green Roofs

Only those properties that can demonstrate the capacity to handle a 10-year or 100-year rain event can receive a stormwater quantity credit. To apply for a stormwater quantity credit, property owners must have their applications certified by a state licensed engineer or landscape architect.

Property owners can apply for either the “Standard Quantity Reduction Credit” or the “Additional Quantity Reduction Credit.”

Standard Quantity Reduction Credit. The Standard Quantity Reduction Credit is a 50 percent credit on a property’s stormwater fee. The “Standard Quantity” credit is based on a property’s stormwater quantity management tools/practices being able to retain the 10-year, 24-hour type II SCS storm event. To qualify for this credit, the property owner must demonstrate that stormwater from the property is controlled with an on-site constructed stormwater quantity management tool/practice (BMP).

Additional Quantity Reduction Credit. The Additional Quantity Reduction Credit is a 100 percent credit on a property’s stormwater fee. To be eligible for the “Additional Quantity” credit, a property’s stormwater quantity management tools/practices must be able to retain the 100-year, 24-hour type II SCS storm event. To qualify for this credit, the property owner must demonstrate that stormwater from the property is controlled with an on-site constructed stormwater quantity management tool/practice (BMP).

You can learn more about stormwater quantity management tools/practices from the Minnesota Stormwater Manual.

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Model Green Streets Policy Statement

A Green Streets policy can be adopted by a municipality to encourage the transformation of impervious city street surfaces into landscaped green-spaces that capture stormwater and recharge it on site

Model Policy from Northampton Massachusetts

In City Council, October ____, 2014

Ordered, that the City adopt a Green Streets and Infrastructure Policy

WHEREAS, Stormwater runoff from streets, roads, parking lots, roofs and other impervious urban surfaces is a significant source of water pollution to our rivers, streams and water bodies, and also is a key contributor to inflow into sanitary sewers; and

WHEREAS, Green Streets may provide cost-effective infrastructure solutions to reduce and manage stormwater runoff and flooding, including from more intense storm and flooding events and reduce localized flooding from surcharging, adapt to climate change, and manage stormwater runoff; and

WHEREAS, Green Streets improve water quality by filtering stormwater, removing contaminants and cooling the stormwater before it encounters groundwater or surface water bodies, such as rivers, all of which ultimately benefit watershed health. Facilities that filter stormwater through vegetation and soil can reduce total suspended solids (TSS), organic pollutants /oils, and heavy metals by at least 90%; and

WHEREAS, Green Streets foster unique and attractive streetscapes that protect and enhance neighborhood livability, integrate the built and natural environments, enhance the pedestrian environment, and introduce park-like elements into neighborhoods; and

WHEREAS, Green Streets can serve as urban greenways or pathways and provide a preferred means of connecting neighborhoods and parks/recreation areas in ways that are attractive to pedestrians and bikers and complement complete streets; and



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WHEREAS, Green Streets encourage the planting of landscapes and trees which contribute environmental benefits such as reduced summer air temperatures, reductions in global warming through carbon sequestration and air pollution screening.

WHEREAS, green infrastructure may help to reduce the long-term costs of gray infrastructure maintenance, and complement gray infrastructure with hybrid systems of gray, piped infrastructure combined with green, vegetated infrastructure; and

WHEREAS, a Green Streets and Infrastructure policy demonstrates the City's commitment to achieving comparable infrastructure required for private developments and complements the City's complete streets policy by providing pedestrian and bicycle access; and

WHEREAS, forthcoming U.S. Environmental Protection Agency Municipal Separate Storm Sewer System (MS4) stormwater permits will require that the city control the amount and quality of stormwater discharged from the MS4s to rivers, streams, lakes, ponds, and wetlands; and

WHEREAS, recharge of groundwater sources is a key mitigation activity under the soon to be amended Massachusetts Water Management Act regulations 310 CMR 36.00; and

DEFINITIONS:

- » **Green Infrastructure:** Infrastructure which keeps rain close to where it falls, using structures to improve on-site infiltration, such as rain gardens, green roofs and permeable pavements, to promote cleaner, slower, and smaller storm flows to nearby rivers and streams;
- » **Green Street:** A subset of Green Infrastructure in which the street handles significant amounts of stormwater on site through use of vegetated and/or soil-infiltration facilities. Green Streets can include landscaped street-side planters or swales or tree box filters or porous pavement that capture stormwater runoff and allow it to soak into the ground as soil and vegetation filter pollutants.

RESOLUTION

Now, **THEREFORE, IT IS HEREBY RESOLVED** that the City of Northampton adopts a policy to promote the use of green street facilities and green infrastructure in public and private development through regulation, capital investment, and management mechanisms as a cost-effective and sustainable practice for stormwater management in current and future projects wherever technically and economically feasible. This includes:

- » Road reconstruction, new road development and bicycle or pedestrian projects;
- » Stormwater projects; and
- » New development and redevelopment projects

Further, it is city policy to:

- » Incorporate and maintain green street facilities and green infrastructure into all City-funded development, redevelopment, and enhancement projects, to the extent technically and economically feasible, and utilizing the best technology available at the time to meet water quality goals with the lowest lifecycle costs; and
- » Ensure that regulations require and incentivize all development to incorporate some Green Streets and green infrastructure features; and
- » Ensure coordination and communication between City departments, in particular, Public Works and Planning and Sustainability, to ensure implementation of this policy, as well as fully addressing competing priorities.

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Model Sewer Regulations For Downspout Disconnection

REGULATIONS GOVERNING THE USE OF SANITARY AND
COMBINED SEWERS AND STORM DRAINS OF THE BOSTON
WATER AND SEWER COMMISSION

Adopted February 27, 1998

Section 4 - Wastewater-Stormwater Separation.

(a) The plumbing of any existing or new building shall be so constructed as to keep all stormwater, surface water, groundwater, roof and surface runoff, subsurface drainage, uncontaminated cooling water, and uncontaminated industrial process water, non-contact cooling water, and non-contact industrial process water separate from sanitary sewage and industrial wastes, and from the building sewer.

(b) The building drain conveying wastewater from plumbing fixtures within the building shall discharge to a building sewer, while the building drain conveying stormwater and other drainage shall discharge to a building storm drain.

(c) Where separate storm drains and sanitary sewers are provided, and the Commission has determined that on-site retainage of stormwater is not possible, building storm drains shall be connected to a storm drain. Connection of a building storm drain to a sanitary sewer is prohibited.

(d) Where separate storm drains and sanitary sewers are provided, building sewers shall be connected to a sanitary sewer. Connection of a building sewer to a storm drain is prohibited.

(e) Where only a combined sewer has been provided, and the Commission has determined that on-site retainage of stormwater is not possible, the separate building storm drain shall be connected to the building sewer in a manner prescribed by the Commission's

Requirements for Site Plans and the building sewer connection shall be made to such combined sewer.

(f) The Commission shall require an owner to eliminate a source of infiltration or inflow whenever the Commission determines that the source is resulting in excessive infiltration or inflow to be discharged directly or indirectly to the sanitary sewer system.

Section 5 - Connections to Combined Sewers.

In order to prevent the direct discharge of wastewater to receiving waters under dry weather conditions, a building sewer shall not be connected to a combined sewer overflow.

Section 6 - Connections to Manholes.

Building sewer connections for new or substantially rehabilitated buildings shall not be made directly to Commission-owned manholes unless expressly authorized in writing by the Commission.

Section 7 - Connections to Catch Basins.

Private drains, including but not limited to, building storm drains for new or existing buildings and drains from irrigation systems, shall not be connected directly to catch basins.

Section 8 - Connections from Individual Wastewater Disposal Systems.

Connection of an individual wastewater disposal system, whether directly or indirectly, to a Commission sewer or drain is prohibited.

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Private drains, including but not limited to, building storm drains for new or existing buildings and drains from irrigation systems, shall not be connected directly to catch basins.

Section 8 - Connections from Individual Wastewater Disposal Systems.

Connection of an individual wastewater disposal system, whether directly or indirectly, to a Commission sewer or drain is prohibited.

Section 9 - Dye Testing of Connections.

Prior to activating water service, every new building sewer shall be dye tested by the Commission, or by the owner or his designee in the presence of a Commission inspector, to establish that the building sewer is properly connected to the Commission's wastewater system. The Commission may conduct dye testing of an existing building sewer to establish that it is properly connected to the Commission's wastewater system. The

Commission may require the owner forthwith to eliminate a connection from a building sewer to a storm drain (also referred to as an illegal connection) at the owner's expense. Where separate sanitary sewers and storm drains exist, the Commission may also dye test, or require the owner to dye test in the presence of a Commission inspector, a new or existing building storm drain to establish that the building storm drain is properly connected to the Commission's storm drainage system. The Commission may also require the owner forthwith to eliminate a connection from a building storm drain to a sanitary sewer at the owner's expense.

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Sidewalk Requirements



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Transfer of Development Rights



Traditional Neighborhood Development



Transit Oriented Development



Wetland Protection Bylaw



MODEL SMART GROWTH BYLAWS

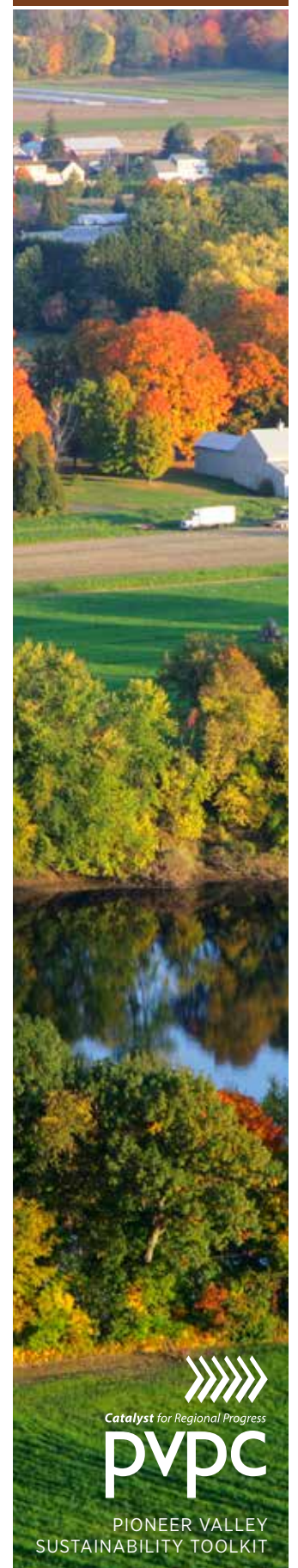


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Transfer of Development Rights



Traditional Neighborhood Development



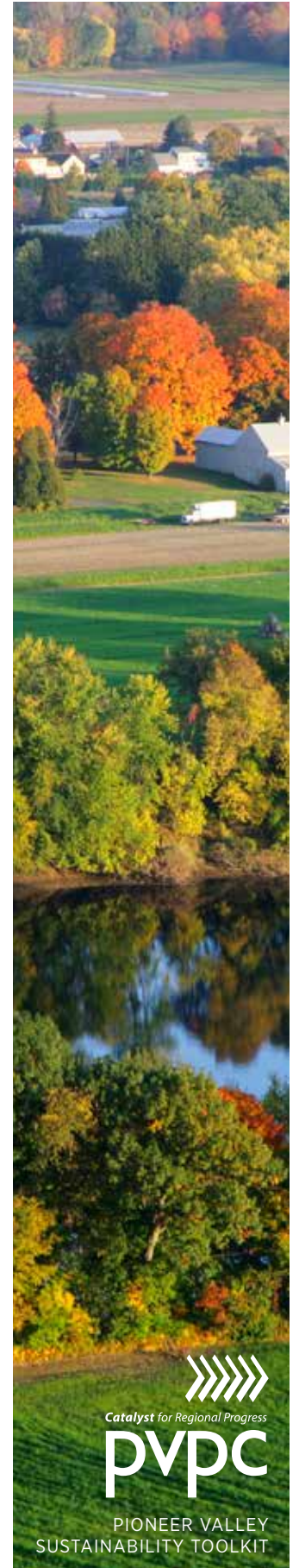
Transit Oriented Development



Wetland Protection Bylaw



SMART GROWTH MODEL BYLAWS



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PIONEER VALLEY SUSTAINABILITY TOOLKIT

Adaptive Reuse & Infill Development

What is the objective of this strategy?

Through Adaptive Reuse and Infill Development, communities can encourage more investment or reinvestment of underutilized buildings and lots in downtown areas and encourage more efficient use of existing infrastructure resources, improve streetscapes in downtown urban core and village areas, further economic development opportunities, and to promote historic preservation.

Why should we implement this strategy?

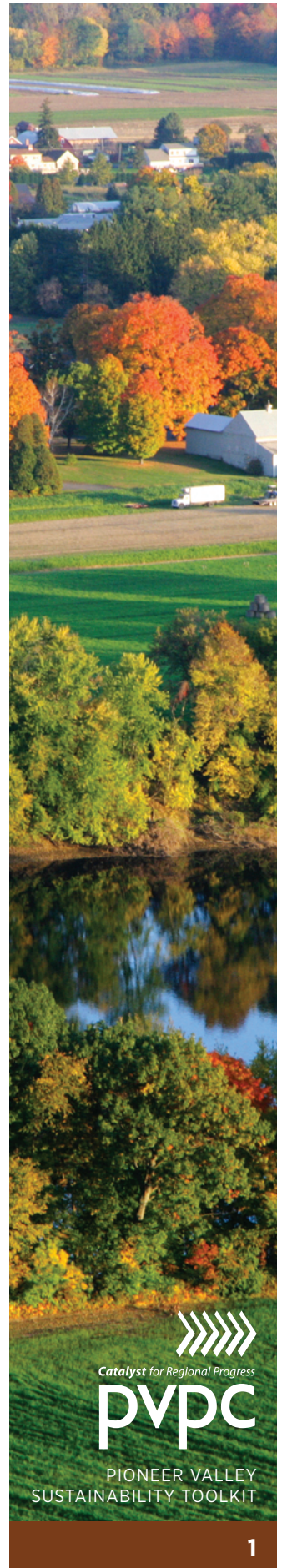
Adaptive reuse, along with infill development, is seen by many as a key factor in land conservation and reducing the amount of sprawl. For those who prescribe to the smart growth concept, it is more efficient and environmentally responsible to redevelop older buildings closer to urban cores, where infrastructure such as water, sewer, and roads already exist, rather than build new construction on faraway greenfield sites. In addition, adaptive reuse and infill development can provide opportunities for mixed-use development, a variety of housing options, and encourage economic development in commercial centers.



Adaptive reuse of the old Baystate Hotel and infill development on Strong Avenue, Northampton

How does Adaptive Reuse / Infill Development work?

Adaptive reuse is the act of finding a new use for a building. The recycling of buildings has long been an important and effective historic preservation tool. Buildings and neighborhoods with interesting spaces and unusual appearance are particularly attractive to developers and buyers.



Infill development is the process of developing vacant or under-used parcels within existing urban areas that are already largely developed. Often within urban core areas and downtowns, there exists vacant or under utilized lots that do not meet current zoning standards such as frontage and lot area. Through the use of an infill development ordinance/bylaw, these vacant nonconforming lots can be brought back into productive use.

DID YOU KNOW...

In 1997, *Builder* magazine published a survey of 516 new-home shoppers. While one-third said they preferred life in suburbia, nearly two-thirds objected to the extra driving suburbia typically requires.

Some 84 percent desired proximity to a town center with shops, cafes, and small parks.

(Source: Northeast Midwest Institute, "Strategies for Successful Infill Development, 2001)

EXAMPLES FROM THE PIONEER VALLEY

Eastworks, Easthampton

The redevelopment of the Eastworks building was the first in a series of public and private actions to revitalize the center of Easthampton. Formerly the Stanley Home Products factory, the Eastworks building in Easthampton is a vibrant mixed-use mill redevelopment containing 75 businesses and 32 housing units. Purchased in 1997, the 500,000 square foot complex houses public retail space, a restaurant, an art and photography school, offices for non-profit organizations and professional businesses, and a branch office for the Registry of Motor Vehicles. This adaptive reuse project has generated 170 new or retained jobs and eventually will provide housing for 46 households. In recognition of their achievements, the City of Easthampton received a 2005 Smart Growth Governor's Award.



A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Bike And Pedestrian Features

What are the objectives of zoning for bike and pedestrian features?

To develop a regional network of pedestrian and bicycle trail systems to provide residents with viable travel alternatives to the single occupancy vehicle.



Bike lanes in Northampton

Why do we need to encourage bike and pedestrian features in our community?

Walking and bicycling are important forms of transportation and recreation throughout Massachusetts. Unfortunately, the rate at which people are walking or biking to work has decreased in many communities since 1990. During this same period the number of people who are obese in Massachusetts increased significantly from 1990 to 2000 according to the Centers for Disease Control (CDC). These two trends are related, and creating a better built environment for walking and bicycling is a key element to rectifying this critical issue. As the costs of health care, energy, and transportation continue to escalate, walking and bicycling continue to be important solutions which require the support of policy, planning, and infrastructure.

DID YOU KNOW...

That 79.3% of commuters in the Pioneer Valley drove alone to work. Only 0.3% bike to work, and 5% walk to work. (US Census, 2000)

How does the zoning for bike and pedestrian features work?

Communities can adopt regulations and bylaws that promote pedestrian and bicycle

linkages, and to meet the following goals: 1) promoting the safety of pedestrian access, movement, and protection for the physically able, physically challenged, children or seniors within the community; 2) insuring that the ADA guidelines are met for all sidewalk or pathway installations, existing and proposed; 3) promoting attractive and well-constructed sidewalks or pathways that correspond to the character, aesthetic qualities, natural, environmental, and historical features of developing or existing neighborhoods; 4) connecting to existing and projected sidewalks or pathways whenever the opportunity arises to insure an interconnected pedestrian system; and 5) insuring that all development actively implements the building of sidewalks for new construction, reconstruction, or rehabilitation.

EXAMPLES FROM THE PIONEER VALLEY

Connecticut Riverwalk and Bikeway

The Connecticut Riverwalk and Bikeway was proposed by PVPC in 1995 as a regional pedestrian and bicycle path along the banks of the Connecticut River, connecting the communities of Springfield, Chicopee, Agawam, West Springfield and Holyoke. The Riverwalk creates a linear park along both sides of the Connecticut River, which when completed, will extend over 20 miles in total distance. It links residential neighborhoods with urban employment centers and riverfront parks and amenities. Two segments of the Riverwalk have now been constructed at a cost of \$5 million, and opened to the public, including a 3.7 mile segment in Springfield and a 2.1 mile segment in Agawam. Other segments are currently under design in Chicopee, Holyoke, West Springfield and Agawam.



Southwick and Westfield Rail Trail

The Southwick Rail Trail and Columbia Greenway in Westfield are part of a regional bike system that will connect the Farmington River Greenway in Connecticut to the Rail Trail in Northampton. The 9.5-mile trail segment in Southwick and Westfield will provide residents access to a variety of natural and culturally significant resources. Southwick Bike Trail follows an abandoned rail line and runs from the Connecticut border north to the town of Westfield. The trail will pass through residential neighborhoods, protected agricultural lands, and the Congamond Lakes region. Currently, the design stage for the Southwick Rail Trail is completed and construction on this project is scheduled to begin



in spring 2008. The Columbia Greenway in Westfield is in the development stage, with construction also expected to begin in 2008. This greenway will run through the center of the city on an elevated rail bed, and provide a safe and easy route to the center of town for residents in surrounding neighborhoods.

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Brownfield Inventories



Demolition of the HB Smith Boiler Company, Westfield. | Photo provided by Tighe & Bond

What are the objectives of a brownfield inventory?

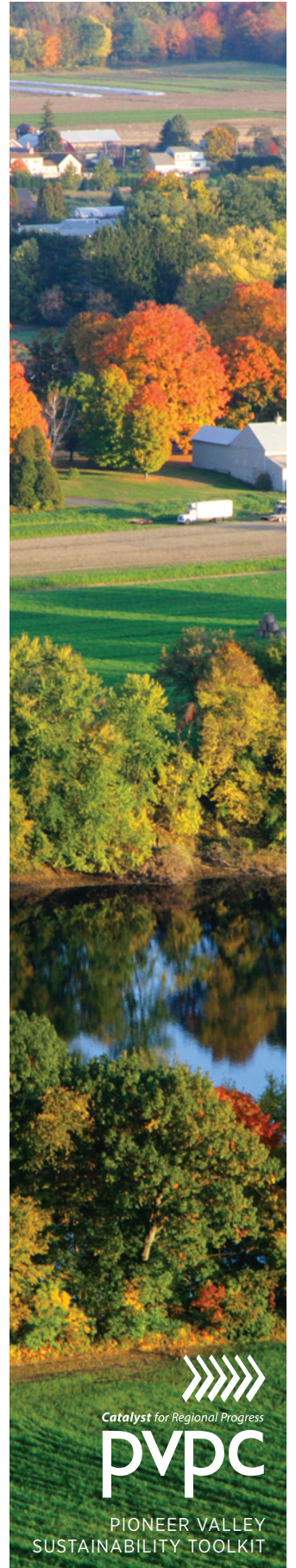
A brownfield is a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. An inventory can assist in the prioritization of brownfield sites for redevelopment and create a marketing tool for interested redevelopment partners.

Why do we need brownfield inventories?

A Brownfield Inventory can assist a municipality in prioritizing sites for redevelopment by identifying its assets and liabilities in terms of redevelopment potential. With all of this information compiled, potential redevelopment partners identify sites that have the criteria they are looking for to locate their project. Easily accessible information facilitates communication with potential developers and can expedite site selection for a project. The inventory also helps the municipality keep track of issues which may be complicating site redevelopment for certain properties, therefore allowing them to dedicate resources, such as grant funding, to sites that have a higher potential for redevelopment.

How is a brownfield inventory created?

There is no standardized methodology for creating an inventory. It is important that the type of data compiled in the inventory can meet the goals of all potential users including municipal staff as well as potential redevelopment partners. Given the needs of the parties the inventory will serve, the types of information relevant to each must be identified and the data sought. To create an inventory, data must be gathered from a number of sources including, but not limited to: the Massachusetts Department of



Environmental Protection, Mass GIS, the local assessor's office, local records of past use, and neighborhood surveys and interviews. Specific information about the property such as its structural integrity, proximity to public water and sewer service, access to major transportation routes, lien status, existing infrastructure, available parking, neighboring land use and zoning, MCP status, etc. Once this information is compiled and weighted as to relevance or importance for redevelopment, a prioritization schedule can be assigned to each property.

DID YOU KNOW...

It is estimated that there are more than 450,000 brownfields in the United States (US Environmental Protection Agency) Demolition of the HB Smith Boiler Company, Westfield. Photo provided by Tighe & Bond

SPRINGFIELD AND HOLYOKE, MASSACHUSETTS

The Pioneer Valley Planning Commission (PVPC) and the Center for Urban and Regional Policy (CURP) of Northeastern University partnered with the cities of Springfield and Holyoke to develop brownfield inventories for each of their communities. Data was gathered from the Massachusetts Department of Environmental Protection, Mass GIS, the cities local records of past use, and property assessment records. The inventory was built in Excel and linked to GIS for map locations of all of the sites.



For more information on brownfield redevelopment, please refer to the state's [Smart Growth/ Smart Energy toolkit](#), developed by the Executive Office of Energy and Environmental Affairs.

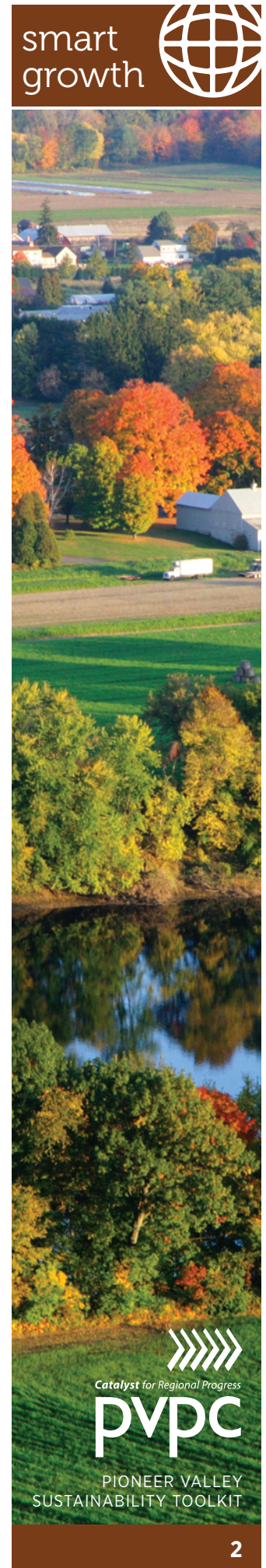
A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Business Improvement Districts



Logo courtesy of City of Springfield BID

What are the objectives of Business Improvement Districts?

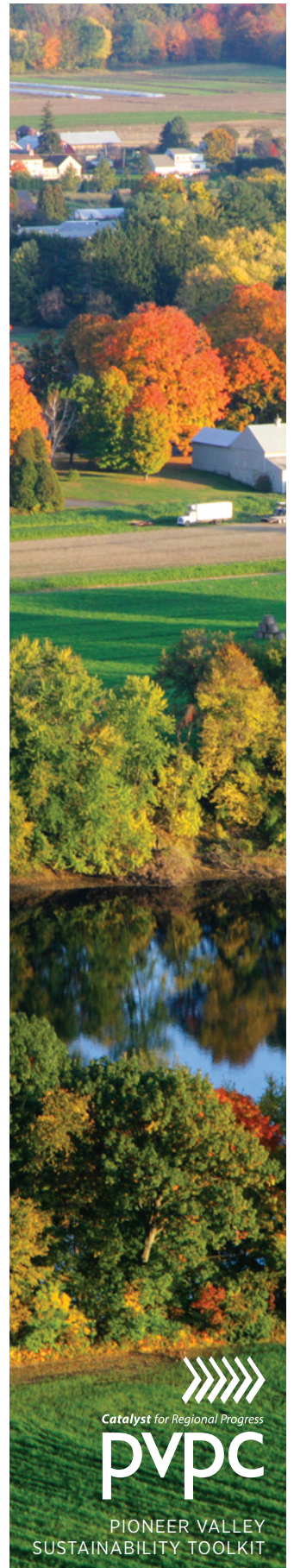
To encourage investment/reinvestment in downtown urban core and village areas; create a more pedestrian friendly environment in these areas; improve urban streetscapes and infrastructure in downtown urban core and village areas to further economic development; and to promote historic preservation.

Why do we need a Business Improvement District?

A key element in reducing sprawl is to encourage growth and revitalization in existing downtowns and other urban centers. With revitalization, downtowns serve prominent and important roles within their communities. There are many important reasons to revitalize downtowns, including the fact that downtown areas are usually centrally located and already contain water and sewer lines and streets. Downtowns are walkable and well served by public transit, allowing reduced car use. It is more economical to use existing and necessary support systems rather than pay for extensions outside of the area. Downtowns also have large employment opportunities, a community focus, and greater functional diversity than outlying areas. In many communities, downtowns still serve as a center for retail stores, financial institutions, public agencies and local government offices, local public transportation, historic areas, and cultural and educational institutions.

How does a Business Improvement District work?

A business improvement district formed pursuant to M.G.L. Chapter 400 is a contiguous geographic area with clearly defined boundaries in which at least three-fourths of the area is zoned or used for commercial, industrial, retail, or mixed uses. As part of the creation of a BID, an "Improvement plan" must be submitted and approved by the local municipal governing body as part of the creation of the BID. An Improvement Plan is



the strategic plan for the BID which sets forth the supplemental services and programs, revitalization strategy, budget and fee structure, as well as the management entity for the business improvement district. Presently, there are only three BIDs in Massachusetts: Hyannis, Springfield, and Westfield.

DID YOU KNOW...

The rights and powers of a BID approved by a municipal governing body include:

- » Retain or recruiting businesses
- » Administer and manage central and neighborhood business districts
- » Promote economic development
- » Design, engineering, construction, maintenance or operation of buildings, facilities, urban streetscapes or infrastructures to further economic development
- » Conduct historic preservation activities
- » Lease, own, acquire, or option real property
- » Undertake planning, feasibility, and market analyses

EXAMPLES FROM THE PIONEER VALLEY

Town of Springfield Business Improvement District (SBID)

The City of Springfield established a BID on November 18, 1998. The SBID calls for an aggressive beautification plan which includes: cleaner streets and sidewalks, more attention to the aesthetics of downtown parks, historic buildings and care for new and existing trees, perennials, annuals and hanging baskets. Through the SBID, local businesses band together to enhance City services and take public safety, community responsibility, and carefully planned growth to a new level. It's a lean, well organized coalition of property owners, tenants, city officials and other groups with a stake in Springfield's success. Property owners pay fees set by their peers, an 11-member Board of Directors. The City collects the funds but keeps them in a separate account, exclusively for the BID.

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

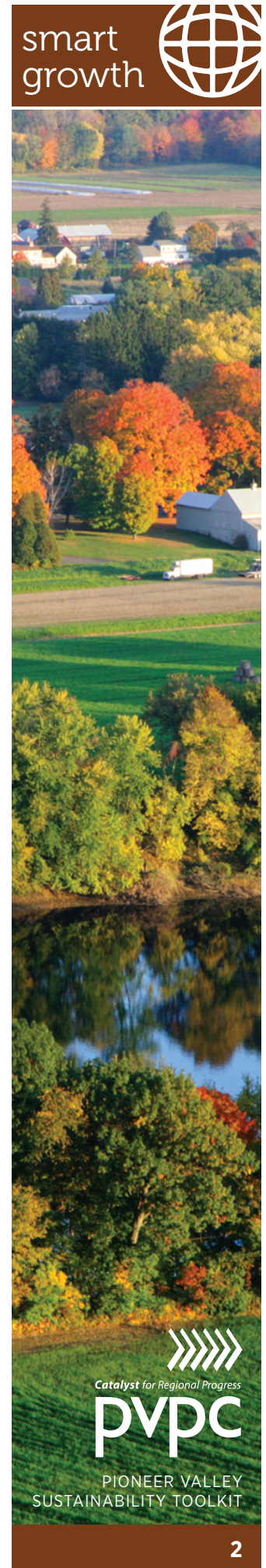
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District Improvement Financing & Tax Increment Financing



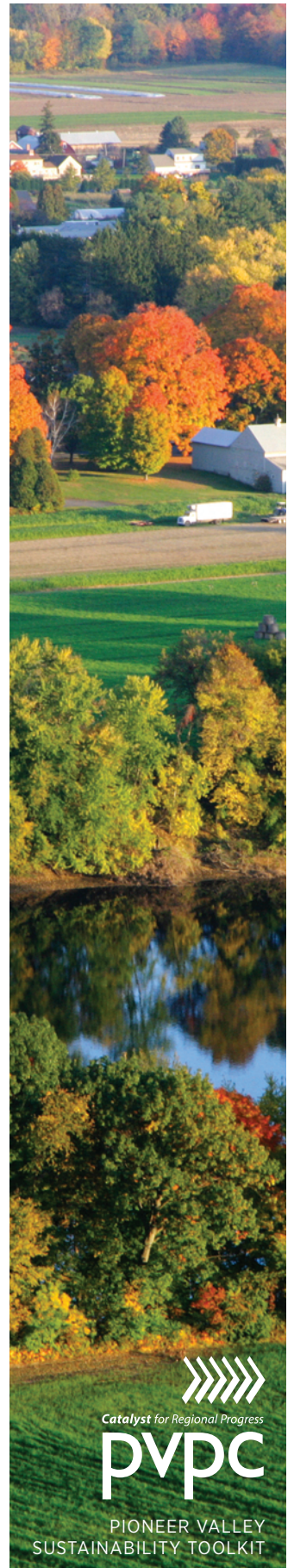
The X in Springfield

What are the objectives of a District Improvement Financing and Tax Increment Financing?

To encourage investment/reinvestment in downtown village and urban core areas; improve urban streetscapes and infrastructure to further economic development. District Improvement Financing (DIF) and Tax Increment Financing (TIF) are economic tools that promote redevelopment by use of public/private partnerships. TIF offers tax breaks to developers, while DIF channels tax dollars into targeted redevelopment districts.

Why do we need District Improvement Financing and Tax Increment Financing?

Many municipalities in the Pioneer Valley Region as well as throughout Massachusetts are faced with blighted, distressed, or simply underutilized areas. Many of these sites contain abandoned or contaminated facilities, while others are characterized by dilapidated infrastructure and commercial operations that simply are not economically viable. These areas often see a decrease in assessed property values with a corresponding decrease in municipal revenue. At the same time, they pose a drain upon municipal services. Often, it is difficult to attract private investment to these areas.



DIF and TIF provide opportunities to redevelop areas in ways which can lead to increased property values, increased tax revenue, improved infrastructure, enhanced transportation services, increased housing supply, new jobs and an overall improvement in quality of life for the inhabitants of the city or town.



Aerial view of the Star Container Corporation complex

Star Corporation, Leominster | Source: MA Smart Growth Toolkit

How does District Improvement Financing and Tax Increment Financing work?

A city or town wishing to utilize DIF must first designate a development district and a corresponding development program. The district and program must then be certified by the State Economic Assistance Coordinating Council (EACC). A development district may be as small as one parcel or may comprise up to 25% of a town or city's land. A district can be in effect for a maximum of 30 years. Each district must have a unique development program which spells out the goals of the district and the means to achieve them.

Under TIF state enabling legislation, landowners may be granted property tax exemptions of up to 100% of the tax increment. A municipality may enter into a TIF Agreement with a landowner for a maximum term of 20 years. The legislation also authorizes TIFs for housing in urban centers. A city or town must initiate a TIF by a vote of its governing body approving the TIF Plan.

At this time, there are no examples of DIF or TIF in the Pioneer Valley region. However, outside the region the Massachusetts Office of Energy and Environmental Affairs highlighted three DIF/TIF case studies in their Massachusetts Smart Growth Toolkit. This toolkit was prepared by the Horsley Witten Group under contract to the Massachusetts Executive Office of Energy and the Environmental Affairs (EOEEA).

EXAMPLES FROM OUTSIDE THE PIONEER VALLEY

Leominster, MA - Star Container Corporation (TIF District)

The City of Leominster entered into a Tax Increment Financing Agreement with Star Container Corporation to encourage Star Container's expansion plans for its packaging facility. The expansion consisted of an additional 54,000 square feet of floor area and the



purchase of additional corrugated box manufacturing equipment. The TIF Agreement had an eight year term, and provided for a front loaded sliding scale of exemptions from taxation of the tax increment as follows:

- » Year 1 100% of the increment
- » Year 2 90% of the increment
- » Year 3 75% of the increment
- » Year 4 60% of the increment
- » Year 5 45% of the increment
- » Year 6 30% of the increment
- » Year 7 15% of the increment
- » Year 8 0% of the increment

Star Container invested approximately 6.2 million dollars into the facility and equipment. The Agreement provided for the creation of 25 new full time manufacturing and managerial jobs. 150 existing jobs were retained by ensuring the facility stayed at the existing site. At the end of the TIF period, the City will gain approximately \$23,000 annually in additional property taxes.

Leominster uses TIF agreements only for manufacturing businesses. This is compatible with the needs of the city, which historically has had a manufacturing base in the plastics industry. Star Container distributes its packaging to many local and regional firms. The focus on manufacturing has the effect of creating jobs, which pay higher than the minimum wage, bringing a greater economic benefit to the area. The shorter term TIF is also geared towards manufacturing, and is tied to the equipment life.

For additional case studies on DIF/TIF, please see the [Massachusetts Smart Growth Toolkit](#) developed by the Executive Office of Energy and Environmental Affairs

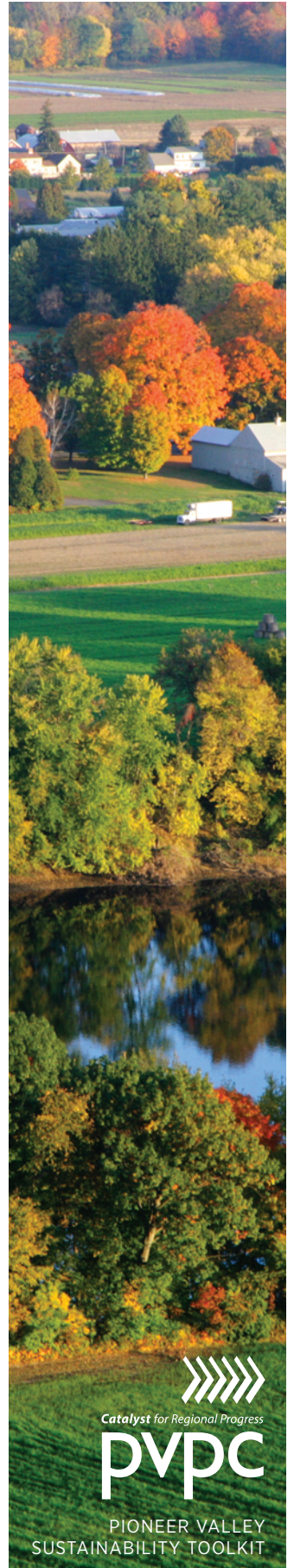
A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Environmental Impact Statements



An Underground Storage Tank (UST) site on Maple Street in Holyoke, Massachusetts – prior to construction of the Multimodal Transportation Center. Photo courtesy of flickr user Massachusetts Dept. Of Environmental Protection

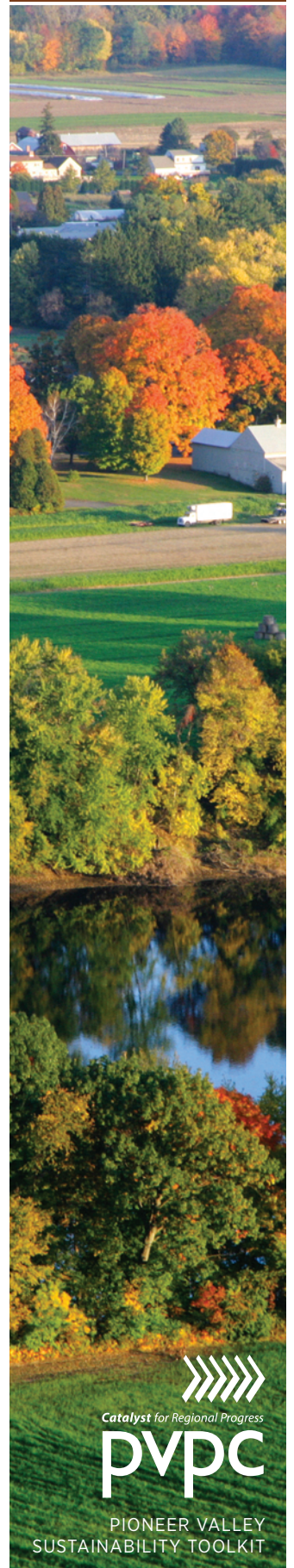
What are the objectives of environmental impact statements?

Environmental impact statements (EIS) are a procedural requirement of the National Environmental Policy Act (NEPA). An environmental impact statement is intended to detail the impacts of any proposed action by a federal agency on the environment. Environmental impact statements detail any detrimental impacts that could not be avoided in the event that the proposal is implemented, as well as any reasonable alternatives to the proposal. Additionally, an EIS demonstrates the relationship between the local short-term uses of a proposal and any long-term effects or irreversible commitments of resources involved in a proposal.

Massachusetts passed the Massachusetts Environmental Policy Act (MEPA) as a supplement to NEPA in 1972. The MEPA review is a state version of the NEPA review process. This process is designed to evaluate the impacts of proposed developments upon the environment. However, the term “environment” is a broad term that includes things beyond air, water and wildlife habitats to include things like historic preservation, traffic generation, and quality-of-life issues.

Why do we need to encourage environmental impact statements in our communities?

While environmental impact statements in the state of Massachusetts do not result in whether a project may go forward or not, the issuance of a certificate is instrumental for other agencies in determining whether funding or permits should be issued for the proposal. Unique to Massachusetts and Minnesota, citizens can petition the government for an environmental assessment - the stepping stone to an EIS - and thereby have a greater say in the development process. Environmental impact statements provide a

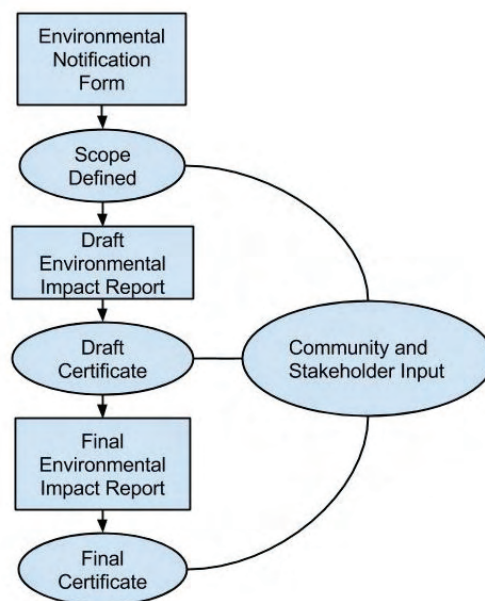


range of possible alternatives to any one proposal and are therefore a valuable tool in assessing the outcomes of any proposed development.

How do environmental impact statements work?

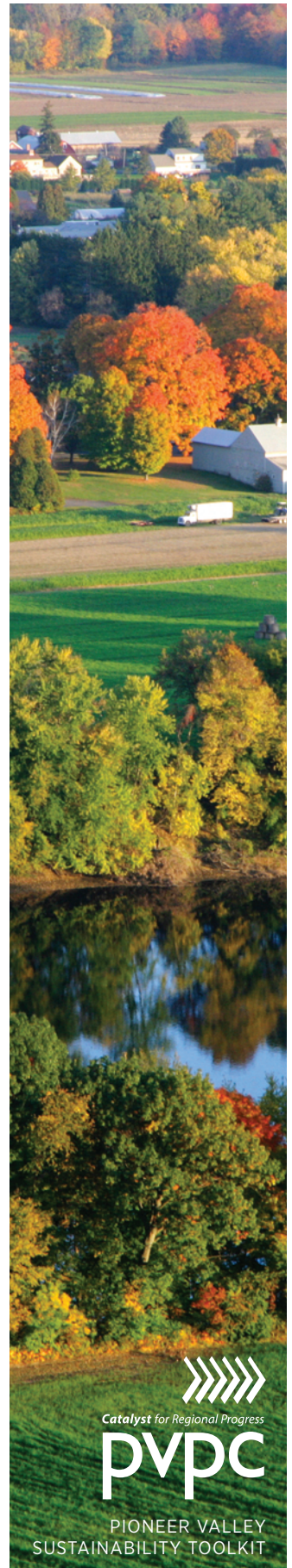
The NEPA and MEPA processes are not a strict regulatory process and do not result in an issuance of a permit or a final sign-off. Instead, MEPA and NEPA issue a “certificate” instead of a permit, and that certificate is used to guide other permitting processes. The certificate can condition an approval based upon what sorts of mitigation measures are taken to minimize the impact on the environment, however it is up to the agency that actually issues a permit to enforce those conditions. The NEPA, MEPA, and other state processes are all generally similar, however only Massachusetts, Montana, South Dakota, and Wisconsin limit this review to state permitting actions only.

When a project is initiated, the proponent – which is usually a public agency – submits an initial report referred to as an Environmental Assessment or an Environmental Notification Form to the appropriate national or state Environmental Protection Agency office. Those forms serve as a formal notification that the proponent aims to implement the proposal, and allows the proponent to seek a waiver from the full EIS process if it believes it to be unnecessary. Comments are taken on that form, and NEPA or the state EPA then determines whether a waiver should be granted, and if not the specific environmental impacts that the proposal needs to address in a more detailed stage of review. This decision is referred to as the ‘scope’, which is based upon a previous ‘scoping session’ held by NEPA, the state EPA, or other state equivalents which may include site visits open to the public, presentations of the proposal, and a community dialogue to elicit feedback on the proposal.



MEPA Planning Process¹

Following the scope, a Draft Environmental Impact Statement or Report is created by the proponent to address the issues outlined in the scope. Following public comments



regarding the draft report, NEPA or the state EPA evaluates those comments and then tells the proponent what additional steps need to be taken in order to create a final draft.

The final draft produced is referred to as the Final Environmental Impact Statement, or Final Environmental Impact Report. After public comments are taken on this version, and if the EPA deems this report satisfactory, it will issue a final 'certificate' stating that the EIS is complete and that the proponent has agreed to make changes to the project to minimize environmental impacts. The certificate is then used by other agencies in determining whether any funding or permits that the proponent is considering for the proposal should be issued.

MEPA establishes three tiers of jurisdiction over projects: complete, broad, and limited. MEPA has full jurisdiction over any project that is undertaken by an Agency, those aspects of a project within the subject matter of any required permit, projects involving financial assistance, and any aspects of a project which are within the area of any land transfer. MEPA has broad jurisdiction over any project undertaken by an Agency or any project that involves financial assistance. Broad jurisdiction in this case means that the scope, if an EIR is required, shall extend to all aspects of a project that are likely, either directly or indirectly, to cause damage to the environment. MEPA jurisdiction is limited when a project is undertaken by a person and requires land transfers or permits but does not involve financial assistance.²

The MEPA law (301 CMR 11:00) includes mandatory thresholds for conducting EAs and EISs with the provision of agency discretion regarding the significance of determinations. Massachusetts is unique with MEPA compared with other SEPA states in that the threshold for preparing an EIS is not a finding of significant environmental impact, but rather a finding that the proposal may "damage" the environment. Also unique to Massachusetts and Minnesota is the fact that citizens can petition the government to require the preparation of an EA for a project.

At the local level cities and towns may require proposals to undertake an EIS within their subdivision regulations or site plan review process. Should the planning board deem it necessary, a proposed development may be required to submit an EIS or a development impact statement in order to obtain a permit for a proposal.

DID YOU KNOW...

That since 1970 dozens of other nations have established their own versions of EISs? The 17th principle of the Rio Declaration on Environment and Development (1992) is devoted to the creation of environmental impact statements by countries around the world.

1 Adapted from: Hamon, Elisabeth M., Linda Silka, and Priscilla Geigis. Preserving and Enhancing Communities: A Guide for Citizens, Planners, and Policymakers. Amherst: University of Massachusetts. 2007

2 For more information see: 301 CMR 11.00: MEPA REGULATIONS. <http://www.env.state.ma.us/mepa/regs/11-01.aspx>



A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

FOR MORE INFORMATION, PLEASE CONTACT

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Green Communities



Governor Deval Patrick at the commemoration of the 100th Green Community.
Photo courtesy of flickr user Deval Patrick

What are the objectives of the Green Communities Program?

The Green Communities Designation and Grant Program is the result of S. 2768, The Green Communities Act, which was passed in 2008. The Green Communities Division is part of the Office of Energy and Environmental Affairs and is tasked with enhancing energy efficiency within the 351 cities and towns of Massachusetts. The Green Communities Division's role is to help communities in the Commonwealth to find clean and renewable energy solutions to reduce their long-term energy costs and strengthen local economies. This is accomplished by providing technical assistance and financial support for municipal initiatives that improve energy efficiency and increase the use of renewable energy in public buildings, facilities and schools.

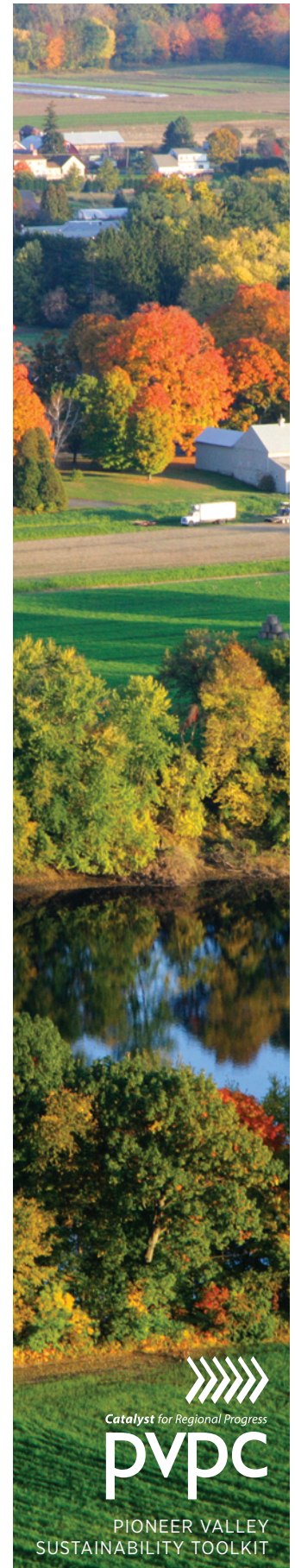
Why do we need to encourage Green Communities?

Cities and towns across the Commonwealth face both economic and climate-change related challenges in the coming years. The Green Communities Designation and Grant Program provides municipalities with the necessary financial and technical assistance to implement changes in the way that energy is consumed. By adopting clean and renewable energy in public buildings, facilities, and schools, municipalities can start moving forward in addressing climate change and save money in the process.

How does the Green Communities Act work?

The Green Communities Act increases energy efficiency in Massachusetts by expanding investments in energy efficient measures in order to reduce electricity demand. This is accomplished by the following measures:

- » **Efficiency First:** Requires that electric and gas utilities secure energy efficiency resources that are cost-effective or less expensive than supply as a first recourse, before more expensive generation resources can be purchased. This



also mandates that an efficiency plan is produced every three years and be approved and that a Energy Efficiency Advisory Council be created to review plans. Plans are approved by the Department of Public Utilities.

- » **Efficient Buildings:** Requires the adoption of the International Energy Conservation Code (IECC) and updates within a year of any revision. This provision also provides for related training, implementation and compliance and requires the disclosure of information regarding the benefits of home energy audits to buyers of single-family dwellings or small multi-family dwellings at the time of closing.
- » **Regional Greenhouse Gas Initiative Implementation:** The act maximizes the benefits of Massachusetts’ adoption of the regional power plant CO2 cap and trade program known as “RGGI”. This requires the auction of all permits to emit pollution under the program rather than giving them away for free. Eighty percent or more of the auction proceeds go towards energy efficiency programs and the remainder goes to municipalities where power plants are situated, funding for community clean energy programs and voluntary green power development
- » **Renewable Energy:** The Act promotes renewable energy by strengthening the Massachusetts Renewable Energy Portfolio Standard (RPS) by increasing requirements for new renewable every year with a target of 15% of electricity for Massachusetts consumers supplied by renewables by 2020. The act also promotes net-metering, long term contracts, and municipal/utility ownership of utilities.
- » **Renewable Energy Trust Fund:** The Act establishes a new governing board and requires the development of 5-year strategic plans for the existing Renewable Energy Trust Fund (RETF)
- » **Cleaner Vehicles:** The Act promotes hybrid or alternative fuel vehicles by calling for state government vehicles to be comprised of 50% of such vehicles by 2018.

How does the Green Communities Designation and Grant Program work?

The Green Communities Grant Program provides up to \$10 million per year statewide in technical and financial help to municipalities to promote energy efficiency and the financing, siting and construction of renewable and alternative energy facilities. In order for a community to qualify for technical and financial assistance and be designated a Green Community, they must adopt the following:

- » As-of-right siting for renewable or alternative energy generating, manufacturing or R&D facilities in designated locations
- » An expedited permitting process for approving such facilities within one year of the filing of an application
- » Energy use baseline and a program to reduce energy use by 20% within 5 years
- » Policy to purchase only fuel efficient vehicles; and

» A policy to minimize lifecycle energy and water costs for all new commercial, industrial and large-residential construction.

Funding is provided to communities through Cap and Trade programs (including RGGI), compliance payments pursuant to the Massachusetts Renewable Portfolio Standard, and the Renewable Energy Trust Fund.

DID YOU KNOW...

The Green Communities Designation and Grant Program is currently working with 123 cities and towns throughout the commonwealth that have earned Green Communities designation. There is currently more than \$28 million dollars from Green Community grants at work in these cities and towns.

EXAMPLES FROM THE PIONEER VALLEY

The Pioneer Valley is well represented thus far with Green Community designations in comparison to the rest of the State. However there are still a number of communities which have not been designated as Green Communities. Holyoke received \$321,221 for the conversion of exterior parking lot lighting to LEDs at all twelve schools, and to purchase BigBelly Solar Compactors for public parks and high traffic areas. Northampton received \$198,500 for a 51 kW solar power project on the Smith Vocational and Agricultural High School (SVAHS), and to purchase an energy auditor/building performance education kit for the SVAHS Home Building Program. Springfield received \$988,102 to replace inefficient boilers at the Deberry, Mary Lynch, and Freedman Elementary Schools and the Fire Repair Building; installation of vending machine misers at the Freedman and Brunton Elementary Schools and the Fire Repair Building; and for five energy management systems at the Deberry, Mary Lynch, Brunton, and Zanetti schools, the Fire Repair Building and the Sixteen Acres Branch Library.

For more information contact Jim Barry, the Western Region Green Communities Coordinator at jim.barry@state.ma.us

Phone(413)755-2232 | Mobile (617) 823-4588

OR GO ONLINE TO:

<http://www.mass.gov/eea/energy-utilities-clean-tech/green-communities/>

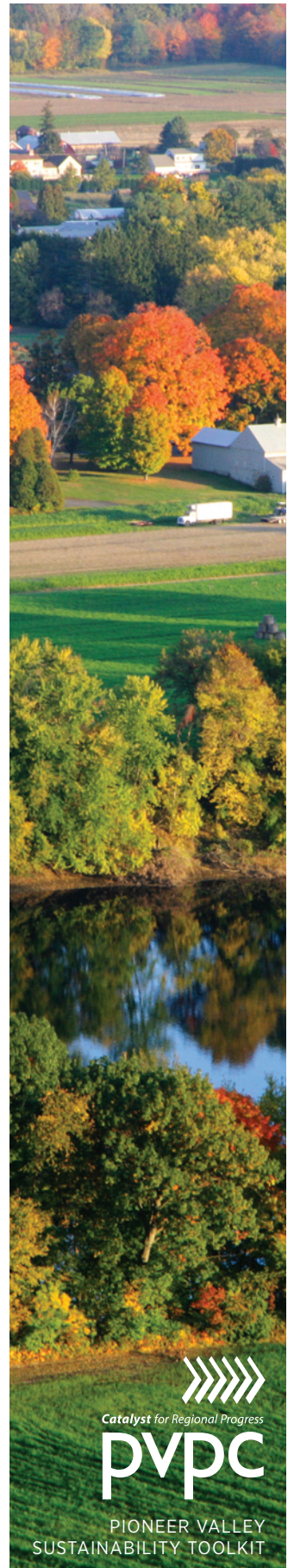
A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Municipally Owned Clean Energy



Brockton Mass, "Brightfields" www.brockton.ma.us

The 535 Megawatt hours of clean electricity generated from the Brightfield will result in a reduction of 589,570 lbs. of carbon dioxide (a greenhouse gas), 1,086 pounds of sulfur dioxide and 289 pounds of nitrogen oxide emitted into the atmosphere each year.

Converts a blighted industrial brownfield into a clean energy showcase

Enhances local property values and encourages reinvestment

What are the objectives of municipally owned clean energy?

To manage risk, stabilize municipal budgets, and combat climate change.

Why do we need municipally owned clean energy?

All levels of government around the world have recognized the need to invest in clean and safe renewable energy sources. Climate change must be addressed to ensure a safe and healthy future for our children and grandchildren. The United States is dependent on foreign sources of non-renewable dirty energy. We have reached peak oil production and we need to transition to safe, sustainable, clean sources of energy. In 1998 the Commonwealth of Massachusetts joined a select number of states being one of the first to pass a renewable energy portfolio standard. This legislative act committed the Commonwealth to secure an ever increasing percentage of its electricity needs from clean and safe renewable sources and created a very competitive market for clean energy. Municipalities can save money and manage risk by investing in municipally owned clean energy.

How does municipally owned renewable energy work?

We recommend reviewing the [Massachusetts Clean Energy Center \(CEC\)](#) website for detailed resources on municipally owned clean energy. Municipally owned clean energy is



just like any other municipal asset. You make the decision to invest your limited resources in clean energy. You use local staff and community resources, including PVPC and Department of Energy Resources, and hire consultants as necessary and possible; to help you determine what source(s) of clean energy is/are available and make the most sense for your community. You allocate the resources necessary (some funding is available from CEC—on a reimbursement basis) and you install the facilities. Massachusetts law prohibits municipalities from generating their own power for sale to the grid—unless you have a municipal utility. Therefore we recommend that you design your municipal clean energy facilities to generate only enough power to use on site. If you want to be an electricity generator, you can create a municipal utility or you can petition Congress for permission.

DID YOU KNOW...

That the city of Northampton has received more than one hundred thousand dollars from MTC for clean energy installations because 3% of residents agreed to pay more to buy clean energy?

EXAMPLES FROM THE PIONEER VALLEY

Easthampton Solar Project

Easthampton is interested in capitalizing on current state and federal government policy initiatives by enlisting a private developer to construct and operate a solar array on its closed landfill. Private sector partners can utilize the tax advantages while the city provides the location and consumption necessary to make the project financially feasible. Such a partnership can be beneficial to both parties by saving money for the city and providing a profit incentive for the developer, while at the same time fostering a conservation ethic by reducing our greenhouse gas emissions and dependence on fossil fuel.



EXAMPLES FROM OUTSIDE THE PIONEER VALLEY

Town of Hull, MA

The state's first recent, commercial-scale turbine began generating green energy in the coastal town of Hull. A 660-kW turbine, Hull Wind 1, was installed on the harbor in 2001. In spring 2006, the Hull Municipal Light Plant dedicated a second turbine. Hull Wind 2 is a 1.8 MW Vestas V80, installed on a closed landfill. The two wind turbines supply more than 10 percent of the community's energy needs. For more information on this project, please visit the [Hull Wind](#) webpage.

For more information on Smart Energy, please visit the state's [Smart Growth / Smart Energy](#) toolkit, developed by Executive Office of Energy and Environmental Affairs

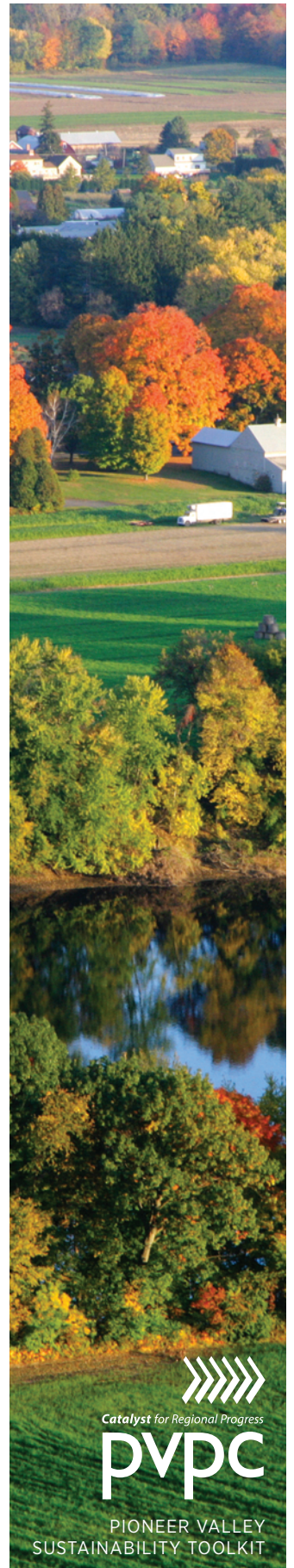
A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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PVPC's Planning Board Assistance Program

What are the objectives of the Planning Board Assistance (PBA) program?

PVPC's Planning Board Assistance (PBA) program provides municipal planning boards with professional, high quality planning services on a part-time, cost-effective basis.

Why do we need the PBA Program?

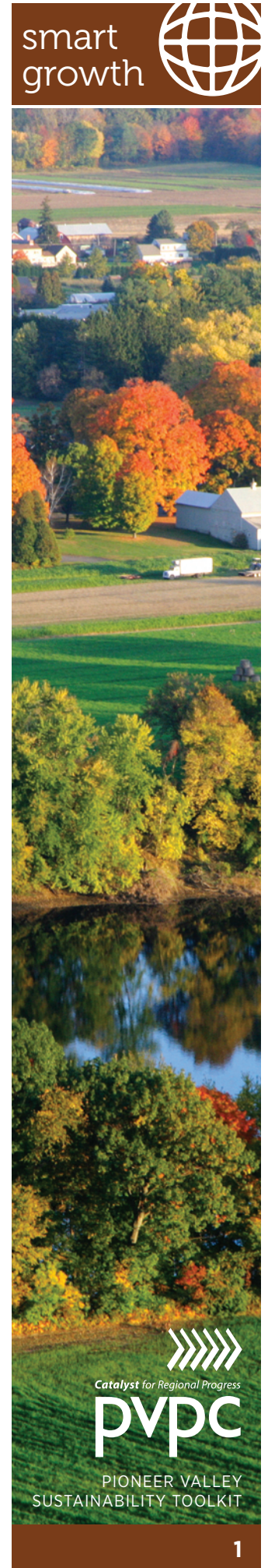
As new laws are passed and the state of municipal planning becomes more sophisticated the responsibilities of local planning and zoning boards becomes more complicated and time consuming to administer. These citizen boards often find themselves lacking the in-house capacity to sufficiently and expeditiously carry-out these responsibilities and budget constraints limit their ability to hire full-time professional planning staff.

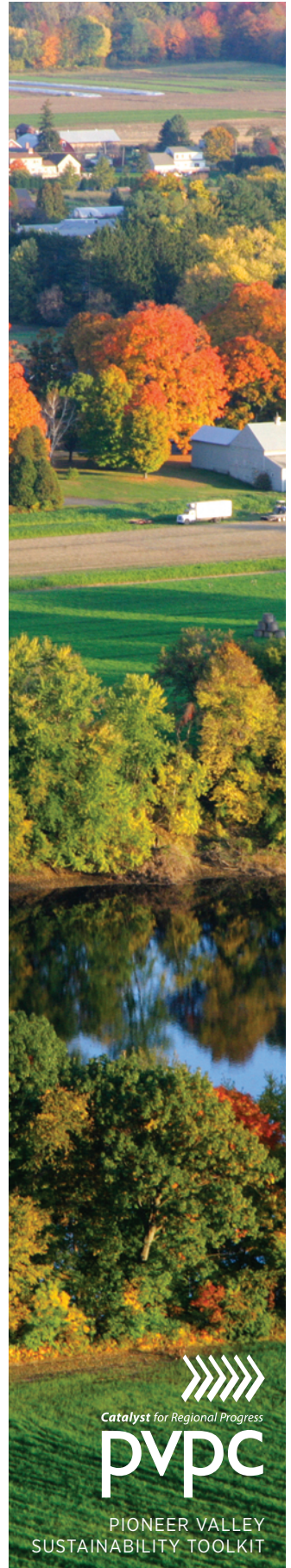
Under the PBA program PVPC will provide a planner on a fee-for-services basis. This planner will provide a higher level of technical assistance and attention beyond the free services available through our Local Technical Assistance (LTA) program. The PBA program is not a substitute for a town planner or community development professional, but is an extremely cost-effective alternative.

How does the PBA Program work?

If your community is interested in formalizing participation under the PBA program, the first step is to establish an agreement for services. This agreement will include a detailed scope of work describing the Planning Board's work priorities and the number of hours of professional planning services available to the community. Typically, the PBA year starts on July 1st and extends through the following June 30th, but shorter-term agreements for a specific project or task are also possible.

Through the PBA program, the Planning Commission will assign a professional land use planner with expertise in zoning and master planning services as the municipal's key contact. This planner will provide technical assistance to the Planning Board on a part-time basis, and will be available for Planning Board members to contact whenever questions arise. The planner will become familiar with local planning issues and problems.





DID YOU KNOW...

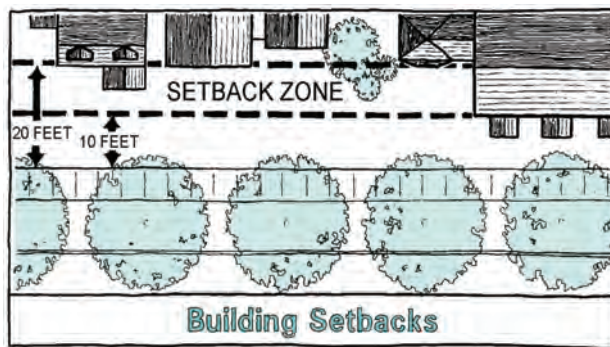
The town of Hadley has been participating in the PBA program continuously for over a decade

The local communities of Cummington, Granby, Longmeadow, Middlefield, Southampton and Westfield have also been recent participants

... The PBA program provides a cost effective alternative for small towns to afford professional planning services, as well as to assist current municipal planning staff.

Levels of Assistance

Under the PBA Program, communities can request a level of assistance that fits the community's budget and individual needs. PVPC staff will assist communities in determining the appropriate level of assistance.



Types of Planning Board Assistance

Planning Boards can create their own unique scope of services tailored to local needs through the PBA program. The following is a menu of planning services which could be included:

- » Assistance with the review of development proposals (subdivision and site plan review applications)
- » Review and comment on adequacy of existing zoning ordinances and bylaws or subdivision regulations
- » Review zoning ordinances and bylaws for consistency with state law
- » Creating development review intake and tracking systems
- » Assistance in re-drafting and updating zoning ordinances and bylaws or subdivision regulations
- » Updates on planning board requirements and responsibilities
- » Assistance in implementing smart growth tools and strategies
- » Urban Design

- » Visualization
- » Access to the key contact via telephone, e-mail and scheduled meetings for guidance and advice
- » Attendance at Planning Board meetings
- » Assistance in reviewing meeting agendas and meeting minutes
- » Planning Board training
- » Guidance concerning planning principles and planning law
- » Interpretation of local ordinances, bylaws and regulations
- » General municipal planning functions

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Stormwater Management Bylaws



Congamond Lakes Restoration Project, Southwick

What are the objectives of Stormwater Management?

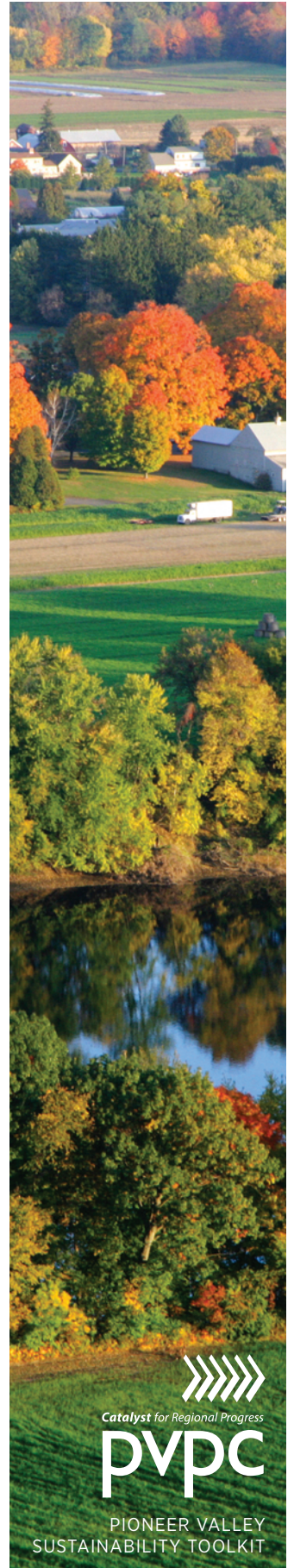
To regulate land activities which generate runoff by requiring on-site management of stormwater runoff, to protect public health and water quality by reducing pollution, flooding, siltation and drainage problems, and to help prevent increases in stormwater runoff, protect groundwater recharge, control erosion and sedimentation, reduce pollutants in runoff, and protect waterways.

Why do we need Stormwater Management?

As urbanization occurs, large areas of impervious surfaces are created by roads, buildings and parking lots. In turn these paved areas generate higher volumes of stormwater runoff at greater velocities and pollutant loads. Without controls, each new development incrementally increases the pollution of waterways. Pollution from urban runoff is now recognized as a significant source of water quality degradation that is virtually impossible to deal with without adequate stormwater controls.

How does a Stormwater Management bylaw work?

A stormwater management bylaw/ordinance can require all new development to provide a Stormwater Pollution Prevention Plan (SWPPP) and design that incorporates Best Management Practices (BMPs) to reduce runoff impacts. The plan's overall goal is to prevent post-development increases or decreases in the total volume or rate of stormwater discharges from the site, as compared with pre-development conditions. This goal could be achieved using stormwater controls or BMPs, such as vegetated swales, retention or detention basins, oil and grease separators, infiltration basins, constructed



wetlands or other measures. The stormwater plan includes a description of existing site characteristics including topography, soils, hydrology and floodplains. Calculations for pre- and post-development stormwater volume and rates of runoff are needed to size appropriate BMPs. The bylaw/ordinance contains specific design criteria for handling post development peak discharge for a particular storm event. For example, the bylaw/ordinance might require that the plan contain adequate control measures for a 24-hour storm event that occurs every 2, 10 or 25 years. The bylaw/ordinance also includes requirements for inspection and maintenance of BMPs during and after construction, with a performance bond to ensure maintenance.

DID YOU KNOW...

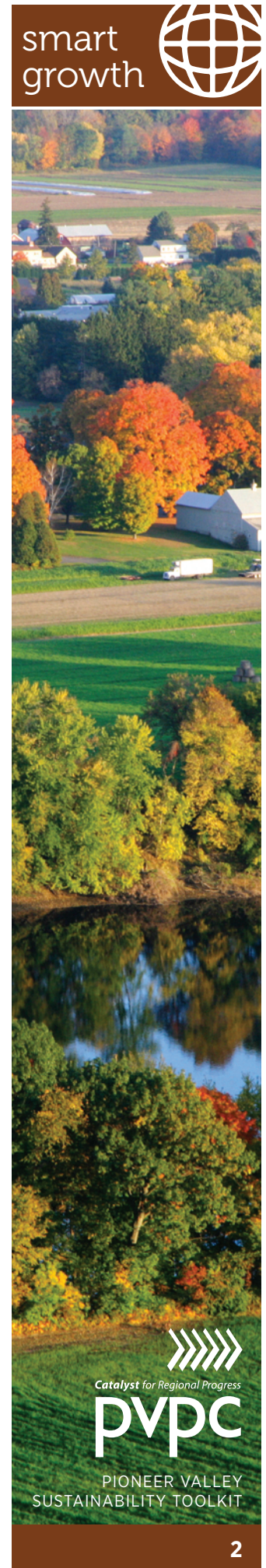
Stormwater runoff is our most common cause of water pollution. Rainwater and snowmelt run off streets, lawns, farms, and construction and industrial sites and pick up fertilizers, dirt, pesticides, oil and grease, and many other pollutants on the way to our rivers, lakes, and coastal waters. (US EPA)

EXAMPLES FROM THE PIONEER VALLEY

Stormwater Bylaws

In 1999, the U.S. Environmental Protection Agency promulgated the Storm Water Phase II Final Rule of the National Pollutant Discharge Elimination System (NPDES). The program is intended to preserve, protect, and improve the Nation's water resources from polluted storm water runoff. Three of the NPDES Phase II "Six Minimum Control Measures" required regulated municipalities to adopt and enforce regulatory mechanisms for controlling illicit discharges, construction site runoff, and post-construction runoff.

PVPC researched model bylaws from around the country and crafted a two model bylaws that addressed all of the NPDES Phase II review and control requirements for construction and post-construction runoff. These bylaws are known respectively as Illicit Connections and Discharges to the Municipal Storm Drain System and, Erosion and Sediment Control. Since development of the two bylaws, PVPC has worked with the communities of Chicopee, Northampton, Southampton, Westfield, and Southwick in tailoring the bylaw to address their specific needs. To date, the cities of Chicopee, Northampton and Westfield and the Town of Southampton have fully adopted both bylaws.



CASE STUDIES FROM OUTSIDE THE PIONEER VALLEY REGION

Additional case studies on Stormwater Management, can be found at the US Environmental Protection website on stormwater protection.

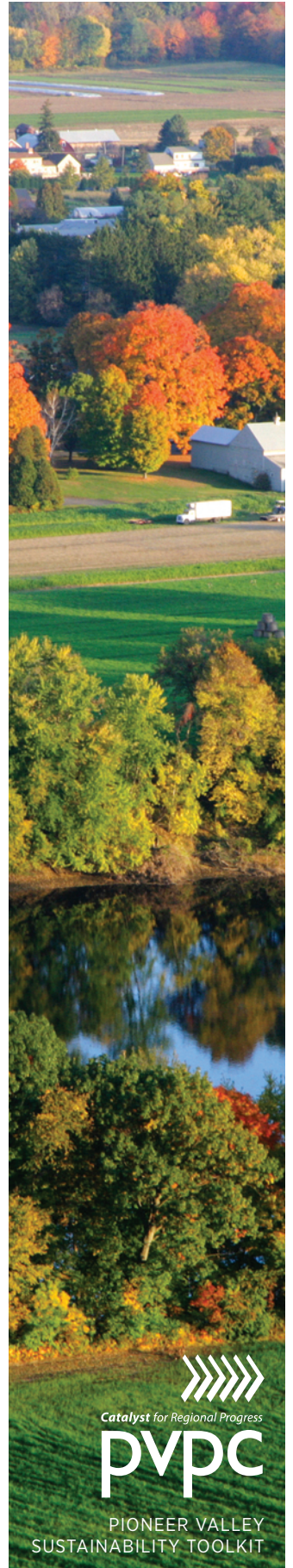
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Stormwater Utilities



Pequot Pond restoration project, Southampton

What is a stormwater utility?

Stormwater utilities are proven effective mechanisms for generating revenue to manage stormwater. Just like electric or water utilities, stormwater utilities collect fees from residents to pay for a ‘product’. Stormwater utilities are different from the other more established utilities as the ‘product’ being paid for is not something concrete and measurable like water or electricity. The product being paid for is stormwater management, and design to control or eliminate water pollution, erosion and flooding.

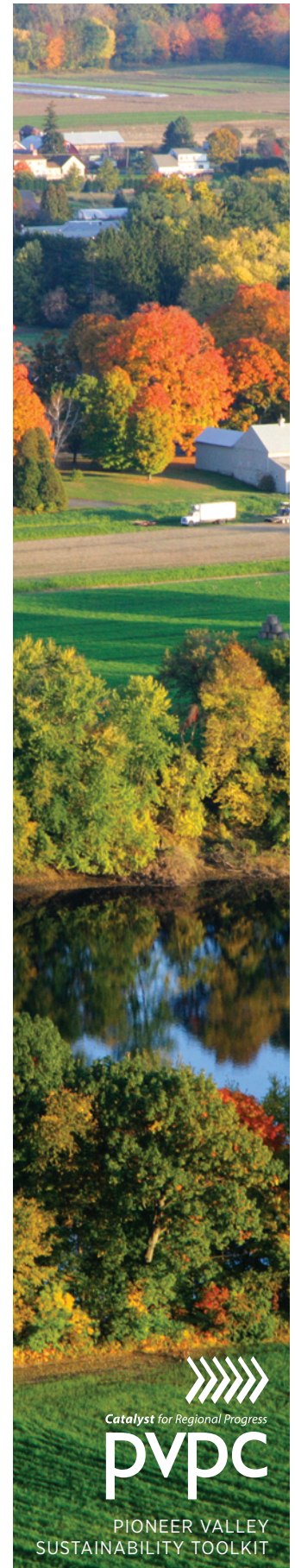
Why do we need stormwater utilities?

For hundreds of communities in Massachusetts, the National Pollutant Discharge Elimination System (NPDES) Phase II program prompted a shift in the way many cities and towns view stormwater programs. Unable or unwilling to fund stormwater management improvements out of general funds, a municipal stormwater utility offers a proven successful way for municipalities to generate the funds required to finance stormwater management programs and upgrade of existing stormwater facilities.

How do stormwater utilities work?

As a rule, municipal stormwater utilities are established by ordinance (or bylaw in the case of a town). The vast majority of these ordinances/bylaws are enacted by local government. Public referendum is also an option. Stormwater Utilities are, in a sense, a form of user fee in which the fee is based on the amount of stormwater run-off created by the development of a property. A fee is assessed to each developed property, and is calculated on the amount of the property’s impervious cover.

For more information on stormwater utilities and a thorough overview of legal issues, sample ordinances, and other technical information, please refer to the PVPC document “How to Create a Stormwater Utility” toolkit.



DID YOU KNOW...

that there are more than 360 stormwater utilities established across the country in 31 states?

EXAMPLES FROM THE PIONEER VALLEY

City of Chicopee Stormwater Pilot Program

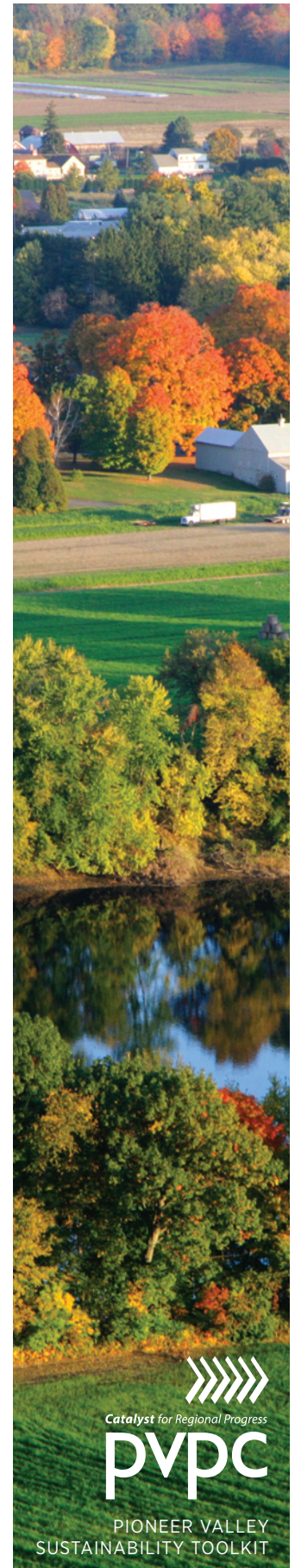
In 1998, the City of Chicopee implemented a pilot storm water utility or fee-based management program. Although the City of Chicopee did not establish a storm water utility per se, the city opted to incorporate storm water management into the existing Wastewater Department to save on administrative costs and take advantage of the expertise of the Wastewater Department's staff. Chicopee also passed an ordinance to collect fees from residents specifically for the purpose of managing storm water. The city conducted extensive research before instituting the storm water ordinance. Residents said that they would be willing to pay a new fee for storm water management if they were sure that the money would be used to address the problems directly affecting them, such as sewer back-ups during wet weather. The ordinance was therefore designed to address such concerns.

Instituting a specific storm water fee rather than increasing sewer fees to cover the costs of storm water management had two advantages. First, it meant that Chicopee could assess fees based on the amount of storm water generated by each property tied into the sewer system. Second, the city expects that over time, large storm water generators will begin to invest in best management practices and remediation measures to treat their storm water in order to reduce their storm water management fee, thus reducing the amount of storm water pollution being generated.

Chicopee's storm water management fee has been in place since December 1998. In the first year, the city raised some \$400,000 for storm water management; by the third year, revenues had increased to \$550,000. To date, the money has been used for activities such as stepping up cleaning of catch basins, purchasing a catch basin cleaning truck, grouting joints in the sewer system to stop leakage and inflow, stenciling storm drains, and cleaning sewer lines. Chicopee has also used the funds to leverage additional state loan funding for a \$5 million sewer separation project.

City of Westfield Stormwater Utility

In 2010 the City of Westfield adopted a formal Stormwater Utility Ordinance. The process took two years and involved numerous revisions to tailor it to the specific needs of the community. While similar to Chicopee's in many ways, it is important to note that each community needs to mold such ordinances to meet their own unique circumstances. While the City Council establishes the rate, the program is administered by the Department of Public Works as they are responsible for the city's stormwater



management system. Residential properties are assessed a flat fee while non-residential property fees are based on the amount of impervious surface on the property. The fees raise in excess of \$450,000 per year which are deposited into a special dedicated account that can only be used to defray the cost of administering and implementing the city's stormwater management program.

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Traffic Calming Measures



Raised pedestrian walkways (Speed Tables) near Amherst College

What are the objectives of traffic calming?

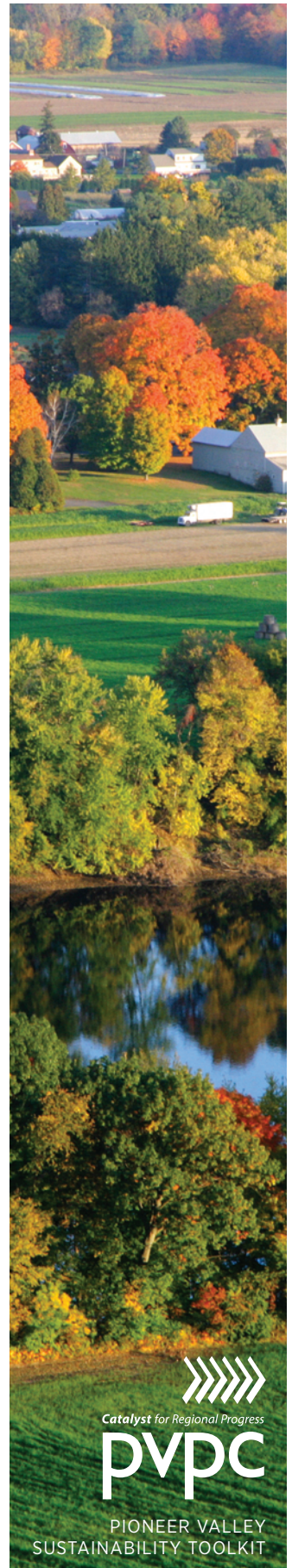
To improve neighborhood livability and pedestrian safety through the reduction of average travel speeds on residential roads.

Why are traffic calming measures needed?

Traffic calming relies on the installation of physical features to slow vehicle speed and enhances safety on local streets. Already used effectively in Europe for decades, traffic calming techniques are now being instituted in communities throughout North America. Reconfiguring the physical design a roadway is the most effective way to reduce speeding on residential streets, avoid traffic accidents and prevent fatalities. Cities with successful traffic calming programs have neighborhoods that are safer, more livable, and more enjoyable. Small, inexpensive retrofits of a roadway can result in speed and traffic volume levels that promote more livable communities.

How do traffic calming measures work?

Rather than relying on stop signs, speed limits and legal penalties (the regulatory approach) to reducing average vehicle speeds and promote safe neighborhoods, traffic calming has been introduced to change the driving conditions on roadways in such a way that traffic speeds and driver behavior are self-enforced. This is accomplished through incorporating design elements into the roadway--such as raised crosswalks, traffic roundabouts and traffic circles—that lead a driver to choose to travel at a reduced speed. This reduces the possibility of severe collisions between motorists, increases safety for



bicyclists and pedestrians, reduces erratic or aggressive driving behavior, and enhances the livability of neighborhoods and business districts through attractive street design.

DID YOU KNOW...

That there are three general types of traffic calming measures:

1. **Narrowing the Real or Apparent Width of a Street:** through pavement cross-section features, placement of street treatments and pavement edge treatments
2. **Deflecting the vehicle path:** such as chicanes, lane offsets, crossing islands and site-specific traffic circles; Introducing roundabouts, traffic circles, curb extensions
3. **Altering the vertical profile of the vehicle path:** such as speed humps and speed tables, raised crosswalks, and textured pavement

(Massachusetts Highway Department Project Development and Design Guide)

EXAMPLES FROM THE PIONEER VALLEY

Amherst College and the Town of Amherst

In 2002, Amherst College identified pedestrian safety as a major point of concern for its student population; this was due, in large part, to the presence of Route 9 and Route and 116 on the college's main pedestrian access points. To reduce the risk of pedestrian and automobile collisions, Amherst College began working with the Town of Amherst in 2003 to finance and design the first test Speed Table on Seelye Street (a minor collector off of Route 9). The successful application of a Speed Table at Seelye Street led to the installation of four major Speed Tables along College Street (Route 9) in 2004. Raised Speed Tables were installed at the crossings of Boltwood Avenue, Webster Circle, and Dickinson Street, and a pedestrian-activated system of flashing lights was also embedded within the Speed Tables to enhance night time visibility.

Amherst College performed an assessment of the section of College Street that the crosswalks were installed on to determine the effectiveness of this project. The findings from the assessment indicated that the average travel speed that existed before the installation of the Speed Tables, 47 miles an hour, was reduced to the posted speed limit of 35 miles per hour. This project relied on the third approach to achieving traffic calming (see inset), and successfully altered the vertical profile of the vehicle path.

This project has been a success with both residents and college students, and the Town of Amherst and Amherst College are proceeding with the installation of four crosswalks along South Pleasant Street (Route 116) to replicate the success of the College Street project. In addition to Speed Tables, the South Pleasant Street crosswalk project will install new curbing and add vegetated traffic islands to the roadway. These design features will accomplish the goals of redesigning the roadway to reduce travel speeds, enhancing pedestrian safety, and improving street design and neighborhood quality.



EXAMPLES FROM OUTSIDE THE PIONEER VALLEY

City of Cambridge, Massachusetts

The City of Cambridge has been extremely active in implementing traffic calming designs into their existing roads system. Please visit the city's Office of Community Development [traffic calming webpage](#) for more information on funded projects and resources on traffic calming.

Seattle, Washington: Neighborhood Traffic Circle Program

Please visit the [Neighborhood Traffic Circle Program](#) webpage for more details on this nationally recognized traffic calming program.

ADDITIONAL RESOURCES

Chapter 16: Traffic Calming and Traffic Management, Massachusetts Highway Department, Project Development and Design Guide, January 2006.

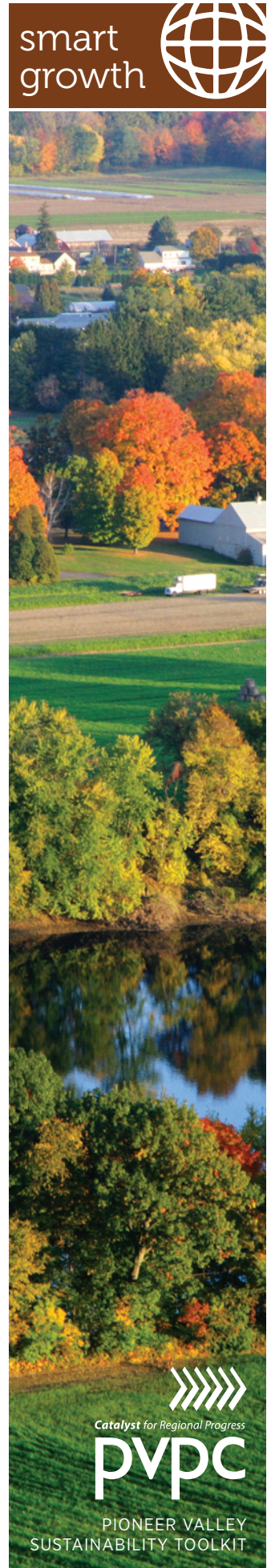
A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

FOR MORE INFORMATION, PLEASE CONTACT

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Trip Reduction



Rideshare Program in Washington State

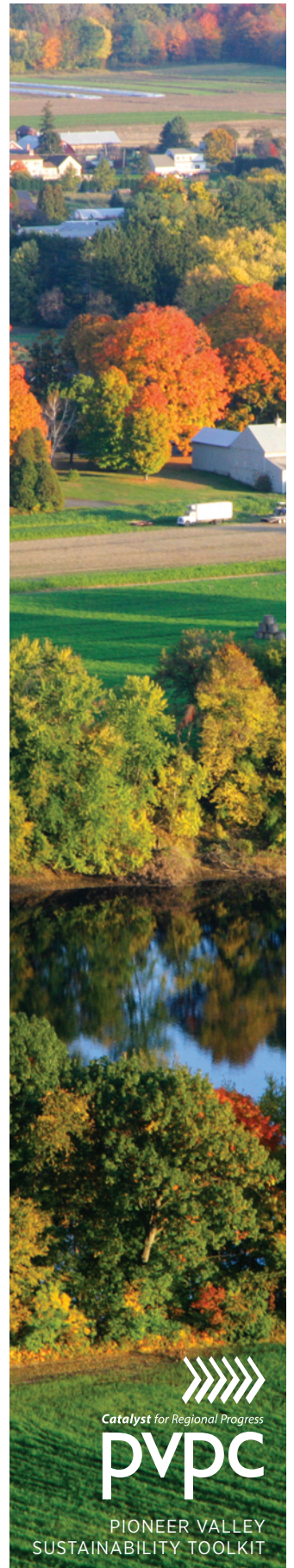
What is the objective of trip reduction?

Trip reduction programs give commuters alternative options to reduce single occupancy automobile trips by offering resources, incentives, or disincentives. Trip reduction strategies work to reduce the impacts of traffic on air pollution, greenhouse gas emissions, and congestion by requiring major employers and schools to develop, implement, and maintain a trip reduction program.

Why do we need to encourage trip reduction strategies in our community?

Excessive traffic can have many negative impacts on communities and individuals. By reducing the number of vehicle trips in our communities, we can minimize unhealthy air pollution, curb greenhouse gas emissions, limit noise, ease congestion, and increase health and convenience for individuals. Federal policy, as set forth in 49 CFR 614 requires Massachusetts to develop, adopt, and annually update a congestion management program to reduce emissions. The Clean Air Act Amendments of 1990 call for the adoption, implementation and enforcement of transportation control measures sufficient to assure the attainment of Federal ambient air quality standards in Massachusetts no later than 1999. Massachusetts' Department of Environmental Protection has an air pollution control regulation, 310 CMR 7.16, which requires the reduction of single-occupant commuter vehicle use. This regulation requires employers of 250 or more to provide incentives for public transit facilities and carpooling and requires employers of 1,000 or more to make vanpool amenities available to any interested group of at least ten employees.

Communities can set more ambitious trip reduction strategies by enacting trip reduction measures through local ordinances and bylaws. A municipality could enact an ordinance which goes even further than State regulation such as the City of Cambridge did with a Parking and Transportation Demand Ordinance (PTDM). This ordinance formalizes parking and transportation demand management planning, programs and coordination for all commercial and non-residential parking facilities over a certain size and requires that a PTDM management plan be approved by a PTDM Planning Officer for any development

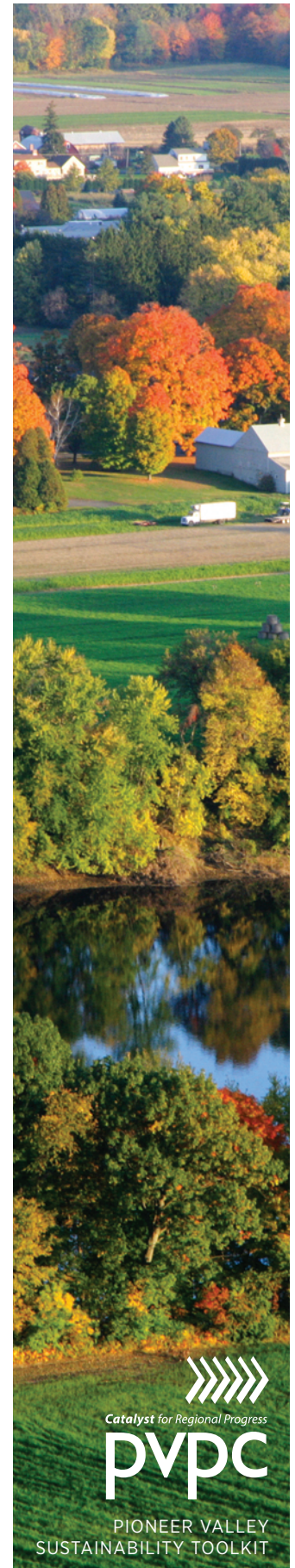


prior to receiving a permit or variance from the Planning Board. Cambridge's PTDM plan has been wildly successful in decreasing traffic congestion and increasing the use of bicycling and public transit. By reducing traffic impacts with trip reduction strategies, communities in the Pioneer Valley will remain and become more desirable places to live, work, visit, and do business.

How do trip reduction strategies work?

Communities can adopt a Trip Reduction Ordinance/Bylaw that establishes programs and requirements for new and existing employers and owners of employment complexes that will contribute to reductions in traffic and improvements in air quality from levels that would otherwise exist. Trip reduction measures consist of incentives or disincentives to reduce single-occupancy trips, or the rate of single occupancy vehicle miles traveled, such as:

- » A commuter matching service to facilitate ridesharing for commute trips
- » Providing of vans for vanpooling
- » Subsidies for carpooling or vanpooling including payment for fuel, insurance, or parking
- » Use of company vehicles for carpooling
- » Provision for preferential parking for carpool or vanpool users which may include close-in parking or covered parking facilities
- » Cooperation with other transportation providers to provide additional regular or express service buses to the work or school site
- » Subsidized bus fares
- » Construction of special loading and unloading facilities for transit, carpool, or vanpool users
- » Cooperation with a subdivision to construct walkways, or bicycle routes to the work site or school site
- » Provision of bicycle racks, lockers, and showers for employees who walk or bicycle to work or students who walk or bicycle to school
- » Establishment of a telecommuting program for employees
- » Establishment of a program of adjusted work hours which may include compressed work weeks or staggered work hours
- » Establishment of a program of parking incentives such as a rebate for employees or students who do not use the parking facility
- » Incentives to encourage employees to live closer to work or students to live closer to school
- » Provision of day care facilities
- » Emergency transportation services
- » Joining a Transportation Management Association



- » Incentives to encourage the use of certified vehicles for commute trips or, work-related trips
- » Establishment of a trip reduction committee to define new strategies and assist with the implementation of measures
- » Replace gasoline powered motor vehicles with electric golf-type carts or bicycles for traveling at the work site
- » Modify procedures to enable employees who normally commute for the sole purpose of picking up a company vehicle, to bring those vehicles home at the end of the work day to eliminate the commute trip.¹

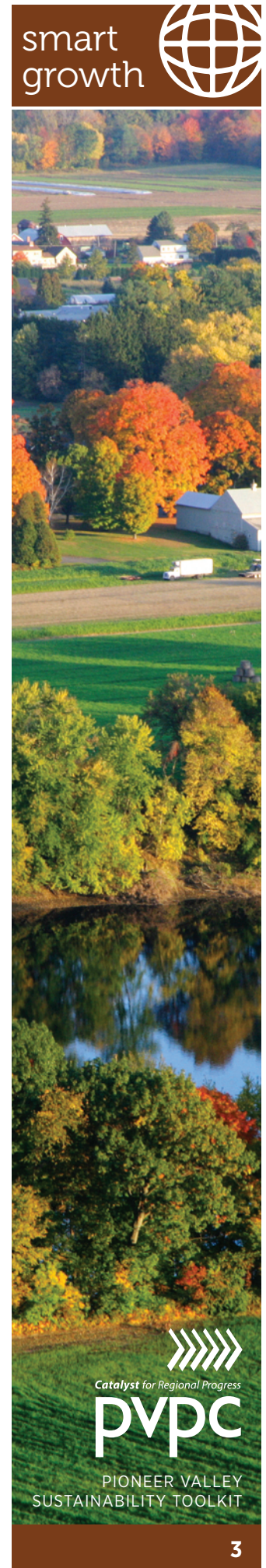
Alternatively, trip reduction measures may be incorporated into zoning bylaws as opposed to the creation of a separate Trip Reduction Ordinance. The Town of Hadley inserted trip reduction measures into their zoning bylaw for Commercial Site Plan Approval. The bylaw requires that any new building or new use of a building in excess of 10,000 square feet must submit a Trip Reduction Plan which clearly identifies a combination of transportation system management strategies designed to reduce anticipated vehicle trips by 35%. The Trip Reduction Plan includes measures such as vanpool/carpool incentive programs, on-site bicycle storage and locker facilities, and encouraging employee and customer use of transit services, amongst others. Additionally, the Planning Board may reduce minimum parking standards by a percentage for developments that make a long-term commitment to promoting employee and public use of transit, ridesharing, and other means of reducing single occupant vehicle trips.

DID YOU KNOW...

That as of the year 2000, 79.3% of commuters in the Pioneer Valley drove alone to work. Only 9.1% carpool to work, 2.5% use public transportation, 0.3% bike to work, 5% walk to work, and 3.1% work from home (US Census, 2000)

EXAMPLES FROM THE PIONEER VALLEY

The Pioneer Valley has a number of facilities, organizations and programs to help people share rides, either on public transportation or by private autos. These include ride sharing and park and ride lots. Ride sharing is increasingly popular as more facilities and programs for it become available and the price of auto fuel fluctuates. There are several opportunities for ride sharing in the Pioneer Valley, one of the most notable is MassRides. MassRides is a private non-profit organization working with MassDOT. The MassRides Employer Partner Program helps businesses and their employees cut commuting costs, shorten travel times, and improve the quality of commutes. MassRides holds commuter events at a participating business's worksites to provide information to employees. Also, MassRides can help set up carpooling, vanpooling, preferential parking, transit, teleworking, flexible work hour programs, or other cost saving programs, such as pre-tax payroll deductions of transit costs. MassRides Partner Program participants currently include Westfield State College, Solutia, Mass Mutual, Holyoke Community College and PVPC.





Additional Examples

<http://www.cambridgema.gov/CDD/Transportation/fordevelopers/ptdm.aspx>

Northampton allows parking requirement reduction up to 20% for employee parking on major projects (350-8.6) through site plan review. Also requires a trip-reduction plan through Site Plan Review for “new commercial, office and industrial buildings or uses over 10,000 square feet.” (see details at 350-11.5(3)b Ayers MA has similar incentives, though the criteria are different, and the method of requiring the trip-reduction plan is different and the criteria for writing trip-reduction plan is even more vague than Northampton’s. (Ayers zoning 6.4.2c and 9.4b)

http://www.ayer.ma.us/pages/AyerMA_About/zoningbylaws/zbylaws

Easthampton also has similar, and again fits it into the bylaw in a slightly different way. Their mdescription of the trip-reduction plan is the best of the three. (zoning 10.511 and 10.524)

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

FOR MORE INFORMATION, PLEASE CONTACT

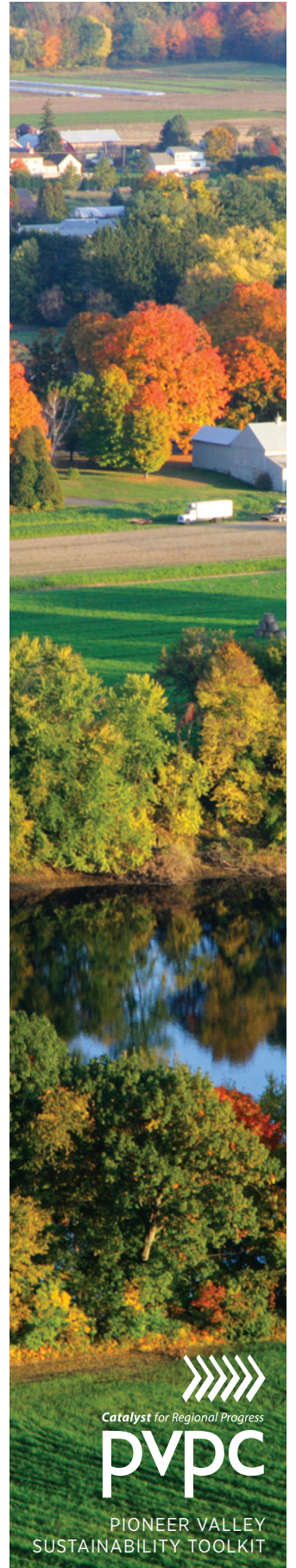
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Intergovernmental Compacts



The Chesterfield Gorge is located on the East Branch of the Westfield River. The Westfield River has been designated a National Wild and Scenic River thanks in part to the signing of the Westfield River Protection Memorandum of Agreement

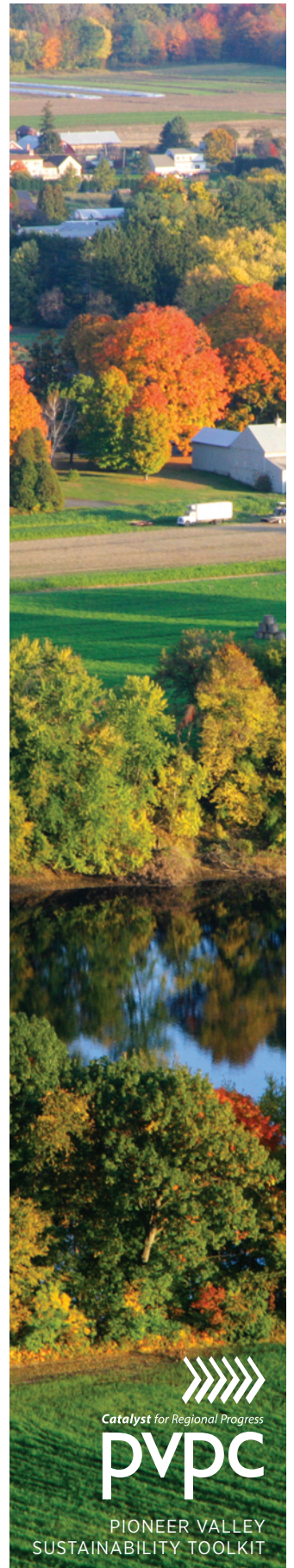
What are the objectives of an intergovernmental compact?

An intergovernmental compact is a cooperative effort between local, state, and/or federal government entities that binds the parties involved through joint exercises of power to actively participate in carrying out an agreed upon activity. The problems addressed by compacts were initially used primarily to settle boundary disputes. Compacts are now being used in an ever-expanding number and variety of fields that are relevant to planning such as: energy conservation, mass transit, education, pollution control, law enforcement and corrections, natural hazards mitigation, land use and water resources, and a myriad of other applications.

Why do we need to encourage intergovernmental compacts in our community?

Intergovernmental cooperation allows for economies of scale, the provision of specialized services that would not otherwise be available to small governments, maximum utilization of certain types of capital-intensive facilities, and specialization among governments. Such cooperative efforts also avoid the unnecessary duplication of governmental services, inefficient distribution of resources or expertise, and the need to change basic governmental structure.

A variety of challenges that face the Pioneer Valley are regional in scope and thus require the collaboration of multiple actors and stakeholders in order to be effectively addressed. Intergovernmental compacts are legally binding agreements that ensure that



the services, activities or undertakings detailed in the compact will be attended to by all parties involved for the duration of the compact. By entering into an intergovernmental compact, the parties involved can be assured that each member will be held accountable by other members for upholding their respective roles.

How do intergovernmental compacts work?

Communities may decide that it is mutually beneficial to work together and develop an intergovernmental compact on any issue of significance to more than one community. Examples of compact topics can range from protecting regional natural resources, to managing growth and development, to shared municipal services such as health agents or emergency call services. Chapter 40, Section 4A of the Massachusetts General Laws provides authorization for intergovernmental compacts and establishes that intergovernmental compacts may be entered into by the chief executive officer of a city or town, or a board, committee or officer authorized by law to execute a contract in the name of a government unit with other governmental units. Typically, an intergovernmental compact is managed through membership by involved parties on a commission, board, or other entity formed to oversee the cooperative efforts. A ‘governmental unit’ consists of a city, town or a regional school district, a regional planning commission, a regional transit authority, a water and sewer commission, a county, or a state agency as defined under Massachusetts General Laws. A governmental unit in turn may raise money by any lawful means, including the incurring of debt for purposes which it may legally incur debt, to meet its obligations under the compact agreement. No governmental unit is exempt from liability for its obligations under an agreement lawfully entered into.

Intergovernmental compacts detail the responsibilities and duties of participating governmental units through a ‘memorandum of agreement’. Participating cities and towns, for instance, may agree to pursue strategies such as the adoption and enforcement of new zoning bylaws, or the use of community funds to acquire lands of conservation interest. A regional planning agency such as PVPC may be required to assist municipalities in meeting their responsibilities and to monitor their compliance. State and Federal agencies may in turn be required to enforce all applicable laws and regulations as it applies to the aims of the intergovernmental compact.

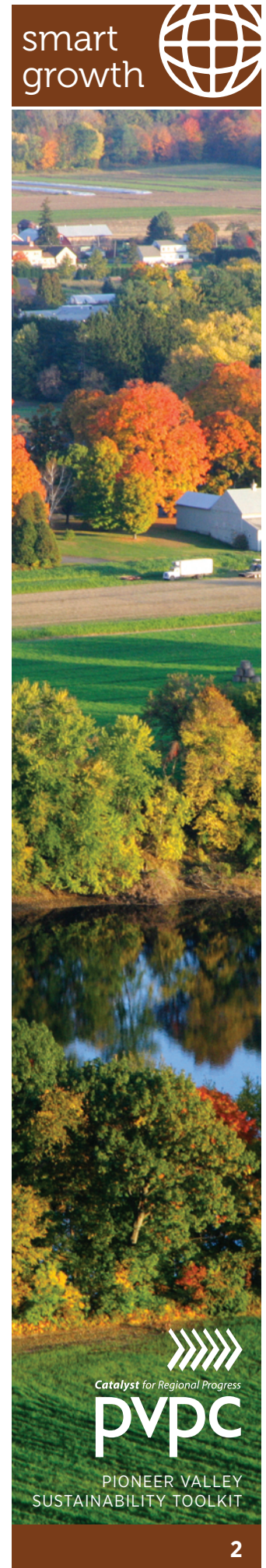
DID YOU KNOW...

That in 1990 six towns along the East Branch of the Westfield River, PVPC and the Westfield River Watershed Association signed a “Memorandum of Agreement” that was the first step leading to the Wild and Scenic River designation by the State.

EXAMPLES FROM THE PIONEER VALLEY

The Connecticut River Clean-up Committee (CRCC)

The Connecticut River Clean-up Committee (CRCC) is composed of representatives from four Massachusetts communities (Springfield, Chicopee, Holyoke, and Ludlow) and the Pioneer Valley Planning Commission (PVPC). Each of the municipal members are under EPA Administrative Orders to address the negative water quality impacts to the





The Connecticut River from atop Mt. Sugarloaf in South Deerfield. In 1993 the Connecticut River Clean-up Committee (CRCC) was formed by the signing of an intergovernmental compact

Connecticut River from combined sewer overflows (CSOs). CRCC was formed in 1993, with the signing of an intergovernmental compact between the communities and PVPC. The Committee is an action-oriented entity that explores funding sources and opportunities for intermunicipal cooperation on river cleanup. CRCC has been instrumental in leading efforts to secure federal funding for CSO control.

Over the past 20 years, the Connecticut River Clean-up Committee has made great strides in cleaning up the Connecticut River, with the support of our Massachusetts Congressional delegation. In fiscal years 1999 through 2010, CRCC worked to secure \$17.6 million in funding for clean-up of our rivers, including \$9.6 million in federal funds and \$8 million in matching local funds. CRCC has Using the CRCC as a vehicle, the members a high degree of inter-municipal collaboration has been achieved despite the absence of a metropolitan district commission. Key achievements of the regional collaboration as a whole include over one billion gallons/year in CSO discharges reduced, 18 miles of the Chicopee River and its tributaries have no CSOs, and the two largest CSOs on Connecticut River have been reduced by 415 million gallons per year.

Other intergovernmental compacts that have achieved success in the Pioneer Valley include the Barnes Aquifer Protection, Westfield River Protection, and Valley Vision Memorandums of Agreement.

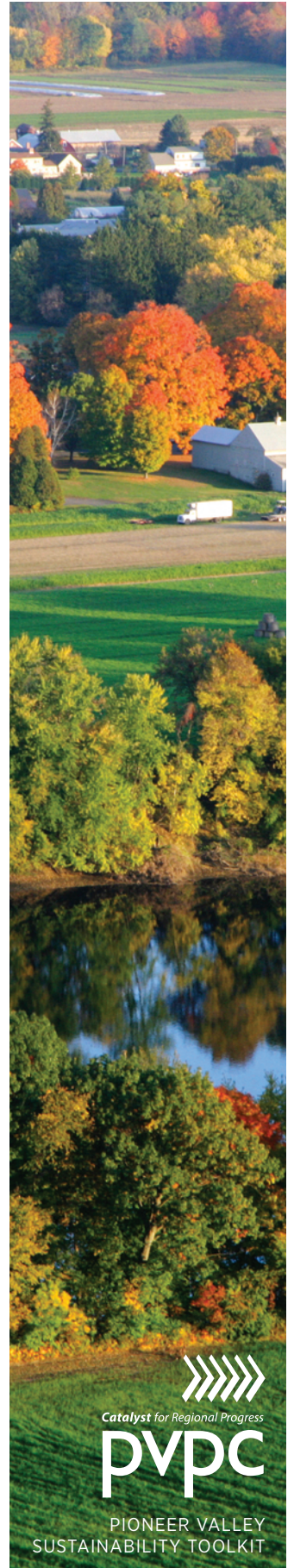
A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Accessory Apartments



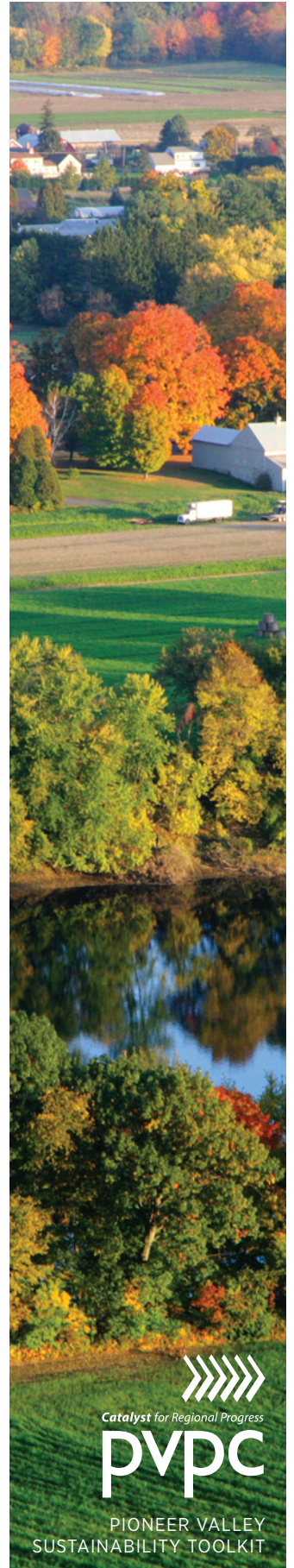
An accessory apartment over the garage in a single family house

What are the objectives of Accessory Dwelling Units?

To add rental units to the housing stock of a community, while protecting the residential character of a neighborhood or community. Accessory apartments can improve the affordability of housing for both homeowners and renters at all stages in their lives.

Why do we need Accessory Dwelling Units?

Rising housing costs in Massachusetts have made finding and staying in affordable housing difficult. For some homeowners, with limited incomes and rising real estate taxes, the income from an accessory apartment could mean the difference between being able to afford to stay in the community and having to move away. These apartments can also allow families to provide support to another family member such as a young adult or grandmother who can live independently close to the family home. Accessory units help to maximize use of existing public infrastructure and services since they are created on already developed sites. They can help reduce development pressure on “greenfield” sites like farmland and wooded sites..



How do Accessory Dwelling Units work?

Accessory dwelling units (also known as accessory apartments, granny flats, guest apartments, in-law apartments, family apartments or secondary units) provide supplementary housing that can be integrated into existing single family neighborhoods to provide a typically lower priced housing alternative with little or no negative impact on the character of the neighborhood. Because the units are usually small, they are more affordable than full-size rentals. Accessory dwelling units can be permitted and regulated through the adoption of zoning provisions.



Example of a detached accessory dwelling unit in Northampton, MA. Source: Dillon Sussman

EXAMPLES FROM THE PIONEER VALLEY

As of August 2007, there are 18 communities in the Pioneer Valley that have adopted Accessory Apartment Bylaws. Most of the communities in the region permit accessory apartments to be built within a single family home. These units are typically called “attached” accessory apartments, in that the new dwelling is incorporated within a single family dwelling, and therefore attached to the primary residence. Communities often encourage accessory apartments to be developed in this manner to ensure these new units blend within the existing neighborhood.

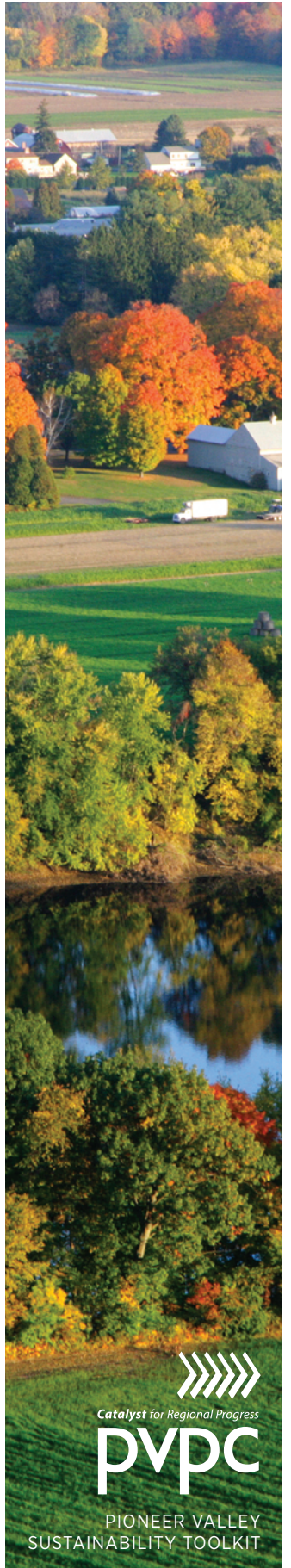
DID YOU KNOW...

There are three different types of Accessory Dwelling Units...

1. Interior – using an interior part of a dwelling.
2. Interior with modifications – the outside of the dwelling is modified to accommodate a separate unit. Also called “attached” accessory apartments.
3. Detached – a structure on a residential lot that is a separate from the main dwelling, yet by definition still “accessory” to the main unit.

The Town of Plainfield, however, recently amended its Accessory Apartment bylaw to allow accessory apartments to also be built within detached accessory buildings, such as a barn or detached garage. In Plainfield, the development standards for accessory

apartments are the same for both attached and detached apartments. The accessory apartments must be clearly subordinate to the primary structure, with the new unit being no larger than 1/3 of the existing primary, residential structure. By allowing residents the opportunity to build accessory apartments in these existing detached structures, the town has increased the possibility of the creation of affordable rental units to the existing housing stock, without significantly changing the character of the community.



Communities that have adopted an Accessory Apartment Bylaw

Amherst / Chester / Chesterfield / Easthampton / Granville / Huntington / Ludlow /
Monson / Montgomery / Northampton / Palmer / Pelham / Plainfield / Ware / Westfield
/ Wilbraham / Williamsburg / Worthington

For more information on examples of Accessory Units from across Massachusetts, please refer to the state’s **Smart Growth / Smart Energy Toolkit** developed by the Executive Office of Energy and Environmental Affairs.

A model bylaw or strategy is included in the **Pioneer Valley Sustainability Toolkit**.

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Agricultural Commissions

What are the objectives of an Agricultural Commission?

To create programs to protect prime farmlands, and incentives to encourage the growth and development of farm-related businesses.

Why do we need an Agricultural Commission?

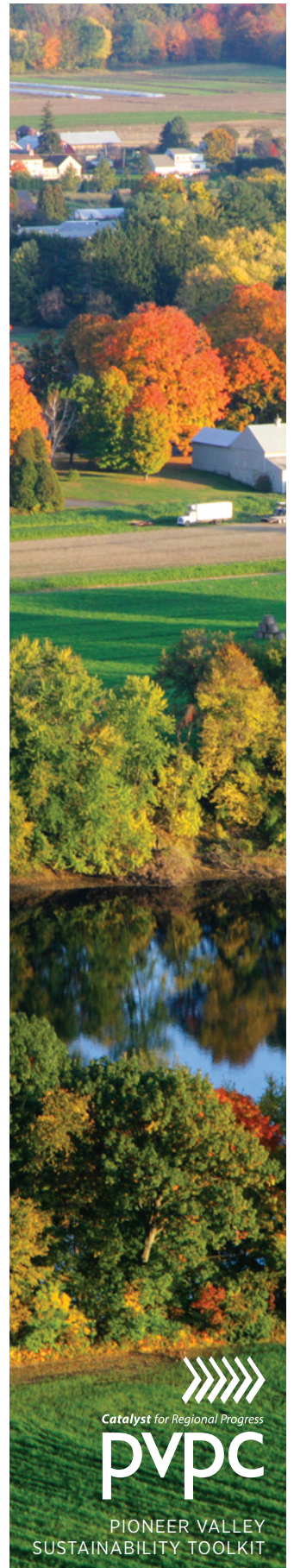
The incremental loss of farmlands and agricultural heritage is one of the major issues facing the Pioneer Valley region. Suburban sprawl is consuming acres of farmland and open space. The American Farmland Trust listed the Connecticut River Valley as one of the twenty “most endangered agricultural regions in the United States”. The protection and maintenance of farmlands in agricultural use is important in maintaining the region’s ties to its farming history, preserving open space and promoting smart growth.

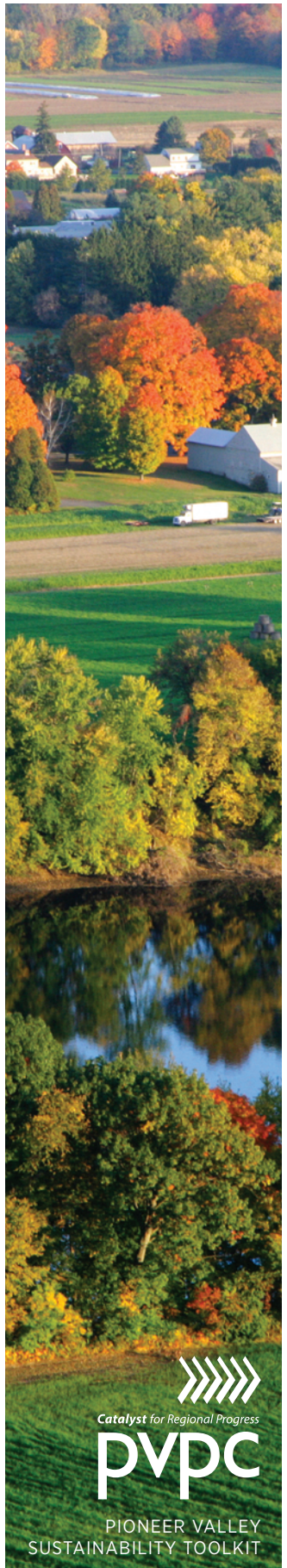


Tobacco Fields in Hadley

What does an Agricultural Commission do?

An Agricultural Commission is an appointed town standing committee, usually comprised of farmers, that provides a voice for the agricultural community and improves the visibility of farming in the community. Agricultural commission can tackle a whole variety of tasks, depending on the community. Here in the Pioneer Valley, Ag Commissions have sponsored Right-to-Farm bylaws, inventoried and identified agricultural properties in the community, created guides and brochures for community farms, researched information and educational resources for farmer, and have hosted community agricultural events. Ag Commissions can also advocate at the local and state level for zoning and regulatory changes that benefit existing and future farming, and work with other town boards and committees, such as the Planning Board, to ensure that the community actively retains agricultural and forest land and agricultural businesses.





DID YOU KNOW...

The Pioneer Valley Planning Commission can assist your local Agricultural Commission in developing an inventory of existing farms in your community as well as develop a map with Chapter 61A lands, agricultural lands, prime agricultural soils, and parcel data (if available).

EXAMPLES FROM THE PIONEER VALLEY

Town of Hatfield Agricultural Commission

The Town of Hatfield adopted their Agricultural Advisory Committee (ACC) in 2001 and has been extremely active in promoting agricultural activities in their community. In its first year, the ACC sponsored two educational seminars on farm support and farmland protection efforts, one for town officials and another for farm and forest land owners. The ACC also researched and assisted in the implementation of agricultural water rates for farm operations in town.

Other notable activities include a brochure developed by the ACC entitled “Hatfield Farms,” which highlights farms and farm stands throughout town with product and sales information for each, including a map locating each establishment. Over 2,500 copies of the brochure were distributed at Town Meeting in 2004, with an update brochure distributed in 2005.

Communities that have established Agricultural Commissions

Amherst / Belchertown / Blandford / Chester / Chesterfield / Cummington / Granby / Granville / Hadley / Hatfield / Ludlow / Middlefield / Monson / Montgomery / Northampton / Plainfield / Southampton / Southwick / Westhampton / Wilbraham / Williamsburg

Finally, in 2005, with seed money from the Massachusetts Cultural Council, the Hatfield ACC commissioned a mural with the town’s high school art program depicting farm scenes, activities and farmers in town. The mural was then displayed on a barn in a prominent location in town, then moved to the town’s farm museum for the winter. Due to the large success of the first mural, a second mural was recently completed and third mural will be completed next year. The town plans to display the three murals each spring.

For more information on Agricultural Commissions, and to access a copy of the “Agricultural Commission Handbook,” please visit the [Massachusetts Department of Agricultural Resources website](#).

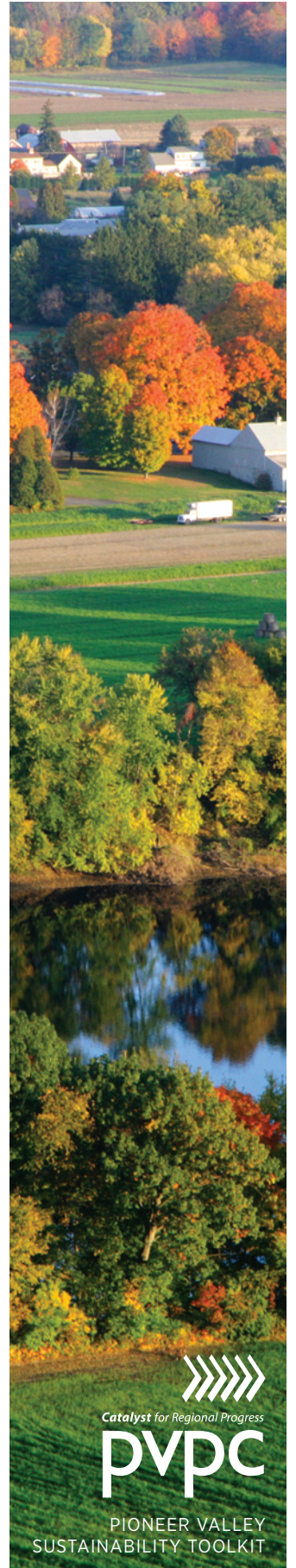
A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Catalyst for Regional Progress

PVPC

PIONEER VALLEY
SUSTAINABILITY TOOLKIT

Chapter 40R – Smart Growth Districts



Former Holyoke Catholic High School

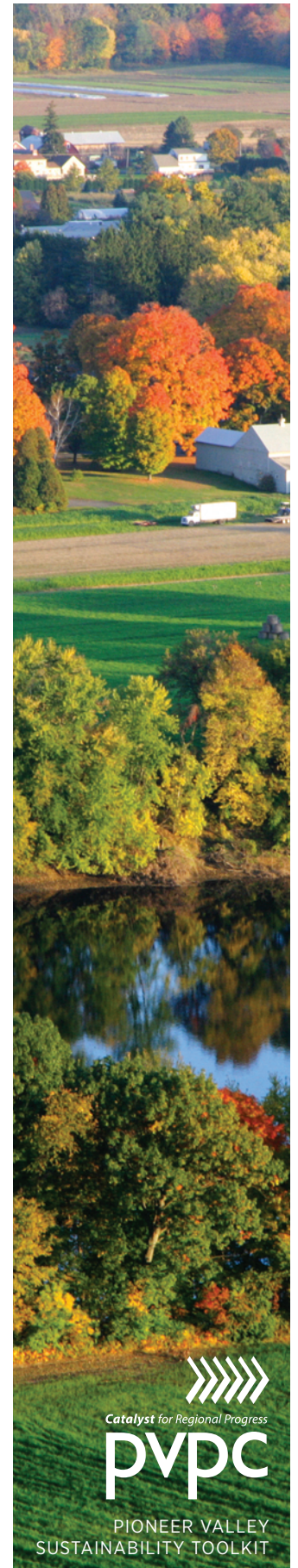
What is a Smart Growth District?

This is a district in which the community has decided it would like to encourage housing and mixed use (residential and office or retail uses together in one area). Usually these districts are located in or near town centers and help to maintain the character of the community's 'downtown'. At least 20% of the housing units created in this district will have to be affordable to families who make approximately \$50,000 per household annually.

Why do we need Smart Growth Districts?

Well-designed residential, commercial and mixed use development can be a valuable addition to a community's tax base, a source of jobs, and an attractive component of the character of the community center(s). Adopting a Smart Growth Zoning District can:

- » Create a range of housing and transportation options for residents;
- » Foster a sense of place by encouraging distinctive and attractive neighborhoods & centers;
- » Take advantage of the quality of life improvements that can be gained by mixing housing, commercial activities, access to open space, and transportation options;
- » Preserve farmland and critical environmental areas by directing growth to areas with existing infrastructure; and
- » Earn the community priority for state funding programs that are part of the state's Commonwealth Capital program.



Also, the municipality will be eligible for an incentive payment of between \$10,000 and \$600,000 depending on the number of new units that this district allows. These funds are unrestricted and may be used to meet the community's needs.

How does this strategy work?

In its zoning ordinance or bylaw, a municipality may adopt a smart growth zoning overlay district in an eligible location, as defined by the Chapter 40R enabling legislation. Within this district, a city or town shall zone for primary residential use as of right and may also permit business, commercial or other uses by right or by limited site plan review. The minimum density requirements within a Smart Growth District are 8 units/acre for single family homes, 12 units/acre for two and three family homes, and 20 units/acre for multifamily units. The community also develops design standards for this district to assure that the required density is achieved in a way that preserves and reflects the existing character in the town's district.

DID YOU KNOW...

Chapter 40S is additional state funding that is directed to cities and towns that establish a 40R district, to cover the costs of educating any school-age children who move into such districts. This legislation was in response to the common concern that new housing was costly in terms of municipal finances, given the imbalance of tax revenues and service costs. Qualifying communities will be reimbursed for the net cost of educating students living in new housing in smart growth districts.

EXAMPLES FROM THE PIONEER VALLEY

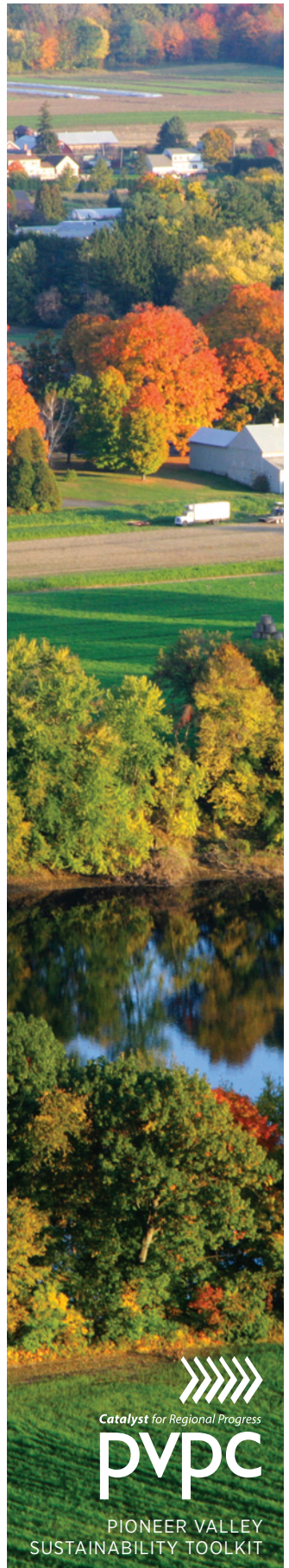
Sub-regional Smart Growth Zoning Districts Approach

Easthampton, Holyoke and Westfield applied together and were awarded Priority Development Funds to create Smart Growth Zoning Districts and are working with Pioneer Valley Planning Commission staff to achieve this.

Communities in Massachusetts that have adopted a Smart Growth District

Amesbury / Chelsea / Dartmouth / Haverhill / Lakeville / Lunenburg / North Reading / Norwood

In the first stage of the process, areas that could be eligible for smart growth districts were mapped based on the 40R eligibility criteria and draft smart growth overlay ordinances and design standards are being developed. In the next stage of the process an advisory committee from each community will review the potential smart growth district maps and draft bylaw for their city. There will be a public outreach effort in all three communities prior to the adoption of a 40R Smart Growth District or the submission of a 40R application to the Department of Housing and Community Development.



As part of the 40R application to DHCD, housing needs assessments are being completed and/or updated and community housing goals and strategies are being developed.



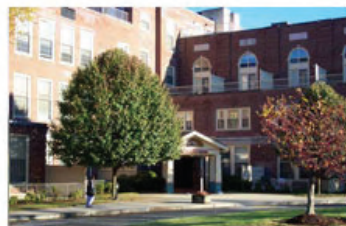
8 Units Per Acre



12 Units Per Acre



20 Units Per Acre

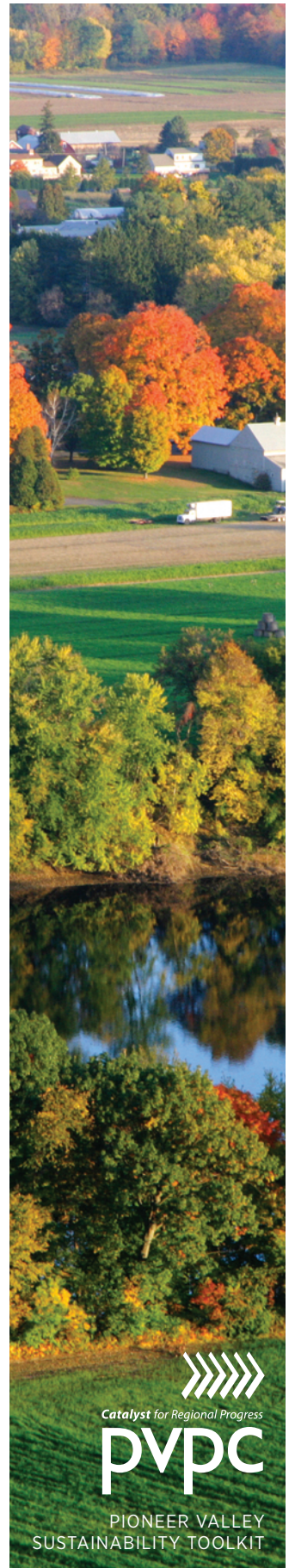


Source: Massachusetts Smart Growth Toolkit

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Commercial/ Industrial Development Performance Standards

What are the objectives of commercial/industrial performance standards?

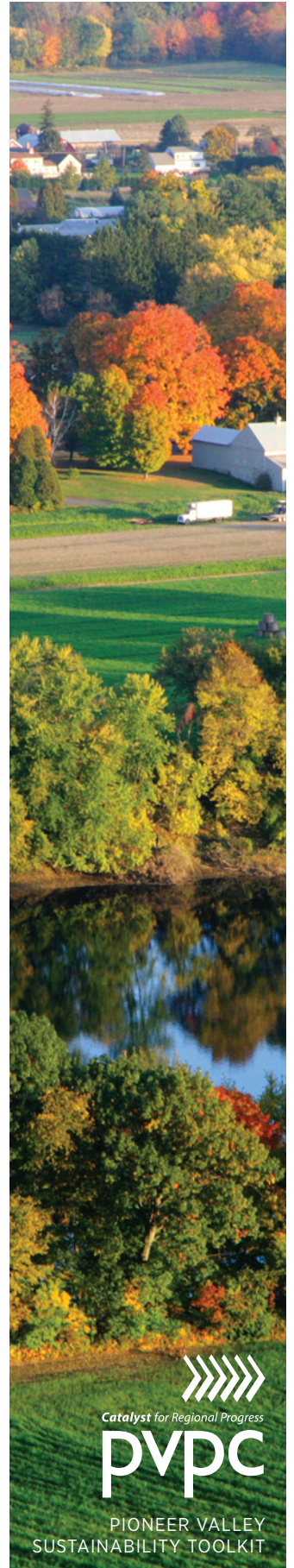
To control potential adverse impacts of new commercial or industrial development on traffic safety, existing residential neighborhoods, community character and the environment.

Why do we need commercial / industrial performance standards?

Uncontrolled commercial or industrial development can create traffic congestion problems on local roads and traffic safety hazards due to poor access layout or inadequate parking. Community character and adjacent property values can be degraded by poor design, lack of landscaping, uncontrolled signage or lighting. Environmental degradation, such as water pollution by toxic chemicals, soil erosion and flooding due to uncontrolled stormwater runoff can also occur without proper controls.



Downtown Palmer



Commercial and industrial performance standards establish specific standards in several categories. These are essentially “good neighbor” standards because they minimize adverse impacts on surrounding properties and the community. Standards for “access and traffic impacts” are designed to minimize traffic and safety impacts on highways and roads by minimizing curb cuts, encouraging shared access, requiring all driveways to have safe sight distances for exiting motorists, and providing sidewalks and safe internal circulation plans. Parking standards encourage parking areas located to the rear or side of buildings, and shared parking areas between businesses. Landscaping standards require a landscaped buffer strip along all public road frontage, landscaped islands in large parking lots, and screening of storage, machinery or service areas. Appearance and architectural design standards require that commercial and industrial building designs be compatible with the rural and historic character and scale of existing buildings in the neighborhood and the community. Stormwater runoff and erosion control standards ensure that runoff from commercial and industrial properties will not result in water pollution or flooding. Water quality standards are established for outdoor storage of hazardous materials. Lighting standards limit the height of light poles and require shielding of outdoor light fixtures to reduce light pollution.

DID YOU KNOW...

With conventional suburban parking ratios of five spaces per 1,000 square feet of building space, at least 50% more square footage will be devoted to parking that to space under roof. (Making Smart Growth Work, Urban Land Institute, 2002)

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

FOR MORE INFORMATION, PLEASE CONTACT

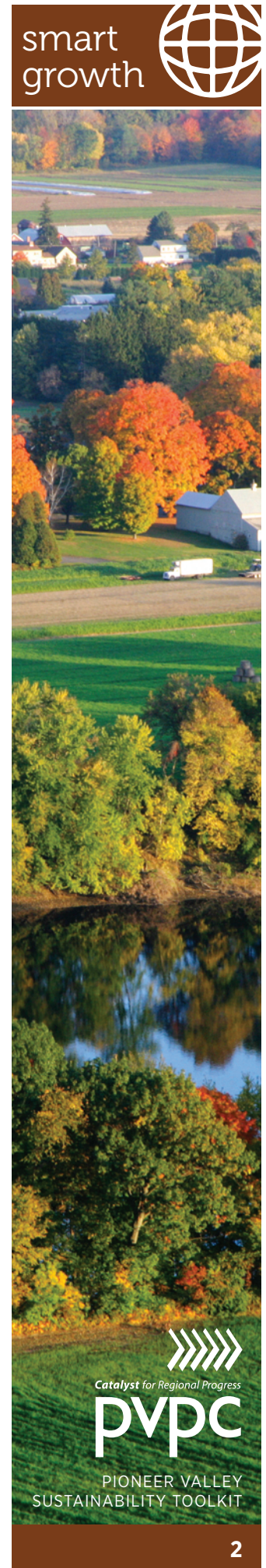
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The Community Preservation Act



CPA funds were used for the protection of Echodale Farm in Easthampton. Photo courtesy of the Easthampton Master Plan Committee

What are the objectives of the Community Preservation Act?

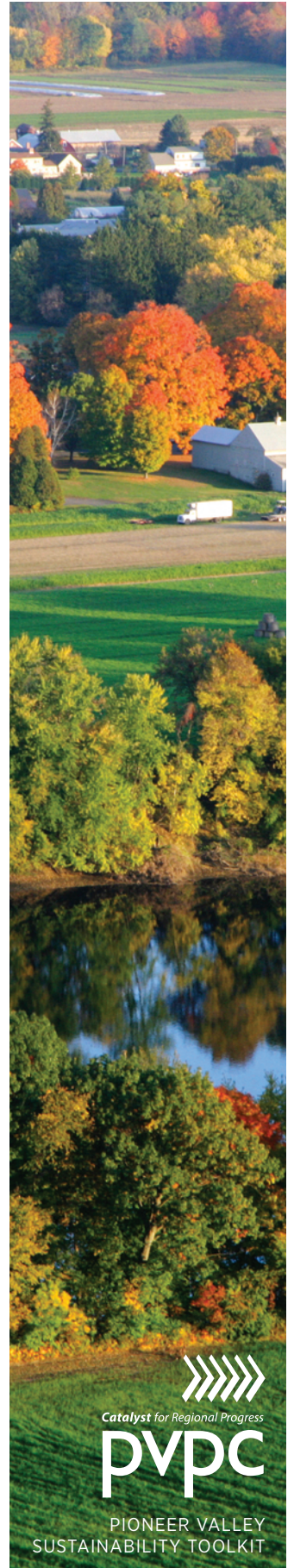
To help communities preserve open space and historic sites, and create affordable housing and recreational facilities through a reliable funding source.

Why should we adopt the Community Preservation Act?

Adopted in 2000, the Massachusetts Community Preservation Act (CPA) is a critical tool to enable communities to protect open space, protect historic resources, and provide affordable housing for low and moderate income individuals and families, including low or moderate income senior housing. The CPA has been heralded by the Trust for Public Land and other organizations, as one of the most important environmental protection tools in the country.

How does the Community Preservation Act work?

The Community Preservation Act (CPA) enables communities to establish, through a ballot referendum, a local Community Preservation Fund dedicated to historic preservation, low and moderate income housing, and open space including active and passive recreational uses. Revenue for the fund is generated through a surcharge of 0.1 to 3% of the local property tax. While local adoption of the Act is optional, the Commonwealth is providing, as an adoption incentive, state matching funds totaling approximately \$26 million annually. This funding incentive will match up to 100% of the money raised annually by a community through its surcharge.



Passage of the Act on the community level is a two step process. First, a community must place the CPA on the ballot by obtaining approval of Town Meeting or City Council. Alternatively, a petition of 5% of registered voters can place the CPA on the ballot. Second, once on the ballot, a majority of voters is required to make the CPA law. The CPA is designed to maximize spending flexibility to enable each community to meet its unique needs. A minimum of 10% of annual funds must be spent for each category of historic preservation, affordable housing, and open space. The remaining 70% of funds may be spent in any category. A community may reserve funds to be spent in later years. Additionally, funds may not be used to supplant existing operating funds already dedicated to similar purposes.

DID YOU KNOW...

In 2006, the state distributed \$58.6 million to 102 communities in matching funds. Since 2002, the state has distributed a total of \$180.6 million.

EXAMPLES FROM THE PIONEER VALLEY

City of Easthampton

The City of Easthampton adopted the CPA in 2001, at a 3% surcharge and an exemption for the first \$100,000 of the assessed value of a residential home. Since 2001, the city has spent a total of \$1.5 million dollars on fourteen (14) projects using local and state match CPA funds, on historic preservation projects, affordable housing, open space protection, and recreation.

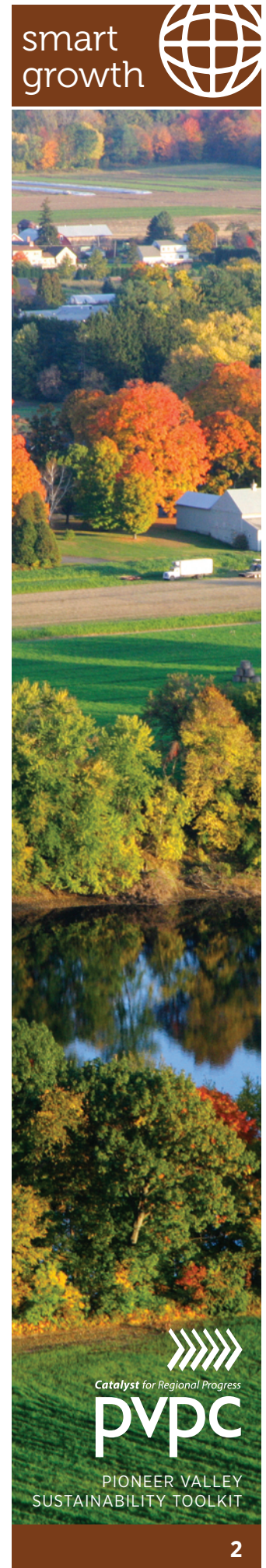
Communities that have adopted the Community Preservation Act

Agawam / Amherst / Belchertown / East Longmeadow / Easthampton / Goshen / Hadley / Hampden / Hatfield / Longmeadow / Monson / Northampton / Southampton / Southwick / Westfield / Wilbraham

The greatest percentage of funds (66%) have been used for open space protection, particularly the acquisition of Echodale Farm, a 164 acres of pristine farmland and open space within the Park Hill region of the city. The Echodale Farm acquisition utilized \$650,000 in CPA funds to match APR and private donations. The CPA also provided \$300,000 in funds for dredging of Nashawannuck Pond, a mill pond located within the center of the city. The city is making great efforts to revitalize this water body and restore environmental quality to the pond.

The CPA has also funded in Easthampton:

- » Five historic preservation projects, including the repairs and improvements to many historic structures throughout the city. (\$244,000)
- » Three recreation projects, including restoration of ball fields and the creation of Lower Mill Pond Park. (\$152,130)
- » Three affordable housing projects. (\$120,000)



Project recommendations are made by the Community Preservation Committee to City Council. The committee is nine members as established by local ordinance. The six core committees represented are the Planning Board, Conservation Commission, Parks and Recreation Commission, Housing Authority, City Council Finance Committee, and Historic Commission. The remaining members are appointed by the City Council President, and Mayor. Final appropriations are made by the City Council.

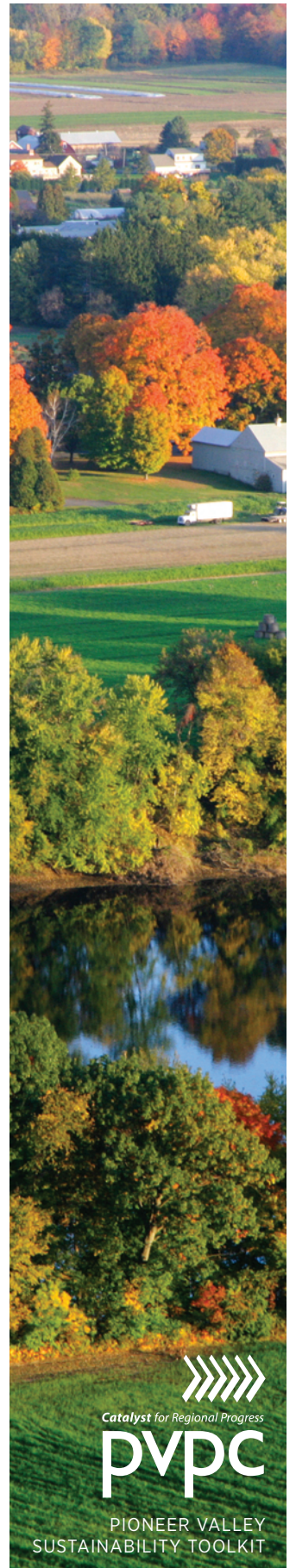
A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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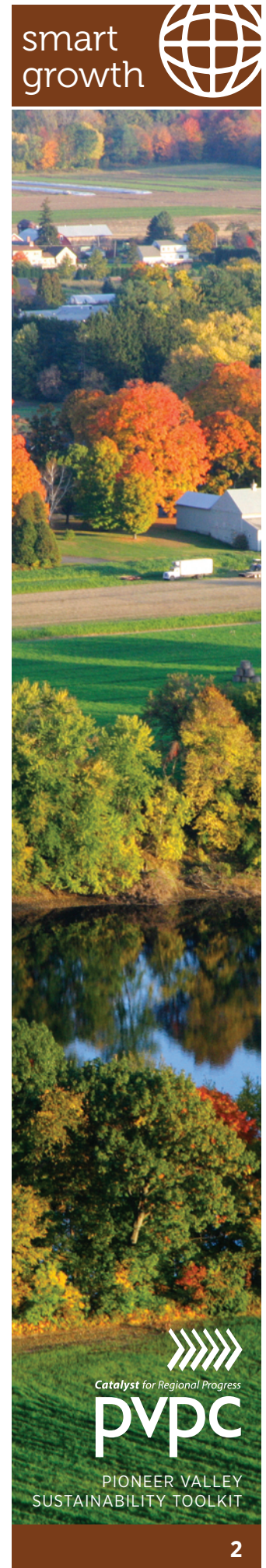
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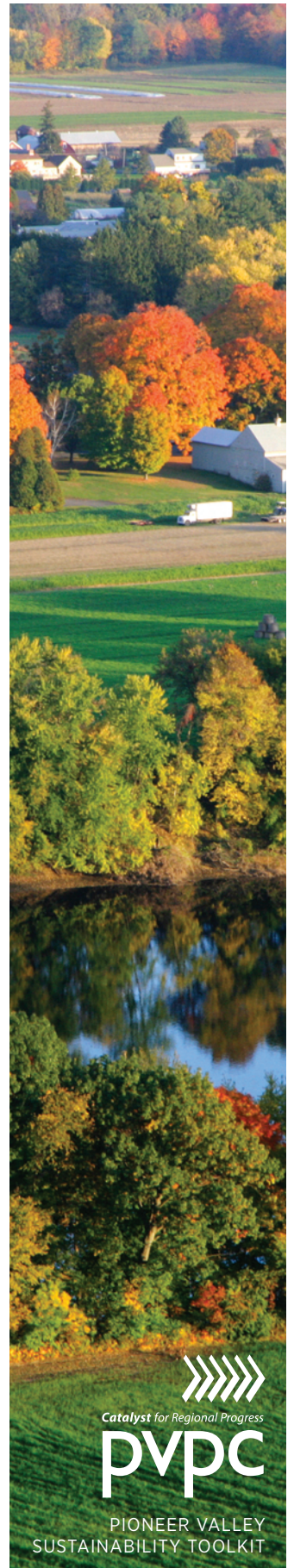
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Commercial Site Plan Review



King Street, Northampton

What are the objectives of site plan review?

To promote standards for new business development and advance the appearance, traffic conditions, shopping atmosphere and opportunities in pertinent zoning districts.

Why do we need commercial site plan review?

Commercial and industrial growth is important for any community's tax base and can benefit the community by providing needed jobs and services. However, without proper local review, large-scale projects such as shopping centers or industrial parks can have significant impacts on traffic, neighboring properties and community character. To prepare for the new forms of development anticipated today and beyond, communities need a site plan approval process for commercial and industrial uses.

How does commercial site plan review work?

To streamline the process, Site Plan Approval is usually undertaken simultaneously with the Special Permit review process. In general, the types of projects which require site plan approval include retail services, wholesale, transportation and industrial uses, community facilities, commercial earth removal operations, and multi-family residential uses. Other more simple projects usually require only administrative site plan review. Depending on the use, the Special Permit Granting Authority may be the Planning Board, Zoning Board of Appeals, or Board of Selectmen.

A site plan approval bylaw/ordinance sets forth specific procedures for application, review and approval of both Special Permits and Special Permits with Site Plan Approval. Such regulations include a description of the necessary application contents for basic Special



Permits and for Special Permits with Site Plan Approval. The procedures are described for review by municipal boards and for joint public hearings on both the Special Permit and Site Plan Approval, where necessary. Detailed criteria are established for evaluating site plans and special permits in order to ensure a fair and objective review process. The Special Permit Granting Authority's final action on a site plan may be to either approve, approve with modifications, or deny the application. After approval of the site plan, the Special Permit Granting Authority then takes action on the Special Permit.

DID YOU KNOW...

Special Permit with Site Plan Review: This is a clearly designated Special Permit Process that follows all requirements for public hearing and application review timeframes

Site Plan Review: This is an administrative review process only, not a Special Permit process, and applies to certain uses permitted as a matter of right.

EXAMPLES FROM THE PIONEER VALLEY



Hadley Commercial Strip Standards

In the mid-1980s, commercial development along the Route 9 corridor in Hadley began to accelerate at an alarming rate. The Town of Hadley recognized that unmanaged growth along the corridor would have detrimental results on the scenic, rural, and historic character of the town. In 1989, the town adopted the Commercial Site Plan Approval Standards that would help Hadley control development along this commercial corridor. The purpose of these standards is to discourage unlimited commercial strip development by promoting compatible architectural design and safe traffic guidelines in order to protect the rural character of Hadley. These standards require site plan review for any new or expansion of commercial developments with the Business, Limited Business and Industrial zoning districts. In order to receive site plan approval, all commercial projects within these zones must comply with a series of performance standards developed by the planning board. The Hadley bylaws also include trip reduction requirements and traffic impact statement requirements for large developments.

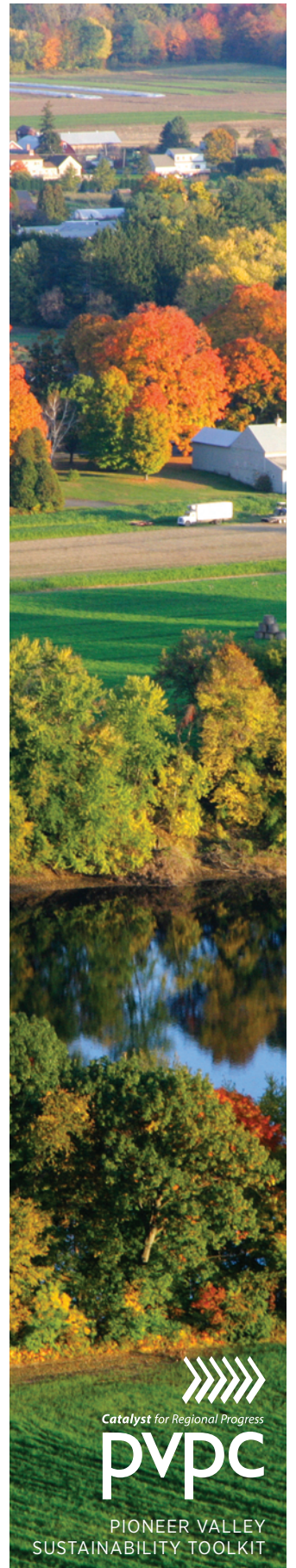
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Catalyst for Regional Progress

PVPC

PIONEER VALLEY
SUSTAINABILITY TOOLKIT

Comprehensive Zoning Overhaul



ANR development in the Valley

What are the objectives of a comprehensive zoning overhaul?

To encourage and support reform at the local level of outdated and inefficient zoning regulations that promote sprawl to more efficient growth patterns.

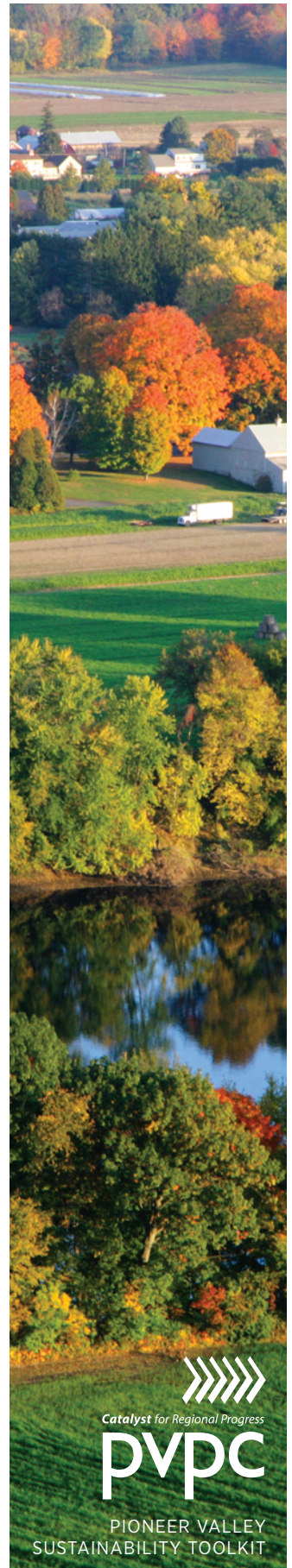
Why do we need comprehensive zoning overhaul?

Antiquated local zoning laws that prescribe sprawl as the preferred development pattern should be updated to promote more efficient growth patterns. While the responsibility for land use planning and regulation rests with each of Massachusetts' 351 cities and towns, the authority to do so effectively is often undermined by the state's out-dated and unduly limiting Zoning Act.

What steps can communities take to complete a comprehensive zoning overhaul and update?

One tool that communities can use to ensure that their zoning regulations are consistent with current state law and to encourage or require Smart Growth strategies is called a Comprehensive Zoning Overhaul and Update. A Comprehensive Zoning Overhaul and Update is a critical review of a community's existing land use regulations relative to internal consistency, consistency with state law, and Smart Growth. Such reviews provide recommendations to help the community achieve three important objectives with its zoning bylaw/ordinance:

1. Bring the zoning bylaw/ordinance into compliance with current state law, Chapter 40A of the Massachusetts General Laws.



2. Identify and correct errors, omissions and unclear language in the zoning bylaw/ordinance.
3. Develop and refine regulations that allow for locally-appropriate development within the community while preventing adverse impacts to natural areas, neighborhoods and to citizen safety.

DID YOU KNOW...

New development in the Pioneer Valley is primarily residential, despite the fact that the population has remained stable over the past 30 years. Between 1971 and 1999, over 30,000 acres were converted to residential development, mostly in the form of “ANRs” or Approval Not Required development.

EXAMPLES FROM THE PIONEER VALLEY

Smart Growth Technical Assistance Grant Program

The Commonwealth of Massachusetts provided the Pioneer Valley Planning Commission with grant funds to review the zoning bylaws and zoning ordinances for several communities in Hampshire and Hampden Counties. Land Use staff at PVPC used their expertise in deciphering land use regulations and applied it to the review of these zoning documents with the intent of finding any inconsistencies within the documents, reformatting tables of use regulations to promote sustainable land use, and flagging those sections that were not consistent with Massachusetts General Law 40A, also known as the Zoning Act. This process involved drafting a brief history of a given community’s zoning efforts, identifying areas of concern in either the table of uses or the zoning regulations, recommending policies for improving a given community’s zoning regulations, and flagging any portions of a given community’s zoning regulations that might be inconsistent with the Zoning Act.

The staff at PVPC endeavored to make sure that common concerns, such as floodplain regulations and water supply district protection areas, were addressed adequately within a community’s zoning regulations. Staff also took the opportunity to include recommendations on how to promote smart growth within Hampshire and Hampden Counties. Many of these recommendations resulted in communities allowing open space residential developments by right, adopting mixed-use district regulations, adopting infill development guidelines, and decreasing lot sizes in appropriate areas.

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Conservation Development



What are the objectives of Conservation Development?

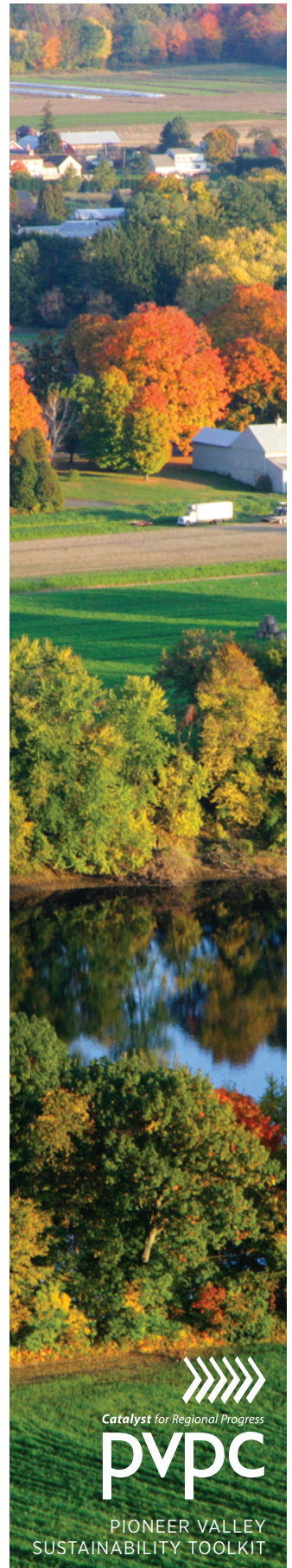
Conservation Developments are compact residential developments that use flexible dimensional standards in order to preserve and enhance rural town character, protect open space, natural resources, and scenic areas, as well as promote the use of sustainable and energy efficient development standards .

Why do we need Conservation Developments?

Growth in many of our small cities and towns is a result of residential development, primarily Approval Not Required (ANR) developments. ANR developments need only an endorsement from a town's planning board that the proposed residential parcel meets the town's frontage requirements along a public way. This type of development has changed the rural character in many of our communities and is the greatest contributor to sprawl development in the region. Conservation Developments are a flexible way for ANRs to consider the rural character of the community and promote green energy sources in residential development

How does Conservation Development bylaw work?

Conservation Development bylaws allow applicants to use common driveways and flexible area and frontage requirements to create permanent open space and avoid standard Approval Not Required and subdivision development. Conservation Developments are allowed by-right with a Site Plan Approval process. Through this approval process, towns work with the applicant to consider development standards such as Stormwater Management, Low Impact Development, Green Energy and Open Space Connectivity. A portion of the development must also be set aside as permanently protected open space.



Conservation Developments allow applicants flexibility in designing the layout of the lots. The bylaw does not require a minimum lot size or minimum frontage requirement, but allows the applicant to consider the designing the development around the unique characteristics of the land. The number of buildable lots is determined by setting an average size lot size for the entire development as a whole, which number is determined by the community. Design flexibility is also enhanced by permitting the use of common driveways rather than a formal subdivision road.

DID YOU KNOW...

In a national random sample survey of 1,130 adults age 18 and older, about 55 percent of Americans prefer a smart growth community and 45 percent prefer a sprawl community, after hearing detailed description of the two community types. (2004 National Community Preference Survey, conducted for Smart Growth America and National Association of Realtors).

EXAMPLES FROM THE PIONEER VALLEY

Highland Communities Initiative Green Development project

PVPC and the Highlands Communities Initiative have partnered with the towns of Chesterfield, Conway, Montgomery, and Worthington to develop and adopt the Conservation Development bylaw by Annual Town Meeting in 2011. PVPC and HCI will be providing technical support to these communities as they develop a campaign for adoption of this bylaw in their communities.

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Green Building Codes & Standards



Green affordable housing project developed by Rural Development Inc, Franklin County

What are the objectives of green building codes and standards?

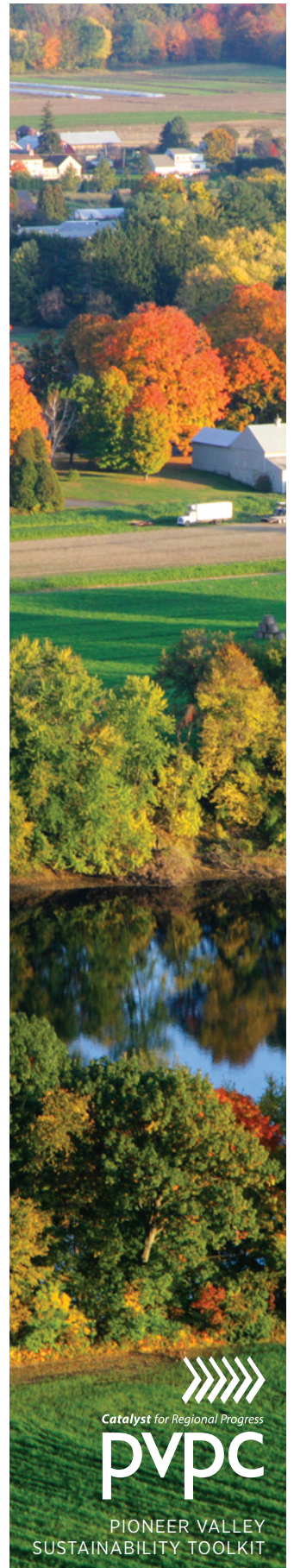
To increase the efficiency of buildings and their use of energy, water, and materials, and reduce building impacts on human health and the environment, through better siting, design, construction, operation, maintenance, and removal.

Why do we need green building codes and standards?

Massachusetts is a leader in the rapidly growing green building movement. Buildings consume 70% of the nation's electricity and a large part of the materials, water and waste used and generated in our economy. Buildings have traditionally been viewed as a relatively static sector of the economy experiencing relatively little change in technology or resource consumption patterns, but that is not the case. According to Ed Mazrin, founder of Architecture 2030, and international movement to transition to zero energy buildings by 2030, greening the building sector is a key to combating global climate change. Codes and standards are increasingly being used to encourage the development of renewable energy, energy-efficient technologies, and high-performance buildings in Massachusetts. In addition to state requirements, codes and standards for specific building types and individual municipalities are in development to encourage a breadth of clean and green features in building projects.

How do green building codes and standards work?

“Green” or “sustainable” buildings use key resources like energy, water, materials, and land more efficiently than buildings that are just built to code. With more natural light and better air quality, green buildings typically contribute to improved employee and student health, comfort, and productivity. In addition, they use less energy and other





essential resources, therefore saving more money. Through zoning and other regulatory measures, communities can require that new and rehabilitated buildings are built to meet green building standards. The green building standard most used is the Leadership in Energy and Environmental Design (LEED) System, developed by the United States Green Building Council. LEED is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.

DID YOU KNOW...

Although the US is home to only 4.5 percent of the global population, it is responsible for over 15 percent of the world's consumption of wood.

(Source: www.GreenBuilding.com)

EXAMPLES FROM THE PIONEER VALLEY

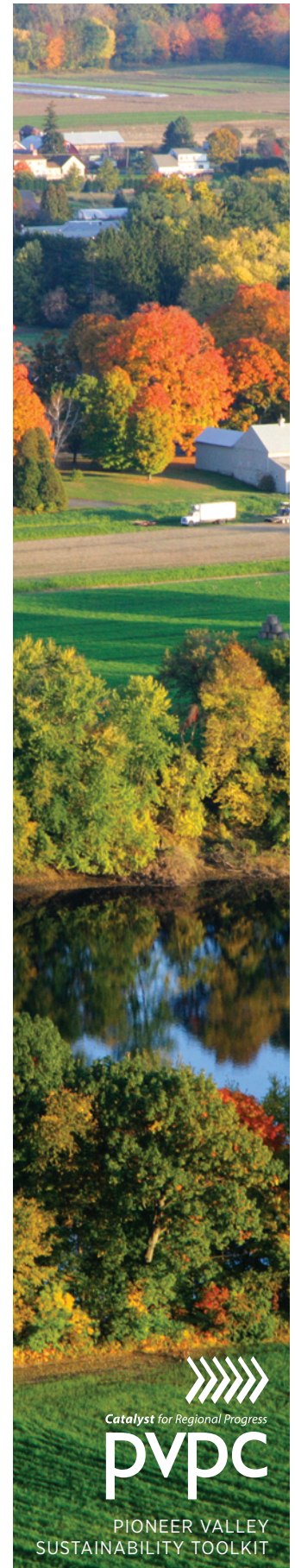
Kittredge Business and Technology Center at Holyoke Community College

Holyoke Community College's Kittredge Center is a 54,000 square foot building on the current HCC campus providing educational opportunities, workforce training, and business development services. The new Kittredge Center for Business and Workforce Development is the first state-owned building with a green roof. Green roofs are part of an important design trend to produce buildings that are more sustainable in that they reduce storm water impacts to nearby rivers and streams, provide better insulation to buildings, and reduce the amount of energy needed for heating and cooling. The 2,500 square foot roof—with 6 inches of soil planted up with drought-tolerant sedums—intercepts and soaks up rainfall. As a result, the amount of storm water running off the built surfaces is greatly reduced.

EXAMPLES FROM OUTSIDE THE PIONEER VALLEY

The City of Boston

The City of Boston recently amended their Zoning Code to require all projects over 50,000 square feet to be designed and planned to meet the "certified" level using the US Green Building Council's and Leadership in Energy and Environmental Design (LEED)



building rating systems. The Article also provides incentives by allowing up to four of the required LEED points to be obtained from the Boston Green Building Credits. One point can be obtained if the proposed project includes and on-site combine electrical and heat generation; one point for the historic renovation of an existing structure; one point for on-site groundwater re-charge; and one point for sustainable transportation options for residents, such as public transit passes and car-sharing options. The City of Cambridge is also developing Green Building standards for buildings over 25,000 square feet.

Maine State Housing Authority

The Maine State Housing Authority (MSHA) has developed a set of green building standards for designers, developers, and constructors who apply for MSHA funding. These standards are a requirement for all projects that apply for funding, including rehab and renovation projects. A copy of the standard can be found [here](#).

ADDITIONAL LINKS:

“Leading by Example: An Action Plan for Green Building in Massachusetts State Construction Projects”, Massachusetts Sustainable Design Roundtable.

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Green Building and the Stretch Code



Habitat for Humanity Housing-Amherst

Brightly daylit, south-facing rooms, super-insulated envelope, energy-efficient, economical point-source heating units, energy-star appliances, super-insulated envelope and point source heating provide an economical alternative for affordable housing.

What are the objectives of green building codes, such as “the stretch code”?

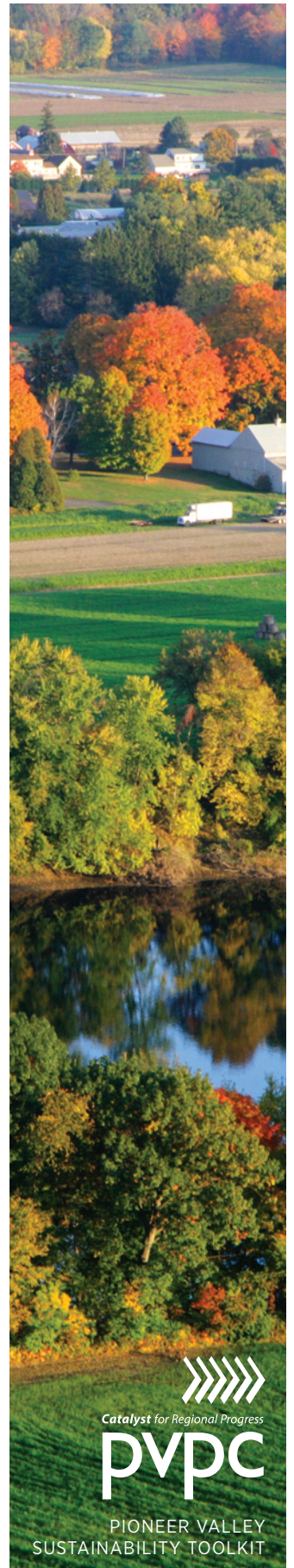
To save money and improve the environment by reducing waste of energy, water, and land in building siting, design, construction, de-construction, and operation. Some codes also seek to improve occupant health by proscribing types of equipment and materials allowed in construction and operation of buildings. The “stretch code” is a more energy efficient building code that can be adopted voluntarily by Massachusetts communities.

Why do we need green building codes and standards?

Because buildings unnecessarily use 70% of electricity consumed in the U.S., 39% of energy, 40% of raw materials, and 12% of all potable water, wasting building owners billions of dollars each year. Buildings unnecessarily produce 39% of all carbon dioxide (CO₂) emissions and 30% of all waste (136 million tons annually) because they are poorly sited, designed, built and even torn down. In the past planners, architects, designers and builders did not always factor use of resources into building design and construction. As a result, most existing buildings waste a lot of energy which translates into wasting a lot of money. We need green building codes and standards to save money and limited natural resources and to achieve our vision of a sustainable region.

How do green building codes, including the stretch code, work?

Green building codes and standards work by requiring building siting, design, construction and de-construction to achieve whatever level of resource efficiency a community wants.



In Massachusetts, all new construction must conform to the state building code. In 2008 when Massachusetts adopted the Green Communities Act, the Commonwealth committed itself to updating the state building code in accordance with the International Energy Conservation Code (IECC) which is usually updated every three years. This commitment will ensure a much greater level of new building efficiency throughout Massachusetts. At the same time, the Massachusetts Legislature enabled cities and towns to adopt an even more energy efficient building code, called “the stretch code”. Adopting the stretch code is optional, but it is one of the five requirements of Green Communities designation. The stretch code is called the stretch code because it is a “stretch” with respect to building efficiency. A building built to the stretch code will be 15% more energy efficient than one built to the base code. Building codes and standards are just like any other local government regulation. They represent a community’s values and they tell builders how to build. “Green” or “sustainable” buildings use key resources like energy, water, materials, and land more efficiently. With more natural light and better air quality, green buildings typically contribute to improved employee and student health, comfort, and productivity. And as stated, they use less energy and other essential resources, thereby reducing wasteful spending. Towns are advised to seek adoption of the Stretch Code as a general bylaw through a vote of Town Meeting. Cities may adopt the stretch code through a vote of city council.

DID YOU KNOW...

Springfield was the first city in Massachusetts to adopt the Stretch Code.

(Source: www.mass.gov/eoeea)

In addition to the stretch code in Massachusetts the other green building standard most used is the Leadership in Energy and Environmental Design (LEED) System, developed by the United States Green Building Council. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. To adopt a requirement of LEED certification for all new buildings, Towns are advised to seek adoption of LEED certification as a general bylaw through a vote of Town Meeting and Cities are advised to seek adoption of through a vote of the city council.



EXAMPLES OF GREEN BUILDING IN THE PIONEER VALLEY

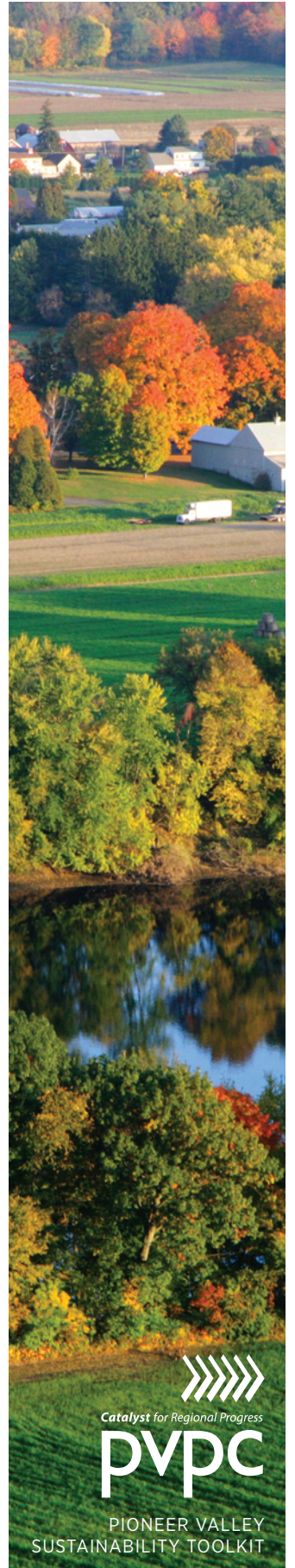
Hampshire College – The Ken Burns Wing, LEED certified



New 6,700 square foot addition to the Jerome Liebling Center for Film, Photography and Video, a part of the Arts Complex at Hampshire College.



Interior Design for the Ken Burns Wing of the Jerome Liebling Center included selection of interior finishes, furnishings, and lighting. Since it is a LEED registered project, special care was taken in making these selections to ensure that products were low in VOC's and that lighting was as efficient as possible. Post-construction graphic design services were also provided.



EXAMPLES OF GREEN BUILDING CODE IN THE PIONEER VALLEY

As of the end of 2010, six communities in the Pioneer Valley had adopted the stretch code and 12 are working on adoption (42%).

ADDITIONAL LINKS:

www.mass.gov/energy/greencommunities detailed resources on adopting the stretch code, cash flow analysis, commercial case studies and detailed FAQ

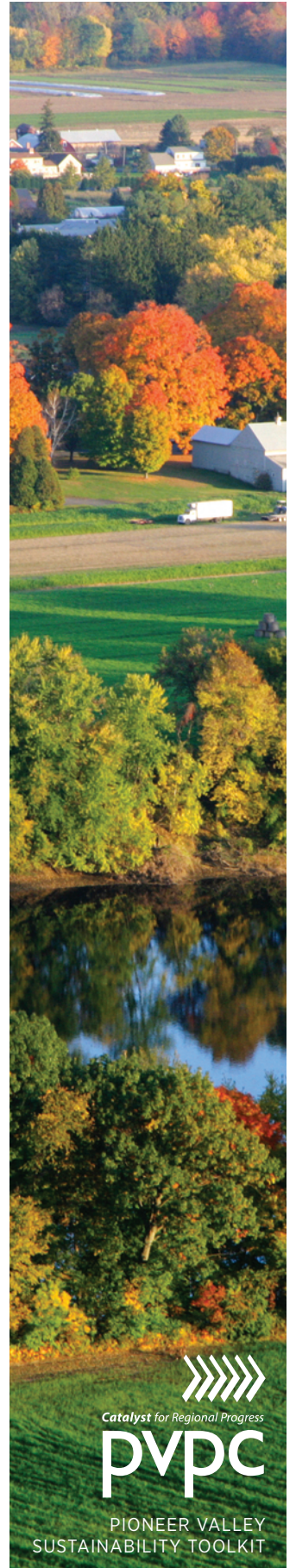
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As of the end of 2010, six communities in the Pioneer Valley had adopted the stretch code and 12 are working on adoption (42%).

ADDITIONAL LINKS:

www.mass.gov/energy/greencommunities detailed resources on adopting the stretch code, cash flow analysis, commercial case studies and detailed FAQ

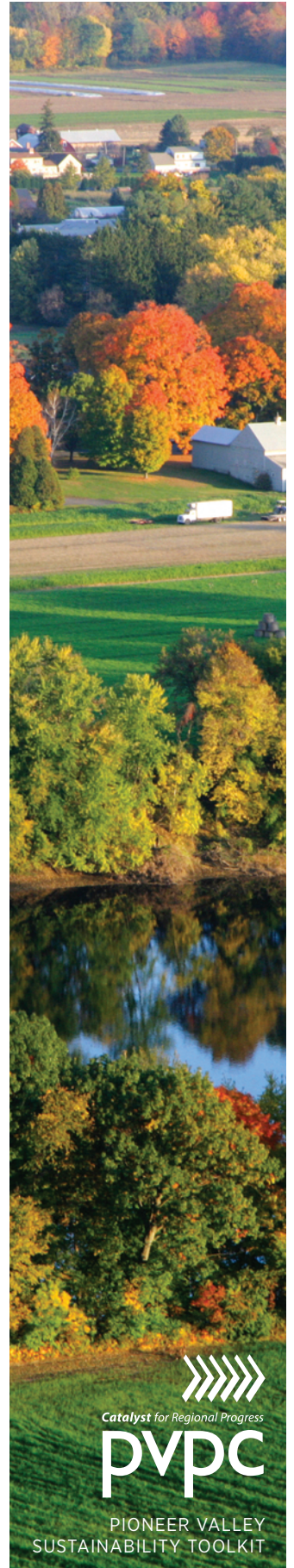
A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

FOR MORE INFORMATION, PLEASE CONTACT

Pioneer Valley Planning Commission
413-781-6045

60 Congress Street, Floor 1
Springfield, MA 01104-3419

www.pvpc.org



Green Development Performance Standards



What is the objective of Green Development Performance Standards?

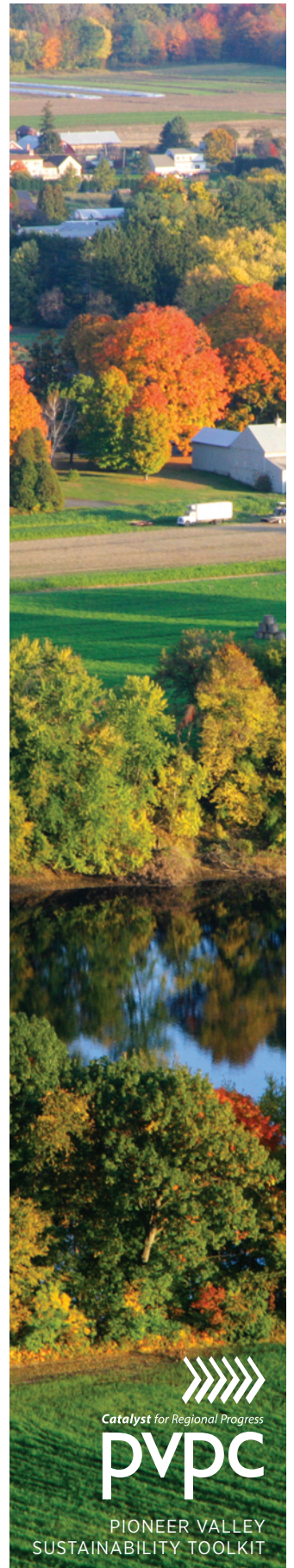
The purpose of these standards is to promote high quality and greener developments that also preserve and enhance natural resources and the environment. Green development techniques also protect the quantity and quality of drinking water supplies.

Why are Green Development Performance Standards needed?

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.

EXAMPLES FROM THE PIONEER VALLEY

PVPC has developed a model set of Green Development Performance Standards, which are the first of their kind. The towns of Palmer, Easthampton and Hatfield, MA are currently considering adopting Green Development Performance Standards. To date, these standards have not yet been adopted.

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Home Based Business Bylaws



Home based business in Hadley

What are the objectives of a home based business bylaw?

To promote economic development by allowing town residents a broad choice in the use of their homes as places of livelihood in residential areas, while protecting the character and quality of life in the neighborhood.

Why do we need a home based business bylaw?

A home based business bylaw is a useful economic development tool for rural communities or communities that want to promote and permit neighborhood businesses. It encourages local economic development opportunities by allowing entrepreneurs and small business owners the ability to run a small business out of the home. In addition, these bylaws provide standards to ensure that these small businesses protect neighborhoods and residential areas from adverse impacts, such as noise, lighting and traffic.

How do home based bylaws work?

A Home Based Business bylaw establishes three types of Home Business that would be allowed in a community, and establishes minimum standards for parking, screening, lighting, traffic, signage, and hours of operation. The three levels of homes based business are:

- » Home Occupation, which has no more than two (2) non-resident employees and occupies no more than 33% of the gross floor are of the home

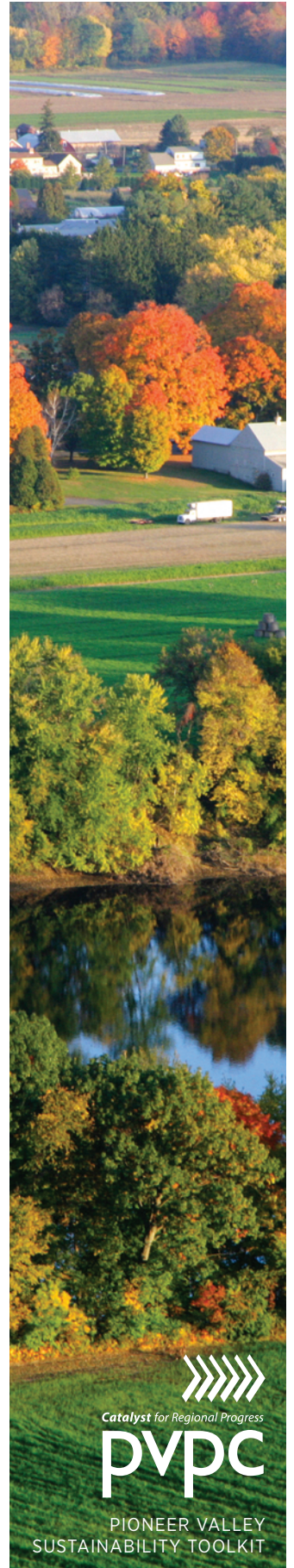
- » Minor Cottage Industry, which has no more than five (5) non-resident employees and occupies no more than 49% of the gross floor area of the building for business purposes.
- » Major Cottage Industry has no more than ten (10) non-resident employees and may not use less than 33% of the gross floor area for business purposes.

The bylaw provides minimum performance standards for each type of home-based business. Home Occupations are allowed by right subject to these minimum standards while Minor and Major Cottage Industries require Site Plan Approval from the Planning Board. The minimum performance standards address such things as residency requirements, minimum dimensional requirements, parking standards, screening, lighting, traffic, signage, and hours of operation. The Planning Board may grant a waiver or amendment from one or more requirements of the bylaw if it finds that the waiver or amendment is in the public interest and meets the intent of the Bylaw.

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Housing For Older Adults

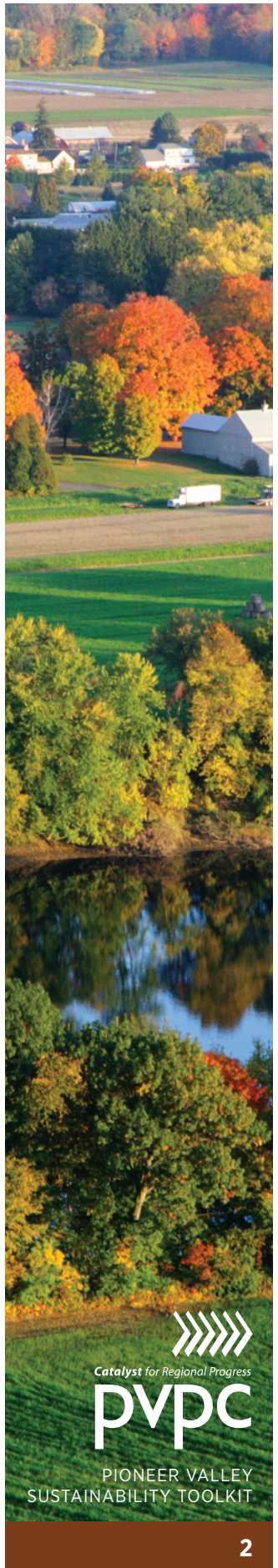


Photo courtesy of flickr user Luvida Care

What are the objectives of pursuing multiple housing options for older adults within the community?

As the baby boomer generation continues to age, the number of older adults will rise to record levels. This will bring strong demand for housing suitable for older adults. Older adults have expressed a strong desire to ‘age in place’. Close to 90% of adults aged 45 and over that were surveyed by AARP indicated that they wished to stay within their homes for as long as possible as they aged.¹ The housing and care services available for older adults need to be both cost effective and attuned to seniors’ desires to age in place. The current approach to housing for older adults is dominated by institutional nursing homes and assisted living facilities. These facilities are expensive for residents who may often not require the level assistance provided by such facilities. Furthermore, large-scale senior housing developments typically require large tracts of land on ‘greenfield’ sites that are often located away from the neighborhoods and communities that older adults would like to stay connected with. By considering alternative forms of housing for older adults, communities can help to create housing that is reflective of the wishes of older adults to age in place with dignity and independence.





DID YOU KNOW...

By 2050, the number of adults aged 65 and older will double to over 88 million with more than 19 million over the age of 85.

(Source: Lipman, Barbara, Jeffrey Lubell, and Emily Salomon. Housing an Aging Population: Are We Prepared? [Washington, D.C.]: Center for Housing Policy, 2012.)

In 2012, the average annual cost of a semi-private room in a nursing home was \$81,030. A private room or apartment in an assisted living facility costs an average of \$42,600 annually.

(Source: Metlife Mature Market Institute. Market Survey of Long-Term Care Costs. (2012) Retrieved from: <https://www.metlife.com/assets/cao/mmi/publications/studies/2012/studies/mmi-2012-market-survey-long-term-care-costs.pdf>

What types of housing for older adults are possible in our communities and how do they work?

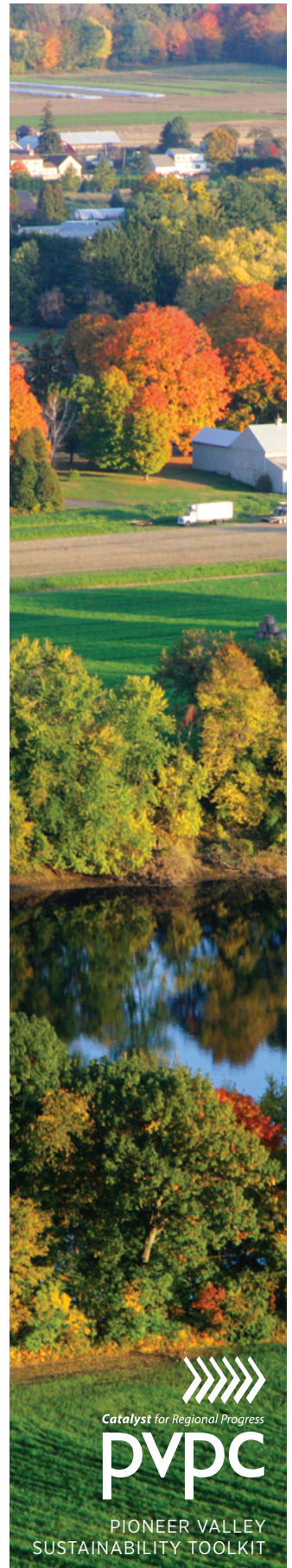
The chart below lays out various options for communities to pursue in order to create a greater amount of housing options for older adults.

Housing Types for Older Adults			
Housing Type	Purpose	Physical Form	Recommended Regulatory and Policy Reforms
House-Sharing	As adults age they may want to share housing with unrelated adults. This may include renting rooms within their own home an exchange of housing for help with daily chores, or moving into a shared-home with others. House-sharing allows older adults to remain in their own homes and share daily activities with others while defraying the costs associated with house upkeep.	House-sharing relies upon the existing housing stock within a community, reducing the need for new developments.	Some zoning codes restrict house-sharing by limiting housing units to one family per unit. The definition of “family” unit is often defined as a limited number of unrelated adults. Changes to the definition of family can facilitate house-sharing by older adults. Similarly house-sharing can be added as an allowed use in appropriate districts
Multi-Family Housing	Single-family homes are typically the most expensive form of housing. They typically require the most maintenance, have the highest utilities bills, and can be isolating for older adults. Allowing more than one dwelling unit in a building provides more diverse choices for older adults and can make it easier for older adults to remain in their home community without the expense of a single-family home.	Multi-family housing consists of multiple housing units within a single building. Units may be leased from a building owner or owned as a condominium or co-op unit. Multi-family housing units may consist of flats, duplexes, townhouses, apartment buildings, mixed use buildings, and apartment communities.	Older adults looking to downsize into an apartment may find limited multi-family housing options available in their community. This may be the result of market forces, but it is often also the result of local zoning. Many zoning codes, particularly in rural areas, significantly limit or even outlaw housing other than single-family houses. Zoning codes may limit multi-family housing to undesirable or economically unfeasible locations which may force older adults to sacrifice their social connections and life patterns for housing that meets their size or cost needs. A community can review its zoning code to make the most efficient and effective changes to accommodate older adults who desire multi-family housing.

Housing Types for Older Adults			
Housing Type	Purpose	Physical Form	Recommended Regulatory and Policy Reforms
Naturally Occurring Retirement Communities (NORCs)	Naturally occurring retirement communities is a term that describes buildings or neighborhoods which have developed a concentration of older adult residents over time. NORCs do not have an official designation as a retirement or assisted living community, though recently NORCs in conjunction with supportive services programs have emerged as an alternative to assisted care facilities. The NORC supportive services model works through partnerships with property managers, health care and social service agencies, and other organizations.	Naturally occurring retirement communities take advantage of existing housing stock and may be located within denser, single-family neighborhoods, or within multi-family housing complexes. As the name suggests, NORCs are guided by the preferences of older adults who choose to live in a certain neighborhood amongst people their own age.	<p>Naturally occurring retirement communities vary depending upon the community. Communities can help encourage NORC's by allowing house sharing, multi-family housing, and accessory dwelling units in the zoning code. When NORC's are identified, communities can revise the zoning code for that location to allow goods and services that are frequently used by older adults.</p> <p>When a NORC is identified, a community can prioritize infrastructure changes to meet the needs of older adults in the vicinity of NORCs. For example, extending pedestrian crossing times, improving sidewalk maintenance, and ensuring adequate non-glare street lighting.</p>

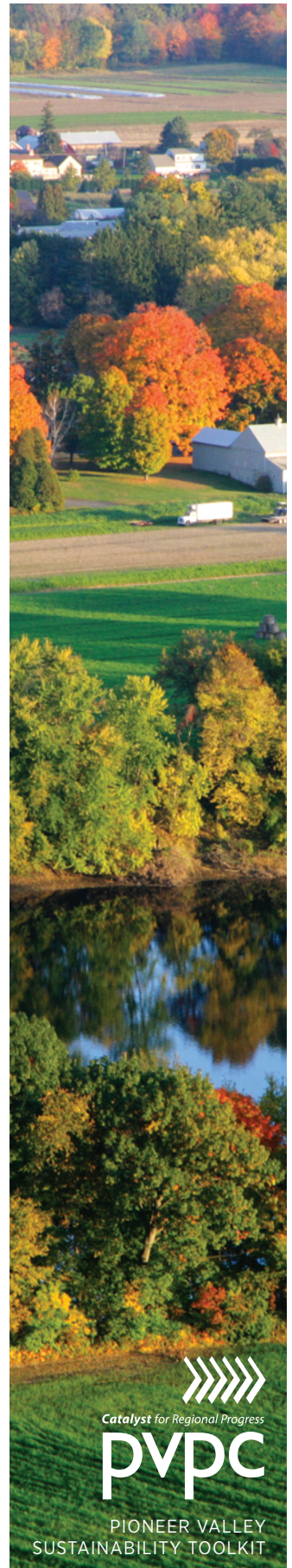
Housing Types for Older Adults			
Housing Type	Purpose	Physical Form	Recommended Regulatory and Policy Reforms
Accessory Dwelling Units, i.e. "Granny-Flats"	Accessory dwelling units (ADUs) are an additional housing unit that is added on to an existing house. ADUs can be used by relatives of older adults to house and care for them while still providing the individual independence. Alternatively, older adults may construct an ADU for themselves to live in while renting their home for supplemental income, or they may choose to rent the unit itself.	Accessory dwelling units may be attached to an existing house such as above an attached garage or they may be detached, stand-alone structures such as a cottage or guesthouse on the property. ADUs typically have their own separate entrance, kitchen, and bathroom but often share certain amenities with the adjoining housing unit like laundry facilities.	Many communities do not allow ADUs within their zoning code or restrict where they can be built by requiring excessively large lot sizes or setbacks, or by restricting the conversion of non-conforming structures into ADUs. By allowing ADUs or revising requirements for them communities can increase housing flexibility for older adults—sometimes enabling an older adult to age-in-place when they would otherwise have to move.

Housing Types for Older Adults			
Housing Type	Purpose	Physical Form	Recommended Regulatory and Policy Reforms
Continuing Care Facilities	Continuing care facilities (CCFs), also known as life care facilities or residential care facilities are retirement communities that consist of assisted living facilities and personal care homes. These facilities provide housing and supportive services to persons who may be unable to live independently, but generally do not require the skilled level of care provided by nursing homes. There are a variety of life care facilities which range in size and services provided. Continuing care facilities are a multi-tiered approach to aging that accommodates residents' changing needs in one place.	Individuals entering a continuing care facility may live an independent lifestyle in a single family home, apartment or condominium, while having services nearby if needed. As residents age and everyday activities become more difficult, they may move into assisted living or nursing care facilities on site. Because they provide a variety of unit types, continuing care facilities are often large developments and are generally built on greenfield sites on the outskirts of a community. This can present challenges for older adults who wish to remain active within a community.	Zoning for senior housing like continuing care facilities is often achieved through establishing specialized use categories within the zoning code. This allows communities to regulate where senior housing can be located, as well as its characteristics. Since life care facilities are often built upon greenfield sites at the edge of a community, residents may be forced into a car-dependent lifestyle. Communities can review site plan and subdivision regulations in order to ensure that a proposed senior housing development will provide safe access and internal circulation for pedestrians and automobiles. Communities can proactively identify appropriate parcels for senior housing and work to steer development towards them. It is especially helpful if communities can advocate for planned development that includes not only senior housing, but housing for other age groups as well as commercial development.



Housing Types for Older Adults			
Housing Type	Purpose	Physical Form	Recommended Regulatory and Policy Reforms
Cohousing	Cohousing is a method of housing development where a group of people get together to act as the developer for a housing community. By building as a group, per unit costs can be reduced (by achieving an economy of scale, eliminating redundant infrastructure, and eliminating the profit margins that a developer would usually make). Cohousing developments typically further reduce costs by building small units in a dense cluster.	Cohousing is typified by shared common spaces (outdoor spaces and common buildings), smaller units, shared parking located at the periphery of the development, and pedestrian-only paths within the development (pedestrian paths often double as emergency access). Because of these design features, cohousing developments have been noted for the safe and sociable environment they create which residents say enriches their lives.	Communities can promote cohousing by allowing “flexible development”, sometimes referred to as cluster development, open space residential development, or natural resource protection zoning. ² Additionally, communities can add cohousing as an allowed use in their zoning regulations, including explicitly allowing common buildings for residential use including shared home office and workshop space. Lastly, communities can review their subdivision regulations to make sure that there are no obstacles preventing compact development patterns associated with cohousing.

Housing Types for Older Adults			
Housing Type	Purpose	Physical Form	Recommended Regulatory and Policy Reforms
Cottage Housing	Cottage housing is similar to cohousing and is another innovative form of housing that is well suited to older adults. Cottage housing is usually composed of a number small housing units clustered around a common space with parking to the outside of the development. Like cohousing, cottage housing is appealing to older adults for the safe and sociable environments they create. Because cottage units are smaller than typical single-family houses, they are usually more affordable than single family houses in the same area.	Sometimes referred to as a “pocket neighborhood”, cottage housing typically takes an in-town lot that would have otherwise been developed for large single-family homes, or a commercial use, and instead develops a number of small cottage units (under 1000 sq ft) around a cottage green. The size of housing units and the total developed parcel of cottage housing units is generally smaller than a cohousing development, and is usually not initiated and developed by future occupants. Parking is typically located around the periphery of the development. It may or may not be shared. Internal paths are typically for pedestrians-only.	Communities can encourage cottage housing by allowing zoning for “multiple units per lot” in certain districts thereby allowing the applicant to avoid a costly subdivision permitting process. If a community wants to promote cottage housing while prohibiting other similar forms of development, they can establish a use category in zoning for cottage housing with an associated definition that distinguishes cottage housing from other forms of development. Criteria likely would include benchmarks for parcel size, unit size, minimum and maximum densities, and provision of shared outdoor space. Cottage housing can be allowed by-right, but communities may want to require a site plan review in order to make sure a proposed development “fits in” to a neighborhood. Alternatively, a community could require a special permit for cottage housing. Finally, zoning dimensional requirements, and subdivision regulations standards can be modified to facilitate cottage housing.



² Natural resource protection zoning is a relatively recent zoning technique that has been developed for rural and suburban edge locations. It was created to improve conservation outcomes for high priority land, while allowing for predictable development of housing at appropriate neighborhood densities.

Housing Types for Older Adults			
Housing Type	Purpose	Physical Form	Recommended Regulatory and Policy Reforms
Assisted Living	Assisted living communities are licensed and regulated by the state and intended for older adults who require assistance with certain daily activities like dressing, bathing and eating, but are not completely disabled. As with continuing care facilities, residents of assisted living facilities typically rent or buy their own rooms or apartments.	Like continuing care facilities, assisted living facilities and nursing home facilities are generally large developments which are typically located on greenfield sites away from the community and amenities. Many older nursing home facilities are set up like and resemble a hospital, though lately some newer developments have a greater degree of privacy and amenities like shared kitchens and living spaces.	Zoning for senior housing for assisted living facilities and nursing home facilities is often achieved through establishing specialized use categories within the zoning code. This allows communities to regulate where senior housing can be located, as well as its characteristics. Since life care facilities are often built upon greenfield sites at the edge of a community, residents may be forced into a car dependent lifestyle. Communities can review site plan and subdivision regulations in order to ensure that a proposed senior housing development will provide safe access and internal circulation for pedestrians and automobiles. Communities can proactively identify appropriate parcels for senior housing and work to steer development towards them. It is especially helpful if communities can advocate for planned development that includes not only senior housing, but housing for other age groups as well as commercial development.
Nursing Homes	Nursing homes focus on caring for older adults that are disabled, severely ill or need help with a majority of daily tasks. Nursing home costs are covered by a combination of savings, relatives, private health insurance or government programs like Medicaid or Medicare.		

EXAMPLES FROM THE PIONEER VALLEY

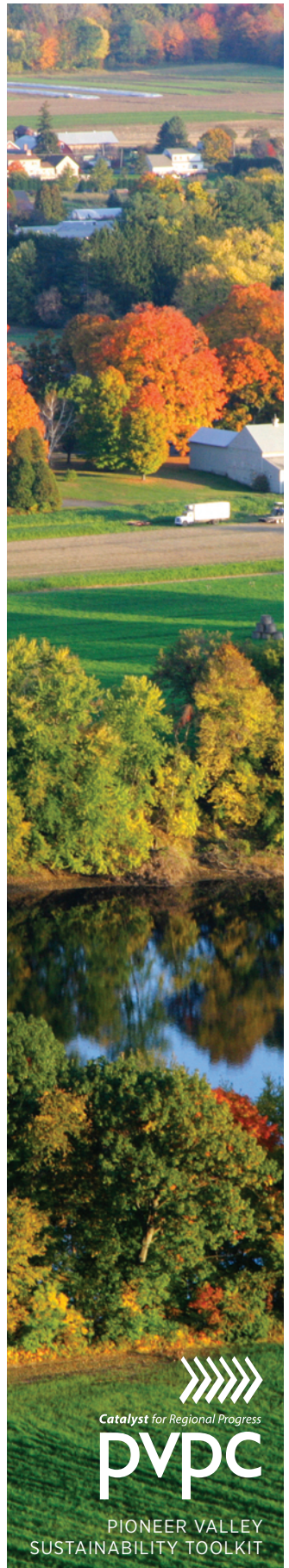
American Inn, Southwick

The American Inn in Southwick is a 50 acre life care facility that provides residents with a variety of housing choices and recreational opportunities. Residents may live in one or two bedroom cottage units, or spacious independent living apartments. For those that need greater assistance with daily activities there are assisted living apartments available as well. There is a host of amenities on the premises including a wellness center, fitness center, a café, library, beauty parlor and barber shop, social, recreational and educational programs, a billiard and card room, and local transportation. The American Inn provides residents with an active lifestyle which includes evening strolls, neighborhood socializing, dining, and numerous activities which bring residents together for socializing.



Photo courtesy of flickr user Luvida Care

One to two bedroom independent living apartments at American Inn are priced from \$145,900 to \$249,900 dollars and include thirty meals per month. The independent living cottages are priced from \$164,900 to \$269,000 and include a fully appliance kitchen and access to the Crane Building facilities. Assisted living apartments include three meals a day, as well as a wide variety of services and is priced at a base level of \$3,364 per month.



Links to More Information

SENIOR COHOUSING:
<http://www.seniorcohousing.com/>

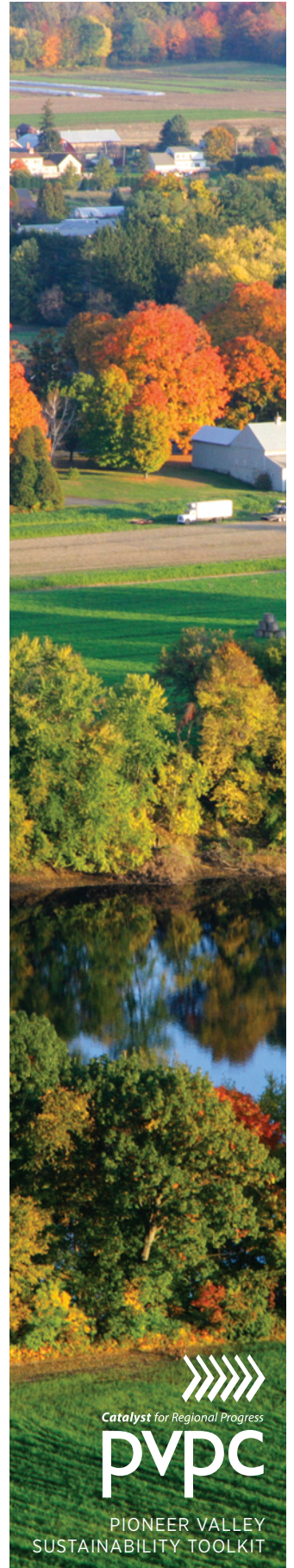
A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Catalyst for Regional Progress

PVPC

PIONEER VALLEY
SUSTAINABILITY TOOLKIT

Inclusionary Zoning



Affordable Units in Amherst

What are the objectives of inclusionary zoning?

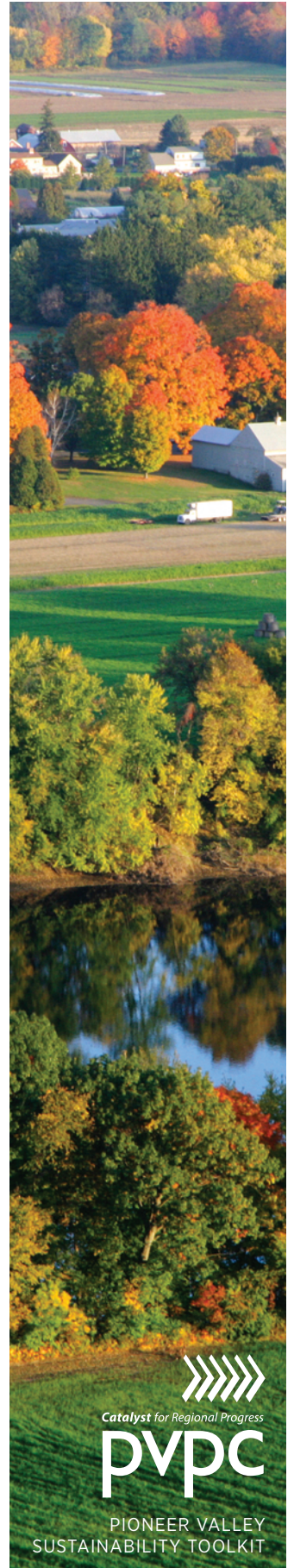
To increase the affordable housing inventory in a community, and to help provide a range of housing options to include homebuyers or renters whose income is below the regional median household income of \$62,900.

Why do we need inclusionary zoning?

Rising housing costs and lack of housing diversity can make housing choices difficult for young adults seeking to live in the town they grew up in, for people to live in the same community where they work to avoid long commutes, or for the elderly to continue living in the same community as their housing needs change. Communities need to make a concerted effort to ensure that homes are available for modest-income households. The task is complicated for several reasons. First, increasing construction and land costs have driven up the cost of development projects, especially after Hurricane Katrina. Developers also profit more by building luxury homes, which has spurred the construction of “McMansion” subdivisions throughout the state. At the same time, many cities and towns do not have zoning that allows more affordable multi-family dwellings or homes to be built on smaller lots.

How does inclusionary zoning work?

Cities and towns can pass a zoning bylaw or ordinance that requires private developers to make a fixed percentage of their housing affordable to low- or moderate-income households. Amherst, for example requires that in all new developments of over 21 housing units, at least 12% of the units have to be affordable. The affordability of the units



is maintained through a deed restriction, typically for 20 or 30 years and in some cases in perpetuity. Most programs contain “cost offsets” (e.g., density bonuses, expedited permitting processes, or fee waivers) that help developers meet the cost of producing affordable homes. Chapter 40R Smart Growth Zoning districts, which are also included in this toolkit, could also be considered a kind of inclusionary zoning. It requires that in any development in the Smart Growth District over 13 units, 20% of the units have to be affordable. In exchange the developers may build at a higher density within the district designated by the community. Over 100 Massachusetts communities have adopted inclusionary zoning regulations.

DID YOU KNOW...

Households whose income falls at or below 80% of the median income for the area qualify for affordable housing programs. For 2007, in Hampshire and Hampden Counties, this is \$57,350 for a family of four and \$61,950 for a family of five. For example, a five person “household” could be a couple, one working full-time and the other part-time, with two children and an elder parent living with them.

(Source: US Department of Housing and Urban Development)

EXAMPLES FROM THE PIONEER VALLEY

Town of Hadley

The Town of Hadley was awarded a Smart Growth Technical Assistance Grant to prepare an Inclusionary Zoning bylaw as a result of the Pioneer Valley Planning Commission’s regional application to the Executive Office of Environmental Affairs. A model Inclusionary Zoning bylaw developed by PVPC and tailored to Hadley’s needs was prepared and given to the Planning Board for their review and consideration. PVPC worked with the Planning Board over the summer of 2006 to finalize the language of the proposed inclusionary zoning bylaw. PVPC also prepared a fact sheet on affordable housing and inclusionary zoning regulations to be used as an educational tool during the public hearing process. The Inclusionary Zoning Bylaw was adopted at a Special Town Meeting held in the fall. The bylaw requires that all new residential developments of six (6) or more dwelling units must provide a minimum of fifteen percent (15%) of the units to be affordable as defined in M.G.L. Chapter 40B.

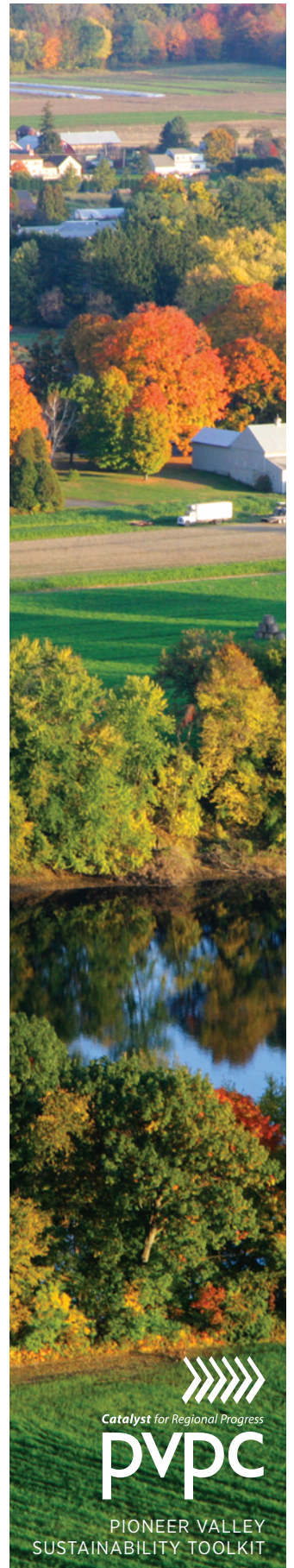
Town of Amherst

Amherst has also adopted an inclusionary zoning bylaw. Following is an excerpt from their bylaw:

SECTION 15.1 REGULATIONS

To ensure the purposes of this section, the following regulations shall apply to residential development in Amherst:

- » 15.10 All residential development requiring a Special Permit and resulting in additional new dwelling units shall provide affordable housing units at the following minimum rates:
 - » Total Development Required Affordable
 - » Unit Count Unit Provision
 - » 1-9 units None*
 - » 10-14 units Minimum one (1) dwelling unit
 - » 15-20 units Minimum two (2) dwelling units
 - » 21 units Minimum 12% of total unit count
 - » * While provision of affordable units is not required for developments containing 1-9 units under this section, the Bylaw encourages affordability and provides for incentives. See Sections 4.33 and 4.55. For developments of 21 or more total units, calculation of the number of affordable units shall, if the required percent of the total results in a fraction, be rounded up to the next whole number where the fractional portion is equal to 0.5 or greater, and shall be rounded down to the next whole number where the fractional portion is less than 0.5.
- » 15.11 Affordable dwelling units provided under Section 15.10 shall be counted as meeting the requirements for affordability density bonuses under the provisions of Section 4.550.0 (Open Space Community Developments).
- » 15.12 The applicant shall establish such housing restrictions, conditions, and/or limitations as are necessary to ensure that the affordable housing units provided under this section will be permanently available for purchase by eligible low-and moderate-income buyers, and available for a minimum of twenty years in the case of rental housing.



OTHER RESOURCES:

“Inclusionary zoning: Guidelines for cities and towns” prepared for the Massachusetts Housing Partnership Fund by Edith M. Netter, Esq.

http://www.mhp.net/uploads/resources/inclusionary_zoning__guidelines__netter.pdf

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

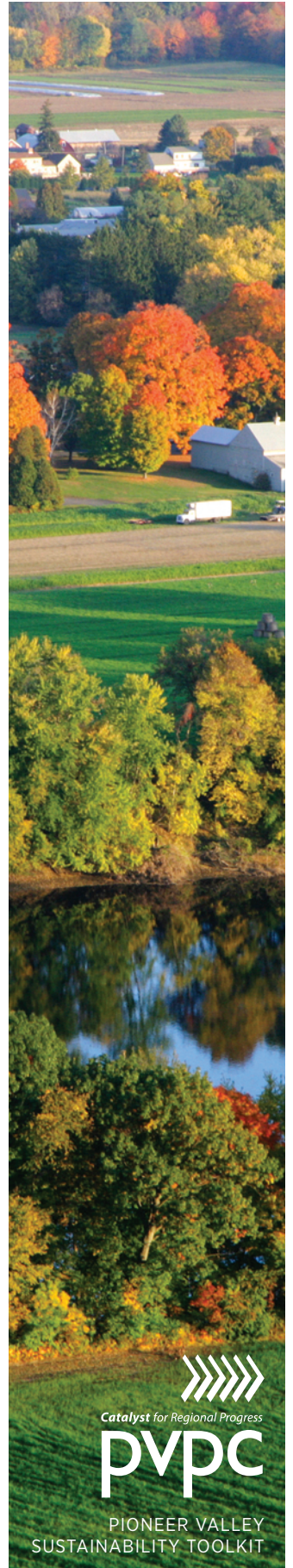
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Low Impact Development



Streets designed without curbs allow water to drain into natural systems, such as gardens

What are the objectives of Low Impact Development?

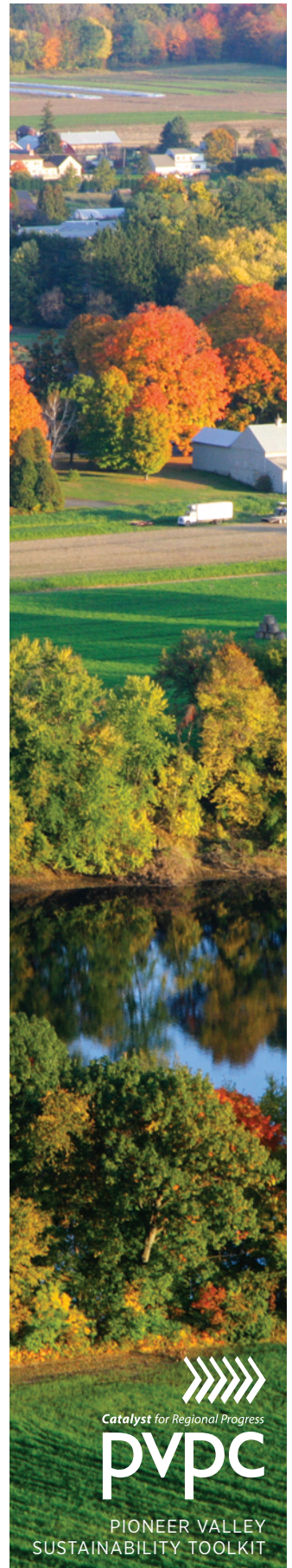
To create a more sustainable land development pattern that results from a site planning process that first identifies critical natural resources, then determines appropriate building envelopes. To incorporate a range of best management practices (BMPs) that preserves the natural hydrology of the land.

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. 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 fast-releasing 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.

DID YOU KNOW...

Vegetated rooftops have been used extensively in Germany for more than 25 years and results show up to 50% reduction in annual runoff in temperate climates. (US EPA)

EXAMPLES FROM THE PIONEER VALLEY

Town of Pelham

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.

EXAMPLES FROM OUTSIDE THE PIONEER VALLEY

Please visit the [Massachusetts Smart Growth Toolkit](#), developed by the Executive Office of Energy and Environmental Affairs, for more examples of LID in Massachusetts.

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Mixed Use Development Districts



What is the objective of Mixed Use Development Districts?

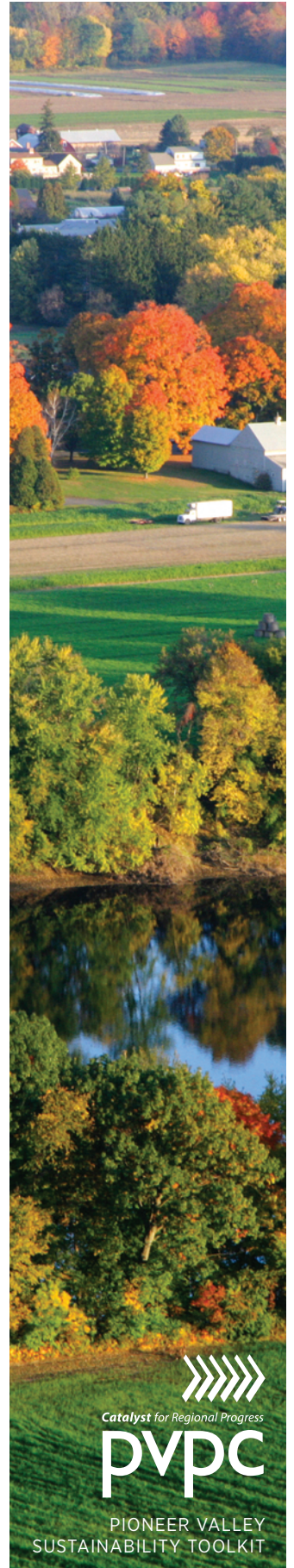
Mixed use districts foster well planned, mixed use, compact developments within downtown and village areas, in keeping with the character of traditional New England villages. They can create places with unique and positive local identities, and provide development opportunities for expanding a community’s economic diversity and vitality.

Why are Mixed Use Development Districts needed?

Low density urban sprawl has become the Pioneer Valley’s dominant form of growth, consuming open land at an accelerated pace. Smart growth principles promote the mixing of commercial and residential uses to help create more interesting, functional, and environmentally sensitive built environments. Mixed use developments integrate housing, shops, offices, schools, parks, and civic facilities into compact areas to make biking, walking, and using transit easier. They can help limit sprawl and lessen air pollution.

How do Mixed Use Development Districts work?

Communities can adopt mixed use village center zoning to provide for pedestrian-friendly “Main Street” shopping districts with attractive facades, parking on the street or behind buildings, tree-lined streets and human scale buildings with offices/apartments above first-floor shops. Mixed-use projects can combine residential, retail, office, and public institutional uses in compact villages or clusters to provide opportunities for people to live close to work and services.



A Mixed Use Development District can be adopted as either a stand-alone zoning district, or as an overlay district which can be superimposed over several underlying zoning districts. This bylaw/ordinance does not create any new zoning restrictions, but rather allows new opportunities for economic development.

The Bylaw/Ordinance will allow mixed use developments to be constructed with the approval of a Special Permit with Site Plan Approval granted by the Planning Board. The following uses may be included within a mixed use development: retail uses; quality restaurants; multi-family residential uses; home occupations; professional service offices; personal service establishments; municipal uses; banks or financial institutions; health club; small hotel or motel; bed-and-breakfast establishments; townhouses; theatre; park; artist studio/residence; assisted living residential uses; parks and recreation; artisan manufacturing; civic uses; live/work units; multiple uses in the same structure.

The Bylaw/Ordinance prohibits certain uses in Mixed Use developments, such as industrial uses, gas stations, dry cleaning, auto sales, adult uses, bars, and animal hospitals.

To protect the community and neighborhoods, the Bylaw/Ordinance contains detailed performance standards for such issues as: access and traffic impacts; noise; vibration; odors; lighting; storage; waste disposal; loading; vehicular access; parking; architectural design; signs; and landscaping.

Finally, the Bylaw/Ordinance provides a density bonus for Mixed Use developments that include affordable housing.

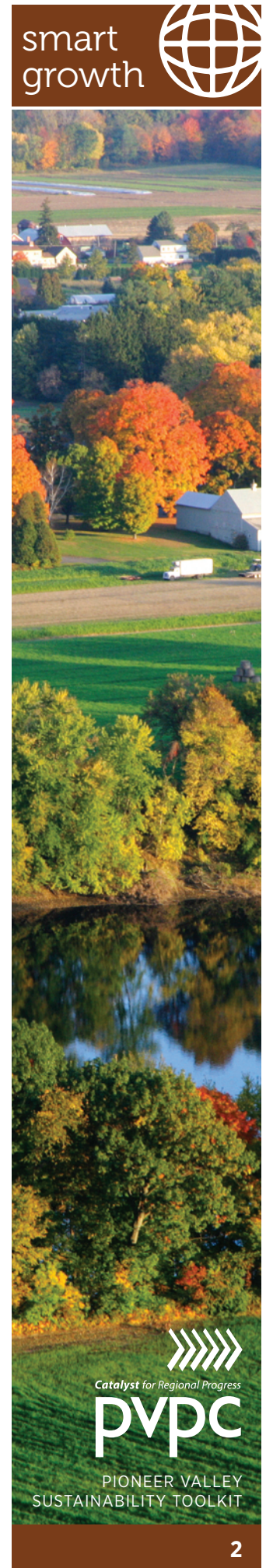
DID YOU KNOW...

In a Seattle study, authors found that by mixing land uses and enhancing the relative convenience on non-auto travel, 12.2% of all trips were non-motorized, compared to 3.9% in single-use residential neighborhoods.

MIXED USE DEVELOPMENT EXAMPLES FROM THE PIONEER VALLEY

South Hadley Village Commons

The Village Commons is an outstanding example of a mixed use development in South Hadley center, which includes retail shops and restaurants, a movie theater, as well as a residential component. It is designed to fit compactly on a small site on the town common, with a well defined street line, pedestrian friendly features and parking in the rear.



Pomeroy Commons, Amherst

Pomeroy Commons is a mixed-use development in Pomeroy Village Center of Amherst. Five townhouse style residential units occupy the top two floors, with commercial space on the street level. The site is located in the center of south Amherst, within walking distance of many amenities. The building features a front porch and balcony in the style of a grand old Berkshires hotel, parking in the rear, and secure bicycle storage in a shed at the end of the building.

Hatfield Mixed Use Zoning

The Town of Hatfield adopted a new Mixed Use Zoning District in 2013 to foster well-planned, compact mixed use development in its village center areas. The adopted district is established in four villages of town including: Hatfield Center, West Hatfield, North Hatfield and Hatfield Mills. The bylaw allows mixed use developments to be constructed with a Special Permit from the Planning Board. They can combine residential, retail, office, and public institutional uses in compact villages or clusters.

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

FOR MORE INFORMATION, PLEASE CONTACT

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Open Space Residential Development, Creative Development, & Conservation Development Bylaws

What are the objectives of Open Space Residential and Conservation Developments?

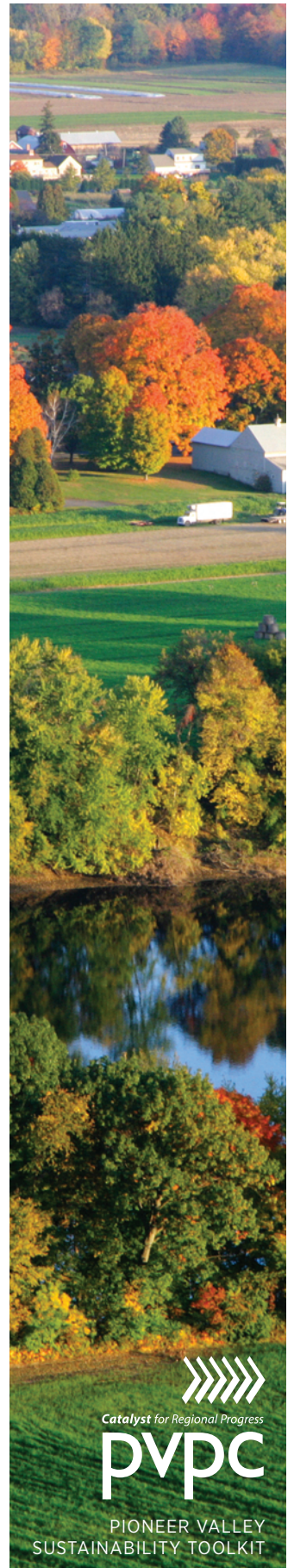
Cluster, Open Space, Conservation or natural Resource Developments, they are called many names as they've evolved over the decades but they are all essentially a variation on a theme, developments utilizing smaller lots in order to create more common open spaces. By promoting compact residential developments utilizing more flexible dimensional standards communities can preserve and enhance their rural town character by protecting open space, natural resources, and scenic areas, as well as promote the use of sustainable and energy efficient development standards .

Why do we need Open Space Residential & Conservation Developments?

Growth in many of our small cities and towns has been primarily comprised of ANR residential development along existing town roads and large lot single family home subdivisions. This has resulted in sprawling residential strips and the clearing of large swaths of woodlands and the conversion of farmland for individual single family homes. This has not only resulted in the loss of natural resources but has also contributed to the loss of a community's rural character and small town identity. Open Space Residential and Conservation Developments provide an alternate way for towns to accommodate growth, but in a more flexible manner which preserves open space and reduces the visual impact of residential development.

DID YOU KNOW...

In a national random sample survey of 1,130 adults age 18 and older, about 55 percent of Americans prefer a smart growth community and 45 percent prefer a sprawl community, after hearing detailed description of the two community types. (2004 National Community Preference Survey, conducted for Smart Growth America and National Association of Realtors).

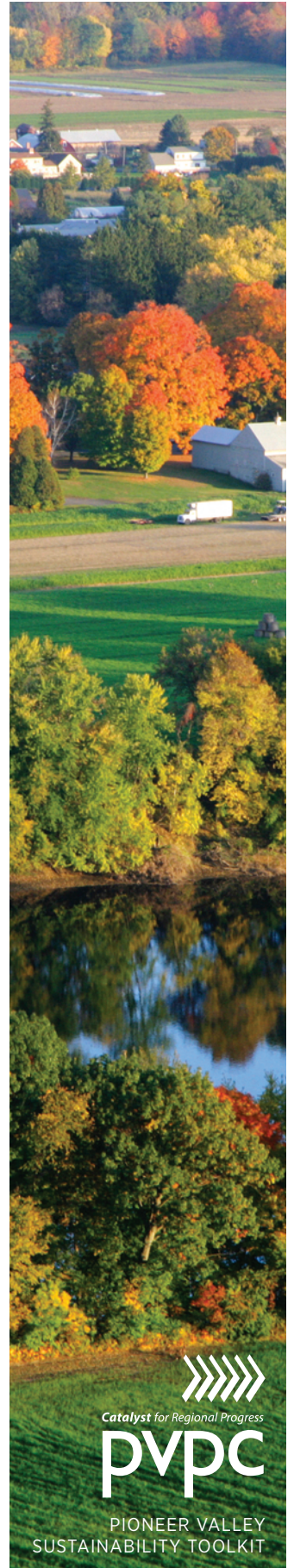




How do Open Space Residential and Conservation Development bylaws work?

These types of bylaws promote development using common driveways and flexible area and frontage requirements to create permanent open space and avoid standard Approval Not Required and conventional subdivision developments. While some versions are permitted by Special Permit recent variations are allowed by-right with a Site Plan Approval process. Through this process, towns work with the applicant to consider development standards such as Stormwater Management, Low Impact Development, Green Energy and Open Space Connectivity in designing the layout of lots and designing the development around the unique characteristics of the land. A portion of the development must also be set aside as permanently protected open space.

Over 65% of the communities in the Pioneer Valley Region have adopted Open Space Residential or Conservation Development Bylaws in one form or another.



PVPC OFFERS THREE MODEL VARIATIONS OF THESE BYLAWS:

Open Space Residential Development bylaw

This model is based on the more traditional cluster concept adopted by most communities in the region over the last 30 years. It often requires a Special Permit, Open Space Residential Developments permit greater density on smaller lots but includes specific minimum dimensional requirements for the reduced lot sizes and frontages. This bylaw typically requires a minimum 50% open space requirement. Only a limited percentage of the open space can be composed of wetlands, floodplains and areas of steep slopes to ensure adequate open space for active outdoor recreational activities.

Creative Development Bylaw

Expanding on the original version, Creative Development Bylaws utilize the same principles as Open Space Developments but allow more flexibility by utilizing common driveways and permitting reduced minimum lot sizes with no minimum frontage requirements. The purpose of this approach is to preserve open space and encourage structures to be situated on the site in a manner that minimizes their visual impact. Creative Developments are permitted by Special Permit and offer Farmland Preservation Standards as well as an Affordable Housing alternative.

Conservation Development Bylaw

Representing a more recent evolution of the concept, and building on the Creative Development Bylaw, Conservation Development Bylaws provide extremely flexible dimensional standards with no dictated minimum lot size or frontage requirements. The purpose of this is to encourage the design of the development that best fits the parcel's unique landscape--conserving the most unique features and blending roads and structures into the site's existing topography, vegetation, and context. The type of conserved open space has been expanded to also include farmland, historic/cultural and significant natural features, endangered species habitat and scenic views. The intent is that through the imaginative layout of the road, buildings and open space these parcels can appear to be undeveloped from the town roads giving the appearance of open space. To encourage developers to take advantage of this alternative Conservation Developments are often permitted By-Right with Site Plan approval and apply to both "ANR" lots and subdivisions.

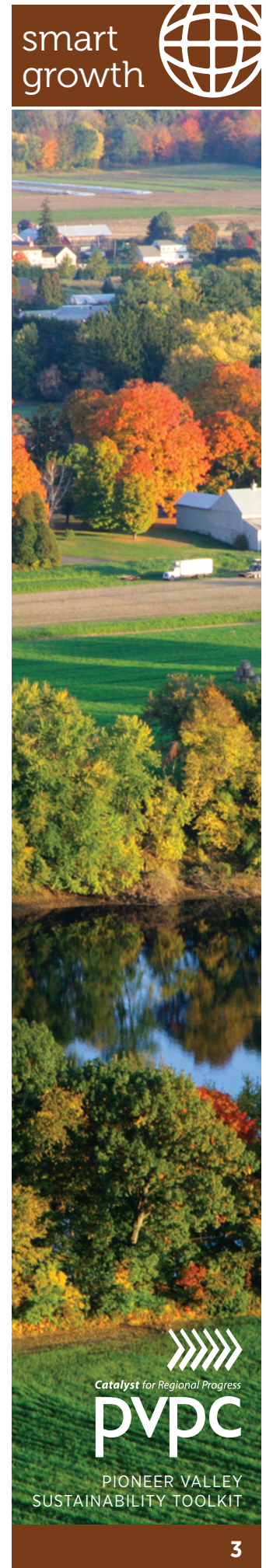
A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Parking Bylaws



Northampton Parking Garage

What are the objectives of a parking bylaw?

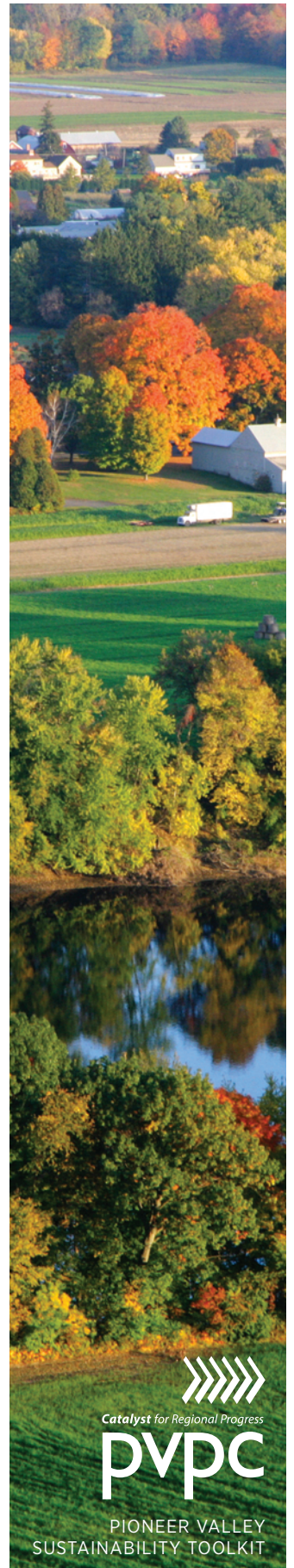
To ensure that all uses provide sufficient off-street parking space to meet the needs of employees, patrons and deliveries; to reduce congestion on streets; to improve pedestrian and vehicular circulation and safety in a cost effective and environmentally sound manner.

Why do we need a parking bylaw?

Parking is an essential component of any land use as well as the overall transportation system. Parking must be accommodated at every destination whether at a residence, convenience store, commercial strip or urban center. The vast majority of a vehicle's life is spent parking and utilizes several parking spaces over the course of the day. From a consumer's point of view there is a perceived parking problem if they can't park near the front door of where they want to shop, and from a developers point of view they are required to provide too much parking. Parking problems are less often a matter of supply and more often a matter of inefficient management of existing resources. Parking regulations promote better designed, more efficient and cost effective off-street parking creating more functional and attractive communities with reduced environmental impacts.

How do parking bylaws work?

Parking requirements are typically based on general land use categories and calculated on either the amount of square footage of a facility or the number of cars/trucks expected to be generated. Often times these numbers are based on a worst case scenario (i.e. holiday season shopping) leaving a majority of the parking lot unused for large portions of the year (resulting in increased construction costs, excessive stormwater run-off and heat island effects). In many urban centers parking requirements are being reduced



(and in some cases even eliminated) in place of instituting better parking management practices (off hour/dual usage of spaces, combined facilities, shared off-site facilities, parking garages, peak demand plans, pricing, improved signage, encouraging other modes of transportation, etc.). Bylaws can also, through a Special Permit, allow for a reduction in the number of parking spaces where it can be demonstrated as being warranted (employer car/van pooling, flexible/alternative work hours, telecommuting programs).

Some communities also allow for a payment into a municipal parking fund in lieu of physically providing the spaces on the ground. This enables communities to raise funds to develop new shared municipal parking facilities.

DID YOU KNOW...

Cost-effective parking management programs can usually reduce parking requirements by 20-40%

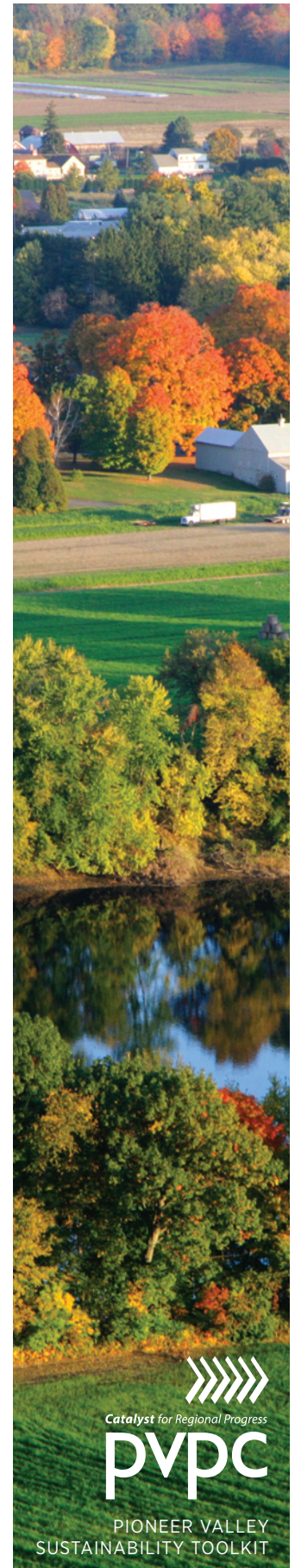
EXAMPLES FROM THE PIONEER VALLEY

Northampton MA

Northampton recently eliminated most of the parking requirements for its Central Business District. The downtown is well served by a municipal parking garage as well as a number of strategically located municipal parking lots. In addition the Planning Board can issue a Special Permit allowing multiple buildings, uses and parcels to share a combined facility. In all districts except the Central Business District the Planning Board can permit (through Site Plan Approval) a reduction of up to 20% of the required number of spaces with an acceptable trip reduction plan and even greater percentages (through a Special Permit) where dual usage of spaces are utilized based in different peak demand periods. The Planning Board can also issue a Special Permit for off-site parking in available non-municipal lots within 500-1000 feet of the use. The Central Business District also allows a by-right option to pay into a Downtown Parking Reserve Account to be used solely for expenses related to increasing parking availability, improving the management and utilization of existing parking spaces, or reducing the need for new parking.

Westfield, MA

Recognizing that strict on-site parking requirements sometimes discouraged otherwise viable and desired downtown revitalization projects, the city of Westfield recently revised its parking ordinance to provide more flexible standards and options. While downtown Westfield does not have a parking garage, it does have a number of well utilized and maintained municipal lots behind its main street stores. The ordinance allows for shared off-site facilities within 300 feet of the uses. The Planning Board can also issue a Special Permit for the multiple use of individual spaces in accordance with an approved Parking Management Plan. The Plan must demonstrate that the peak parking demand generated by the uses occur at different times, and that there will be adequate parking for the combined uses at all times. Westfield also offers a “payment in lieu of” option by Special



Permit in the downtown. These other new parking options are not just limited to the downtown but are also available in all business and industrial districts.

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

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Catalyst for Regional Progress

PVPC

PIONEER VALLEY
SUSTAINABILITY TOOLKIT

Planned Business Development



Village Commons, South Hadley

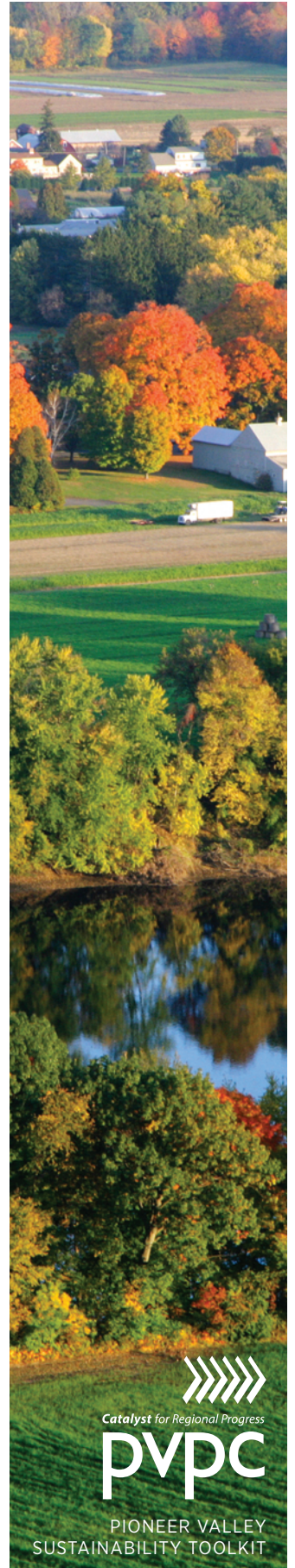
What are the objectives of Planned Business Development?

A Planned Business Development offers an alternate development tool allowing for a more creative and innovative approach to developing business and industrial uses. Projects are undertaken in a comprehensive coordinated manner with clustered buildings often utilizing shared parking, signage and utilities such as storm water drainage systems.

Planned Business Developments result in a lessening of traffic congestion, reduction in vehicle trips, and an increase in public safety through the coordination of land development and traffic patterns. They also promote more attractive development through grouping in clusters and nodes instead of typical highway strips. The resulting projects can be more compatible with existing development on adjacent sites, create a more pedestrian-friendly environment in both design and scale, and utilize a development review and approval process that meets these purposes without causing undue delays.

Why are Planned Business Developments needed?

By promoting Planned Business Developments, communities can capitalize on their limited availability of business and industrially zoned properties by maximizing their development potential with more efficient land usage resulting in an expanded tax base and increased job opportunities. Planned Business Developments provide greater opportunity for the construction of quality, attractive developments on large (or even limited) tracts of land by providing flexible guidelines which allow the integration of shared utilities and on-site improvements and increased densities in one development, sometimes issued under a single Special Permit/Site Plan Approval permit.



How does the zoning for Planned Business Developments work?

Communities adopt zoning provisions permitting Planned Business Developments through the issuance of a Special Permit and/or Site Plan Approval. These provisions also establish incentives to promote Planned Business Developments and performance standards to ensure that such projects have a positive effect on a community’s environment, character and quality of life. The incentives could allow for reduced lot sizes, increased densities, increases in the allowed percentage of building coverage, shared parking and reduced parking requirements.

DID YOU KNOW...

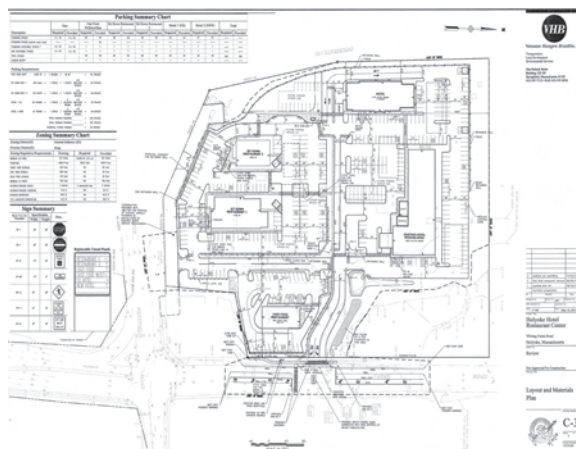
Planned Business Developments can be permitted through the issuance of a single Special Permit/Site Plan Approval that covers the entire parcel(s)/project. This single approval has the advantage of making the subsequent development of the individual units more marketable as being “shovel ready” and pre-permitted.

EXAMPLES FROM THE PIONEER VALLEY



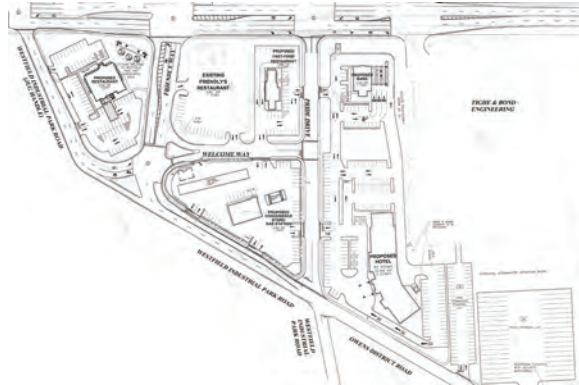
Village Commons, S. Hadley

Following a major fire, this site was redeveloped as a comprehensive mixed use project including retail shops, professional offices, restaurants, coffee shops, theaters personal services and apartments.



Holyoke Hotel & Restaurant Center, Holyoke

Proposed at the corner of Lower Westfield Road and Whiting Farms Road, this proposed redevelopment of a former Holiday Inn site will encompass a new hotel along with an array of restaurant types. Submitted as a single comprehensive project including all on-site traffic circulation, storm water drainage, lease areas, building envelopes, etc. The Planning Board approved the overall development's master plan and uses with unknown specific tenants. As each site is leased, tenants will meet with the Planning Board to review their lease area's landscaping and building materials.



Westpark, Westfield

Developed on Southampton Road across from the Mass Turnpike interchange, this development was also approved as a master plan addressing all traffic circulation, storm water drainage, and lease areas for the site. Like the example from Holyoke, the initial submission included only one identified tenant (Holiday Inn Express) and as each site is leased tenants will meet with the Planning Board to review their lease area's landscaping and building materials.

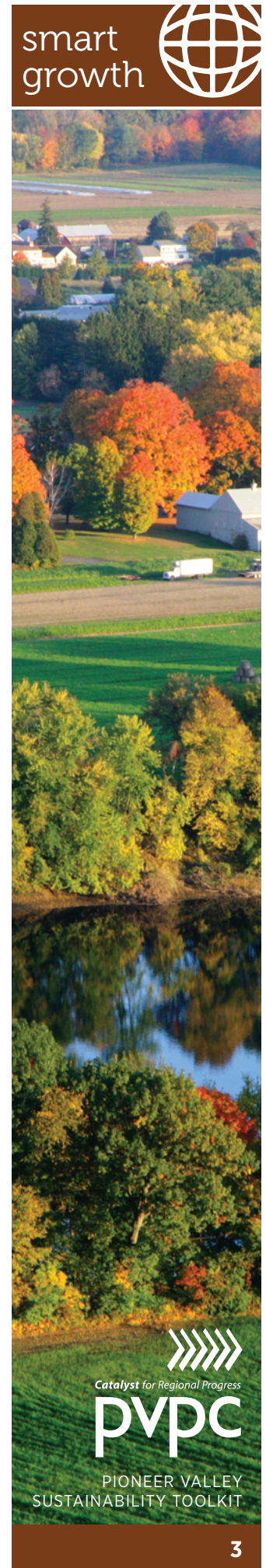
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Planned Unit Development



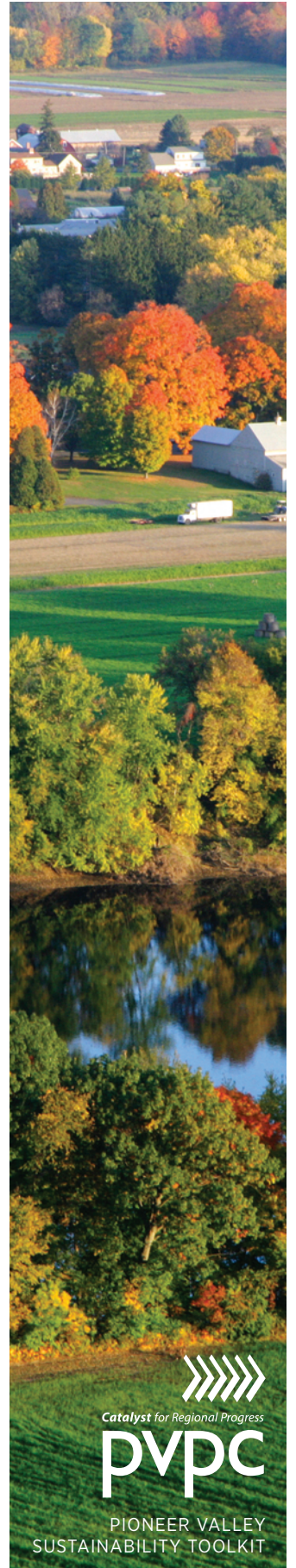
Echo Hill, Amherst

What are the objectives of Planned Unit Development?

The Planned Unit Development (PUD) is a form of development that usually includes a mix of housing units and nonresidential uses in one unified site or subdivision. Communities can minimize sprawling growth by replacing it with alternative development patterns such as Planned Unit Development projects which combine residential, retail, office, and public institutional uses in compact, pedestrian-friendly villages or clusters. PUDs create opportunities to live and work close to shopping, and services; and placing housing and jobs in close proximity reduces the number of vehicle trips to work, home, or shopping, limiting air pollution.

Why are Planned Unit Developments needed?

The adoption of a Planned Unit Development bylaw promotes development projects to develop a tract of land (relatively large scale, but not always) in a unified manner. Through PUDs, a municipality can achieve greater design flexibility in the development of particular land areas, and guide commercial and mixed-use projects to reflect the needs and character identified by the community. PUDs also provide the opportunity to achieve flexibility in architectural design, a mix of compatible land uses as well as the preservation of key natural or historic features, that are otherwise difficult to achieve using traditional, lot-by-lot zoning.



How does the zoning for Planned Unit Developments work?

Communities can adopt zoning provisions that establish incentives to promote Planned Unit Developments and performance standards to ensure that such projects have a positive effect on a community’s environment and quality of life. The incentives could allow for reduced lot sizes, increases in the allowed percentage of a lot that can be built upon, and reduced parking space requirements provided that the development is clustered and planned as an integral unit.

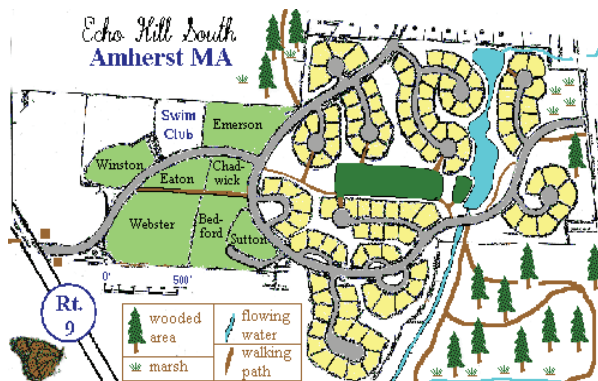
DID YOU KNOW...

In a 1990 study comparing market appreciation of homes in a cluster development versus a conventional subdivision, the cluster/open space Echo Hill development exceeded its conventional counterpart, Orchard Valley, in open-market, sale-price appreciation during the period of 1968 to 1989. (“An Examination of Market Appreciation for Clustered Housing With Permanent Open Space”, Jeff Lacy, Center for Rural Massachusetts)

EXAMPLES FROM THE PIONEER VALLEY

Echo Hill, Amherst

Located off of Route 9 in Amherst, Echo Hill South was conceived and built in the 1960s, becoming the first “open-space” development built under zoning in Massachusetts. Utilizing the flexible provisions of the planned unit development zoning bylaw, the developer and landscape architect designed and built the subdivision while preserving over 36 acres of commonly-held, open-space – nearly half the total area of the original tract.



Source: Echo Hill South (EHS) Community webpage

Echo Hill South houses six sets of condominiums, 102 single family homes, protected open space, marsh, walking trails, a health club and small commercial center. To accomplish this without affecting the overall housing density, individual house lots were reduced from the required one-half acre lots in the underlying zoning, to one-quarter acre. The remaining lands are now held in common ownership, with each individual homeowner possessing an undivided, but equal, interest in the property.



One major collector street serves the development. This roadway was built “over-standard,” having a paved width of 31 to 32 feet, 3 feet of which, on either side, is marked for pedestrian travel. It is a through-street, linking Echo Hill South to three entries and exits onto major roads. None of the 102 house lots have their road frontage on this collector street. Rather, 13 cul-de sacs and “eyebrow” streets form the core of distinct neighborhoods where the houses are grouped. These roads, designed for local-access traffic only, were built “under-standard,” with paved widths ranging from 21 to 28 feet. Each of the 13 access streets serves from 3 to 14 units, creating distinct groupings of houses.

The removal of trees and low-growing vegetation from the house lots was kept to a minimum. Open space, in the form of woods and fields, threads between adjoining neighborhoods, providing privacy while creating a rural atmosphere. Most of the open land remains in its natural, wooded state with an inter-connecting network of trails, providing every resident to direct access to the open space. A large, open field has been maintained as a “town green” which provides space for ball sports and community events. Nearby, a pond with park benches is available to residents for fishing, birdwatching and skating.

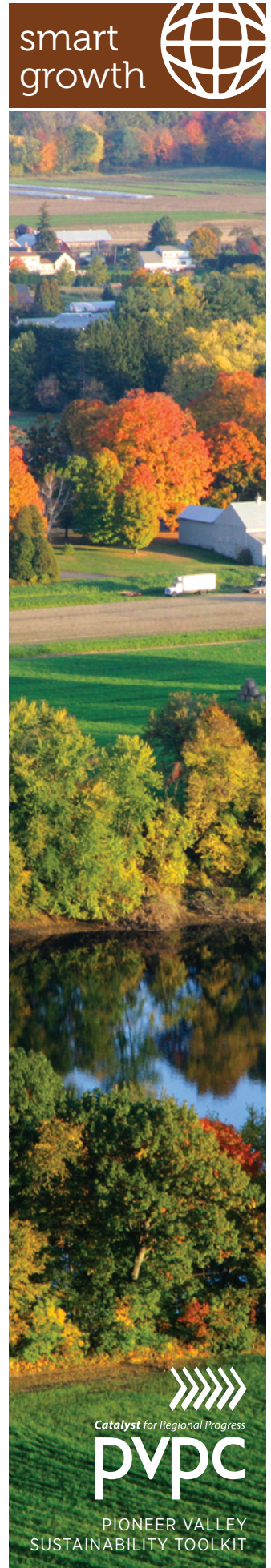
A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Ridgeline & Hillside Development Bylaws



View of the Holyoke Range from Interstate-91

What are the objectives of Ridgeline and Hillside Protection Bylaws?

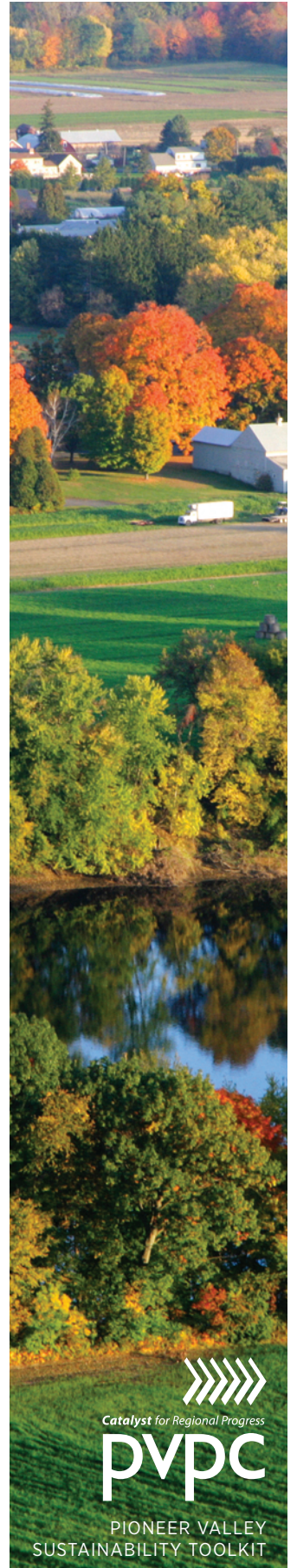
To protect scenic areas, such as prominent ridge lines, or exceptional vistas, as important resources which contribute to the character and quality of life in a community. These bylaws encourage carefully designed low-impact development which minimizes the removal of native vegetation and limits the excavation and alteration of land in order to reduce environmental impacts. Such bylaws also preserve and enhance biodiversity, wildlife habitat, corridors and open space linkages.

Why do we need Ridgeline and Hillside Protection Bylaws?

Most member communities of the Pioneer Valley Planning Commission are fortunate to have large areas of undeveloped hillsides, valleys and ridgeline areas which not only contribute considerable scenic and aesthetic value to the community's historic character, but also have special environmental and public health and safety concerns associated with their development. Inappropriate development of these fragile areas can result in excessive cuts and fills, unattractive slope scars, and erosion and drainage problems which can further result in septic tank failures, sedimentation, flooding, water pollution and the destruction of scenic qualities or natural resources.

How does a Ridgeline and Hillside Protection Bylaw work?

Adopted as an Overlay District, these regulations are designed to ensure that the development of such areas is done in an environmentally sensitive manner which protects the public health, safety, and welfare. Ridgeline and Hillside Protection Bylaws



are designed to be flexible, allowing for development to be tailored to the unique individual characteristics of each site and encouraging innovative approaches to ensure minimal environmental impacts. Bylaws include guidelines for appropriate site planning, buildings, utilities, grading, landscaping and erosion and sedimentation control. Development projects are reviewed by an advisory board that makes recommendations to the permitting authority ensuring that they comply with the purpose of the bylaw by balancing the development of the site with minimizing site alterations and impacts on the natural setting.

DID YOU KNOW...

Ridgeline and Hillside Protection Bylaws have two major objectives: the protection of views and the protection of natural features associated with hillside ecosystems.

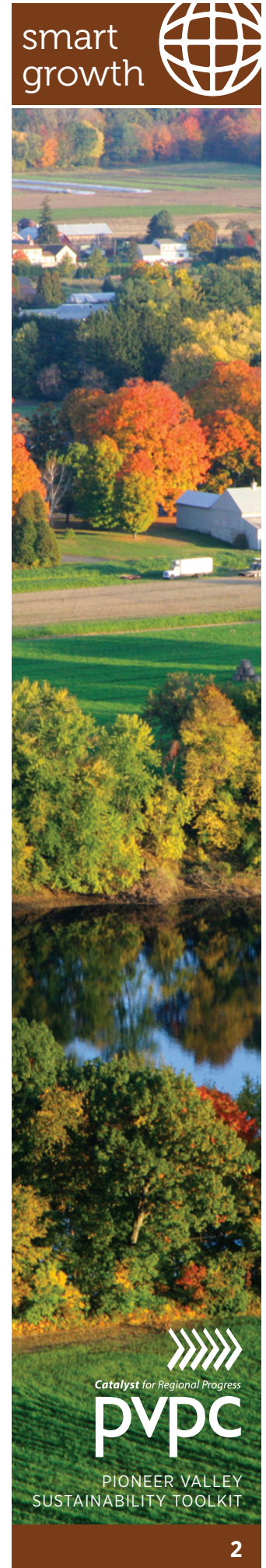
(“Aesthetics, Community Character, and the Law”, American Planning Association)



EXAMPLES FROM THE PIONEER VALLEY

Mount Tom and Mount Holyoke Ranges

In addition to ridgeline and hillside protection zoning bylaws, an intergovernmental compact is another way to protect these resources. The Mount Tom and Mount Holyoke Ranges’ unique attributes and vital natural resources are key components in defining the region’s character and quality of life especially in the Towns of Amherst, Belchertown, Granby, Hadley, and South Hadley, and the Cities of Easthampton and Holyoke. On April 21, 2001, the “Summit on the Range” was held and included participants from throughout the Pioneer Valley. Participants agreed to work cooperatively toward the protection of the Mount Tom and Mount Holyoke Ranges. Through a Memorandum of Agreement (MOA), the Towns of Amherst, Granby, Hadley, and South Hadley, the cities of Easthampton and Holyoke, the Pioneer Valley Planning Commission, the Executive Office of Environmental Affairs, as well as other signatories to the agreement agreed to work cooperatively to seek protection of the Mount Tom and Mount Holyoke Ranges and their scenic, natural, recreational and historic attributes.



The following PVPC communities of have adopted Ridgeline and Hillside Protection Bylaws:

- » Hampden
- » Monson
- » Wilbraham

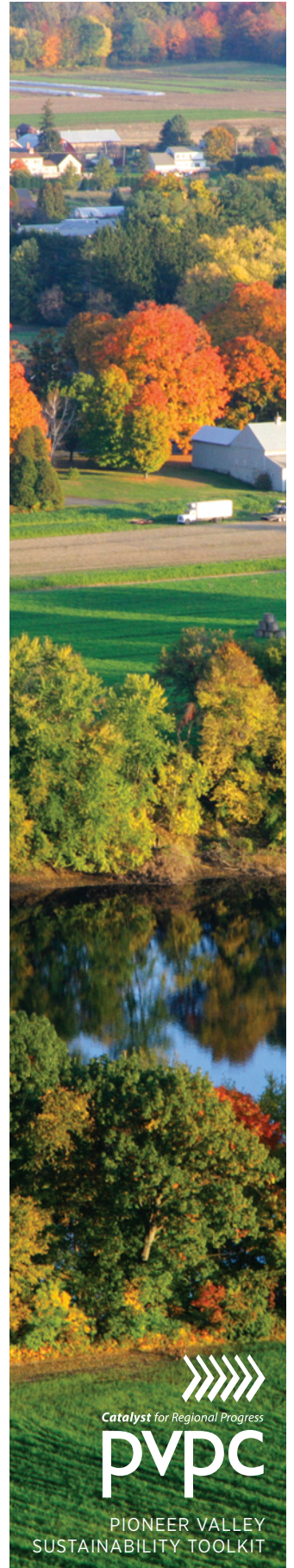
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Right to Farm Bylaws



What are the objectives of a Right to Farm Bylaw?

To protect and encourage the growth and development of farm-related businesses by protecting farmers and farm operators against nuisance lawsuits.

Why do we need a Right to Farm Bylaw?

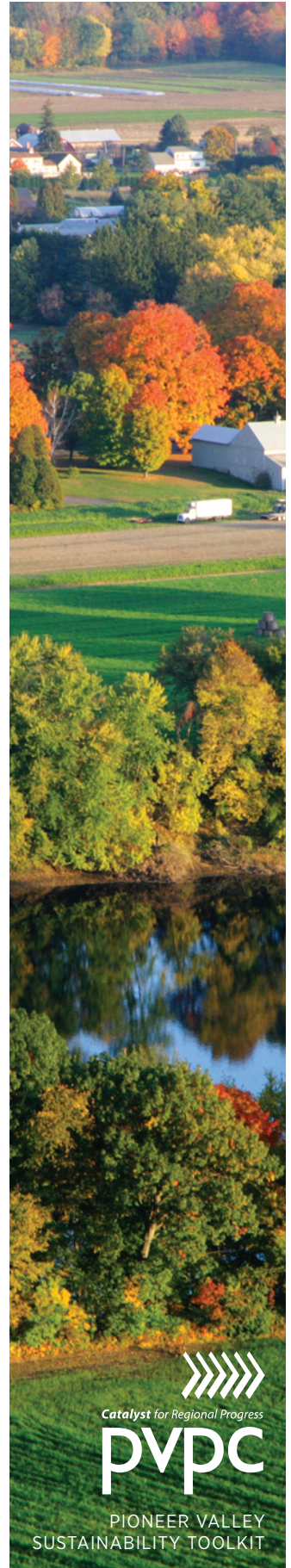
Over the past 30 years, as productive farmland has been converted to residential development, persons not involved in farming were beginning to move into traditional agricultural areas and with them they were bringing new complaints concerning odor, flies, dust, noise from field work, spraying of farm chemicals, slow moving farm machinery, and other necessary byproducts of farming operations. Many states, including Massachusetts, adopted Right to Farm language in the state statutes to protect active farmers from nuisance lawsuits from neighbors. Local communities in Massachusetts can also adopt a local Right to Farm bylaw to create public awareness relative to the needs of local farms and farmers.

How does a Right to Farm bylaw work?

A right-to-farm bylaw is a general bylaw that encourages the pursuit of agriculture, promotes agriculture-based economic opportunities, and protects farmlands within the community by allowing agricultural uses and related activities to function with minimal conflict with abutters and town agencies. Language is based on the all state statutes and regulations protecting agricultural activities, such as MGL Chapter 40A, Section 3; Chapter 90, Section 9; Chapter 111, Section 125A and Chapter 128 Section 1A.



Such a bylaw or ordinance restates and republishes these rights pursuant to a town's authority conferred by Article 89, or the "Home Rule Amendment" of the Massachusetts Constitution.



DID YOU KNOW...

In 1997, farm product sales in Massachusetts reached an all-time high of \$454 million. Net farm income —returns to the farm operator after paying expenses—climbed to a record high of \$143 million in 1997.

(“Agriculture’s Hold on the Commonwealth”, University of Massachusetts Amherst, 2000)

EXAMPLES FROM THE PIONEER VALLEY

Smart Growth Technical Assistance Grant Program

Several communities in the Pioneer Valley region were funded under Rounds 1 and 2 of the Smart Growth Technical Assistance Grant Program to prepare and adopt right-to-farm bylaws/ordinances. The Towns of Middlefield and Plainfield were funded under Round 1, both of which have adopted right-to-farm bylaws at their annual town meetings. The communities of Agawam, Granville, Hampden, Montgomery, and Westhampton were funded under Round 2 of this grant program. The Towns of Montgomery and Westhampton have adopted right-to-farm bylaws at Town Meeting. The Town of Hampden will vote on this bylaw at their spring town meeting and the Town of Agawam will vote on their right-to-farm ordinance during the summer of 2007. The Town of Granville has not yet adopted their right-to-farm bylaw but will consider it at a future town meeting.

Communities that have adopted Right to Farm Bylaw

Cummington / Hadley / Hatfield / Middlefield / Montgomery / Northampton / Plainfield / Southwick / Westhampton

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Rivers Protection Bylaws



East Branch of the Westfield River

What are the objectives of a local Rivers Protection Bylaw?

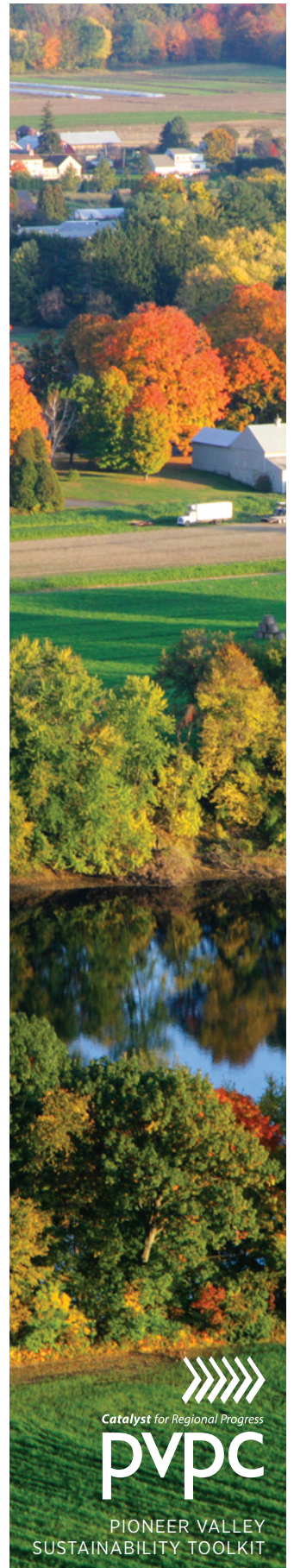
To increase community control over activities on riverfront areas not regulated by the Massachusetts Rivers Protection Act. Although the Rivers Protection Act does offer communities an opportunity to protect river areas, it is too broad-based to address specific community concerns generated by development activities.

Why do we need a local Rivers Protection Bylaw?

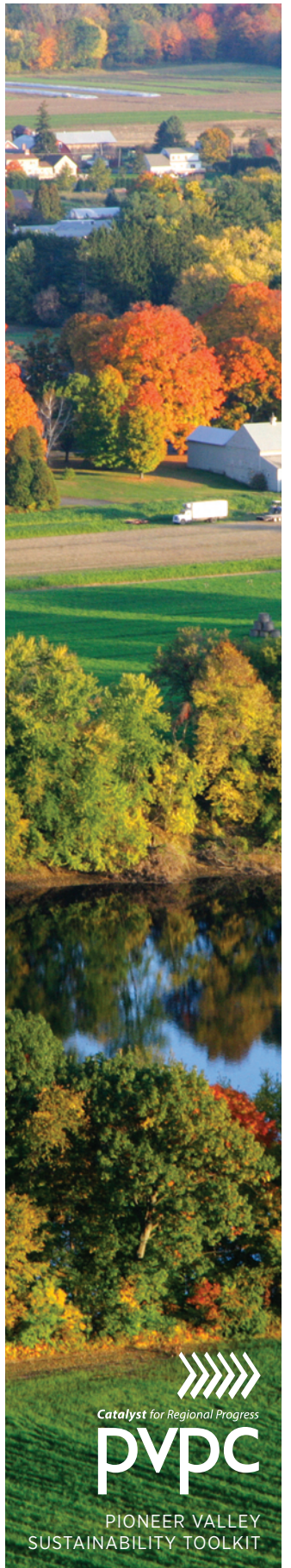
River channels, riverbank areas, and floodplains are rich ecological areas, providing habitat for a diverse array of birds, fish, plants, and animals. Linear river channels function as wildlife corridors for migrating birds, anadromous fish, and many animals. Rivers also attract people, being ideal places 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 does a Rivers Protection Bylaw 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.



DID YOU KNOW...

Stormwater runoff is our most common cause of water pollution. Rainwater and snowmelt run off streets, lawns, farms, and construction and industrial sites and pick up fertilizers, dirt, pesticides, oil and grease, and many other pollutants on the way to our rivers, lakes, and coastal waters. (US EPA)

EXAMPLES FROM THE PIONEER VALLEY

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 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.



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.

Each of the Westfield River Wild and Scenic communities has adopted a River Protection Zoning Overlay District which:

- » Restricts development within 100 feet of the river;
- » Limits cutting of trees and vegetation along the riverbank; and,
- » Prohibits uses which could degrade water quality to the river.

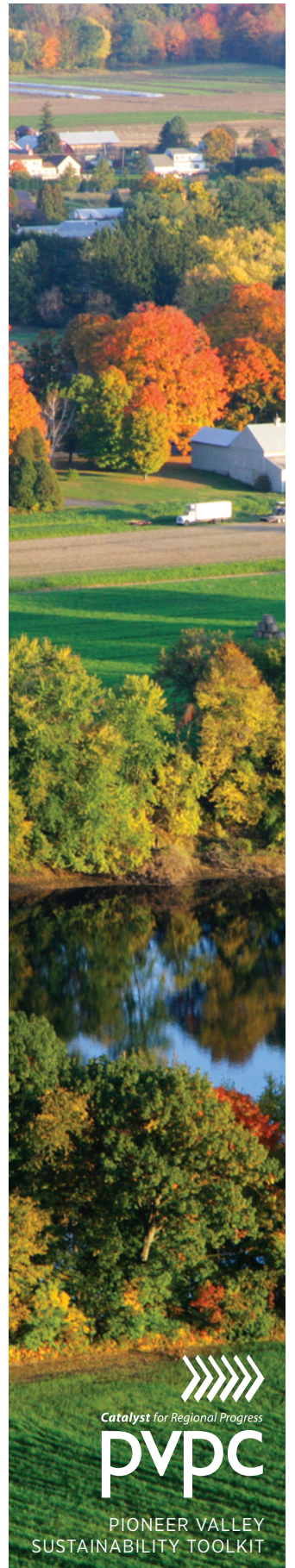
A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Scenic Upland Protection



View of the Holyoke Range from Interstate-91

What are the objectives of Scenic Upland Protection?

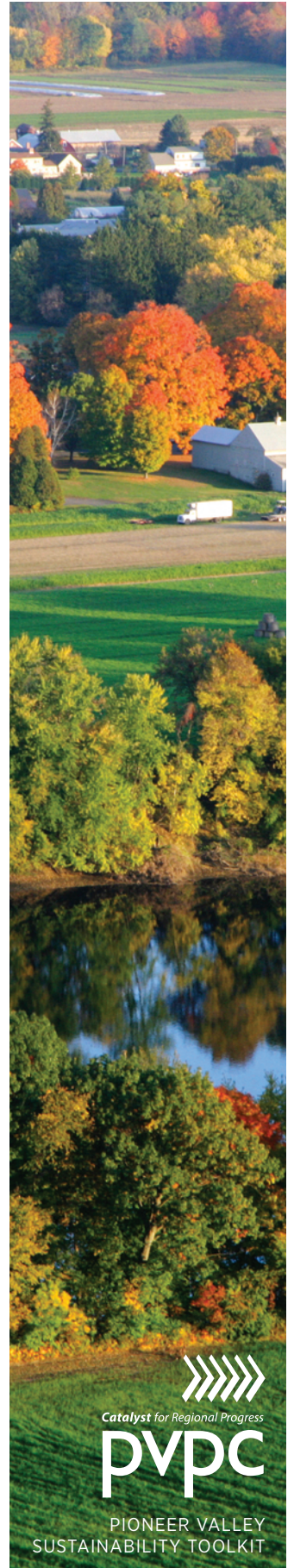
To protect scenic areas, such as prominent ridge lines, or exceptional vistas, as important resources which contribute to the character and quality of life in a community. To avoid problems of erosion, sedimentation, septic tank failures, flooding, water pollution, and the destruction of scenic qualities or natural resources.

Why do we need Scenic Upland Protection?

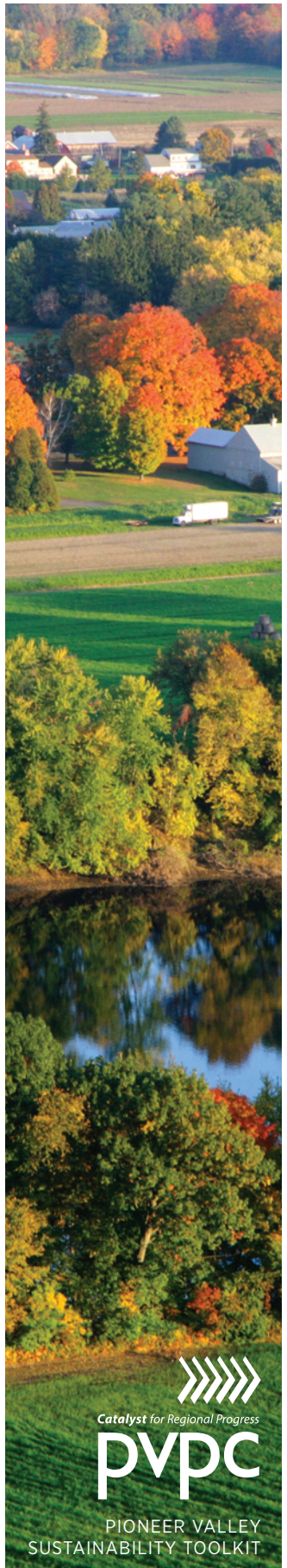
The Pioneer Valley is home to the Mount Tom and Mount Holyoke Ranges, the Berkshire Hills, and many other upland areas which contribute significantly to the unique character of the region. These upland areas have outstanding scenic qualities, outdoor recreational opportunities, wildlife resources, unique geologic features, forest resources, biodiversity, historic features, and unique natural and cultural characteristics. These same areas are also commonly the most fragile areas with the least carrying capacity for development due to steep slopes, unstable or poor soils, and inadequate public infrastructure. To avoid problems of erosion, sedimentation, septic tank failures, flooding, water pollution, and the destruction of scenic qualities or natural resources, development must be done with a particular sensitivity to the land in scenic upland areas.

How does Scenic Upland Protection work?

Scenic upland protection zoning bylaws can protect these important resources by regulating alterations to the land which may have significant effects on these natural resources. Scenic district regulations function in a similar manner to site plan review or design review bylaws. All proposed development is scrutinized for potential negative



effects on the environment, and on the scenic amenities of the district. The following issues can be addressed in scenic area regulations: 1) alterations to the environment, 2) new residential or commercial development, and 3) incentives for land uses which maintain scenic qualities.



DID YOU KNOW...

Scenic Upland Protection Bylaws have two major objectives: the protection of views and the protection of natural features associated with hillside ecosystems.

(“Aesthetics, Community Character, and the Law”, American Planning Association)

EXAMPLES FROM THE PIONEER VALLEY

Mount Tom and Mount Holyoke Ranges



In addition to scenic upland protection zoning bylaws, an intergovernmental compact is another way to protect these resources. The Mount Tom and Mount Holyoke Ranges’ unique attributes and vital natural resources are key components in defining the region’s character and quality of life especially in the Towns of Amherst, Belchertown, Granby, Hadley, and South Hadley, and the Cities of Easthampton and Holyoke. On April 21, 2001, the “Summit on the Range” was held and included participants from throughout the Pioneer Valley. Participants agreed to work cooperatively toward the protection of the Mount Tom and Mount Holyoke Ranges. Through a Memorandum of Agreement (MOA), the Towns of Amherst, Granby, Hadley, and South Hadley, the cities of Easthampton and Holyoke, the Pioneer Valley Planning Commission, the Executive Office of Environmental Affairs, as well as other signatories to the agreement agreed to work cooperatively to seek protection of the Mount Tom and Mount Holyoke Ranges and their scenic, natural, recreational and historic attributes.

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Sidewalk Requirements



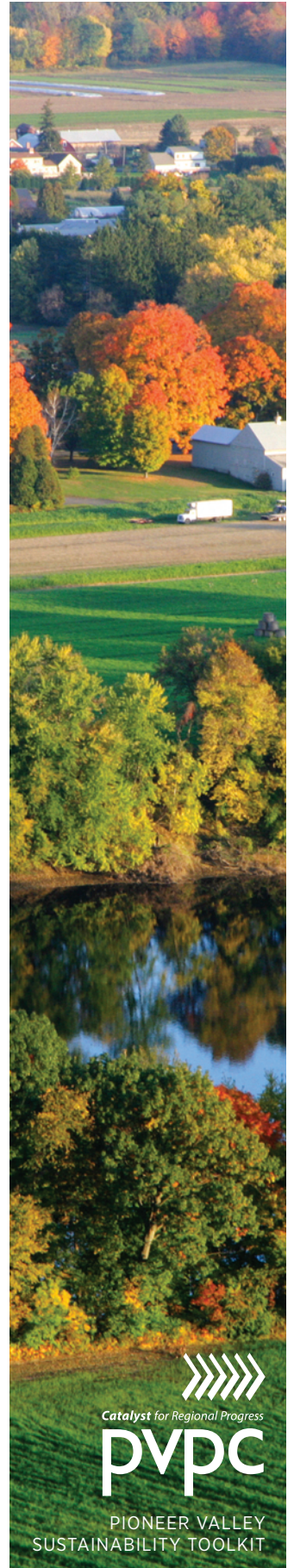
Photo courtesy of flickr user Complete Streets

What are the objectives of sidewalk requirements?

Sidewalk requirements ensure that a community builds and maintains adequate facilities for pedestrians. Pedestrians of all physical abilities and ages need functional sidewalks to safely access goods and services, move freely, and get exercise while carrying out day-to-day activities. Furthermore, sidewalk requirements can promote an attractive streetscape--one that is in harmony with a community's natural, historic, and aesthetic features.

Why do we need to encourage sidewalk requirements in our communities?

In 2012, there were 4,743 pedestrian fatalities and an estimated 76,000 pedestrian injuries in traffic crashes in the United States which equates to a pedestrian killed every 2 hours and injured every 7 minutes¹. High quality sidewalks can improve the safety of pedestrians and reduce the number of pedestrian deaths and injuries. In addition, improving sidewalks encourages more pedestrian traffic which has numerous personal and community benefits. A recent study has noted that by increasing pedestrian traffic, pedestrians in turn become safer². This is known as the safety in numbers hypothesis. As pedestrian traffic increases, deaths and injuries decline as motorists are more aware of pedestrians in the area. Pedestrians also contribute to eyes on the street which can reduce crime.





Sidewalks bring foot traffic to businesses, which can increase the value of real estate and improve a community's tax base. And finally, walking has numerous health benefits. Sidewalks are created in several ways. They may be created by a governmental body as part of road construction. They may be built by a private entity as part of a development project or subdivision. With the passage of the Americans with Disabilities Act in 1990, public entities are prohibited from designing new facilities or altering existing facilities--including sidewalks--without making them accessible to people with disabilities. However, communities can enact policies and regulations to speed implementation and fill gaps.

How do sidewalk requirements work?

Sidewalk requirements may be incorporated into a municipality's zoning code and/or subdivision regulations, and/or design guidelines, and/or as an administrative policy. Sidewalk requirements include regulations on where sidewalks shall be constructed within the community. This should include a) Areas where there are not sidewalks in existence and where pedestrian traffic is not adequately accommodated by existing sidewalks; b) Areas where there is an opportunity to make connections between existing or proposed sidewalks; c) All new developments and redevelopment, construction or reconstruction; and, d) Areas where the health, welfare, and safety of the public require that adequate sidewalks be provided for public convenience, including safe routes for school children to and from educational facilities.

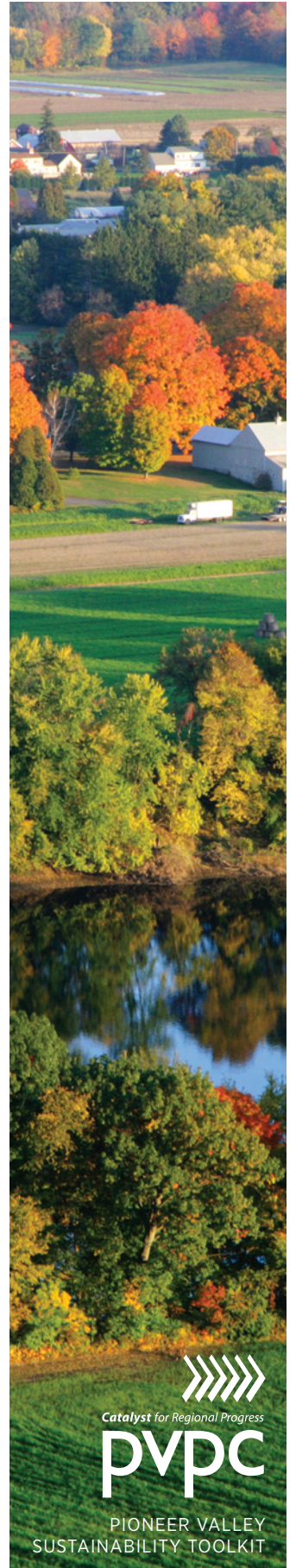
Sidewalk regulations include standards that specify the dimensions and layout of sidewalks. These standards include minimum width requirements in compliance with the Americans with Disabilities Act, as well as slope and grade requirements, and standards that detail curb ramps, how to deal with intersections, driveway crossing, curb extension, crosswalk design, pedestrian signals, etc.

A pedestrian circulation plan may be required for all proposed subdivisions, site plan reviews and special permits. A pedestrian circulation plan includes a) The locations of streets and roads adjacent to the site and proposed roads within a site; b) The location of walkways, road, transit, parking infrastructure and all destination facilities; c) The links between sidewalks and pathways within the development to neighborhood destinations and existing sidewalks in the surrounding area; d) A description of estimated daily and peak-hour pedestrian trips to be generated by the site as well as the flow patterns for pedestrians showing adequate access to and from the site as well as circulation within the site; and, e) An interior traffic and pedestrian circulation plan designed to minimize conflicts and safety problems.

Within the subdivision rules and regulations a paragraph may be inserted in the Design Standards section to provide a direct way for the community to benefit. Requirements may include sidewalks on both sides of all public ways wherever topographically feasible, the inclusion of buffer strips and shade trees, and pedestrian and bicycle connections in cul-de-sac or oddly shaped blocks to enhance circulation. In areas where a sidewalk is limited to one side of the street, provisions may be made for the developer to install or repair an equal number of feet of sidewalk in another area of the community.



Photo courtesy of flickr user Complete Streets



DID YOU KNOW...

That there were 62 pedestrian fatalities in Hampden County and 11 pedestrian fatalities in Hampshire County between 2003 and 2012. The vast majority of these fatalities occurred on roadways of 40 miles per hour and over. (Source: Smart Growth America, *Dangerous by Design* 2014)

EXAMPLES FROM THE PIONEER VALLEY

Many communities in the Pioneer Valley have realized the benefit of encouraging walking through infrastructure improvements. The Town of Ludlow constructed sidewalks within a mile of every elementary school. With children walking to school the town revamped its crossing guard program and saved money on busing. With local funding sources in short supply, many communities have had to “get smart” when it comes to pedestrian improvements. To lower costs, East Longmeadow developed a prioritized sidewalk infrastructure improvement plan and began incorporating the cost of sidewalk improvements into larger roadway reconstruction projects. In the Forest Park neighborhood of Springfield, public works officials replaced painted crosswalks with new long wearing thermoplastic designs. While more expensive initially, the new crosswalks will last 5 times as long as painted crosswalks.

1 National Highway Traffic Safety Administration. (2014). Traffic Safety Facts: 2012 Data. Retrieved from: <http://www-nrd.nhtsa.dot.gov/Cats/listpublications.aspx?Id=A&ShowBy=DocType>

2 Jacobsen, P. (2003). “Safety in Numbers: More Walkers and Bicyclists, Safer Walking and Biking.” *Injury Prevention* (2003): 205-209.

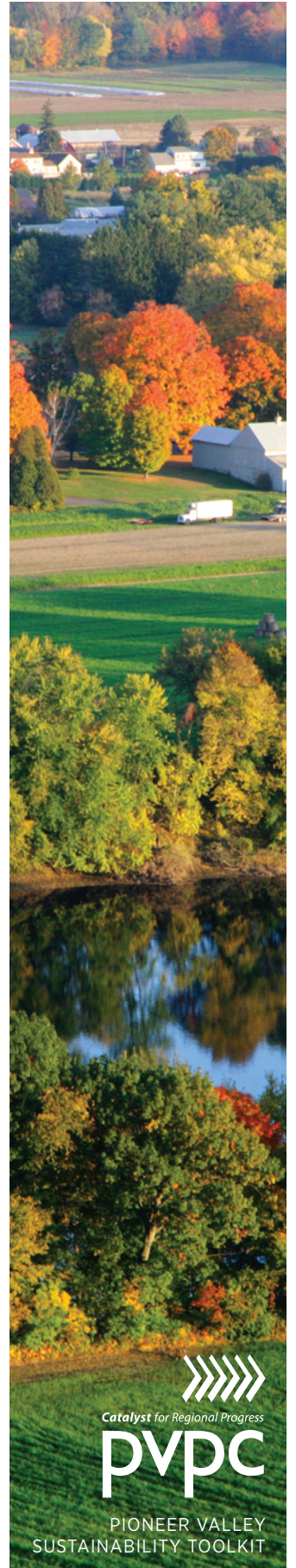
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Sign Bylaws



Route 20 in Westfield

What are the objectives of a sign bylaw?

Sign bylaws establish guidelines and procedures designed to enhance the health, safety and visual environment of the community while still permitting businesses adequate visual exposure to patrons through the use of signage. Sign regulations, which at times may seem excessive, serve to curb unsightly clutter and provide a sense of uniformity to our communities making them more attractive and desirable.

Why do we need a sign bylaw?

Signage is an essential component of most land uses as well as way finding. Sign bylaws encourage the proper development and regulation of signs and signage systems to prevent them from becoming a distraction or obstruction to the safe flow of pedestrian and vehicular traffic. Sign regulations also prevent signage from becoming a nuisance to adjacent properties or uses while protecting and encouraging a healthful economic business environment and protecting the general health, safety, and welfare of the community. Effective sign regulations can promote economic development, create civic identity, identify community activities and events, and create vibrancy and excitement.

How do sign bylaws work?

Sign bylaws should be based on valid public purposes and further community goals. Well written sign bylaws provide comprehensive regulations that are clear, understandable and are easy to both comply with and enforce. They regulate size, quantity, type placement, location and illumination and permit signs which are appropriate for the districts in which they are located. Because there is such a wide variety of sign types, defining what constitutes a sign is critical. At what point does a mural become a sign? Does a canopy or awning sign constitute a wall sign? Signs are typically by-right upon the issuance of a

sign permit by the Building Inspector. However some communities require design review to encourage signage that is consistent and complementary with a district's particular existing character. Some communities require a Special Permit for certain types of signs (large signs, interior illuminated, scrolling message signs, etc.) so they can exercise a level of control. Sign bylaws should be flexible to facilitate creativity and need to be updated to keep pace with emerging technologies such as automatic changeable copy signs. While political signs cannot be prohibited, they can be reasonably regulated in terms of size, longevity and placement. Some communities provide flexibility to their sign regulations by permitting waivers to strict compliance through a Special Permit process.



DID YOU KNOW...

That the most effective sign bylaws are reached through consensus by balancing the needs of the local business community with the needs and interests of local residents and elected officials?

Cottage Street in Easthampton

A model Sign Bylaw is included in the Pioneer Valley Sustainability Toolkit. The model sign bylaw is intended to show what is typically included. Because each community is different, sign bylaws should be developed to reflect the unique challenges and opportunities of each individual community. The model can be used as a menu which can be tailored to address the needs and character of each individual business district.

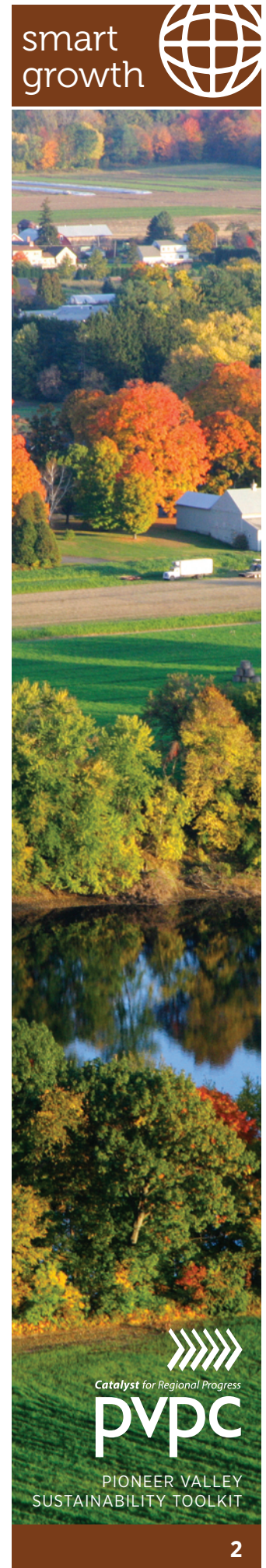
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Transfer Of Development Rights



What is the objective of a Transfer of Development Rights (TDR) bylaw?

The goals for a Transfer of Development (TDR) bylaw are to:

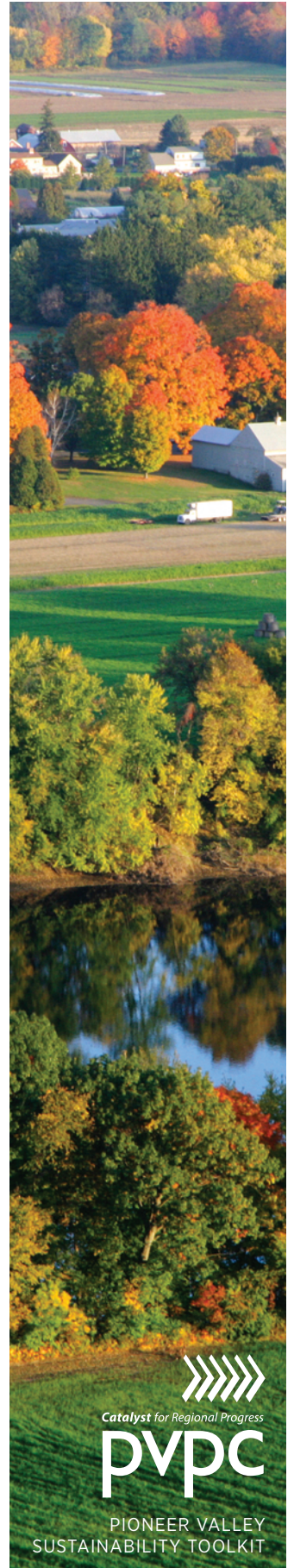
- » preserve farmlands, aquifer recharge areas and rural character;
- » protect river corridors, scenic uplands and mountains;
- » foster compact, mixed use development in town centers and village centers;
- » promote traditional neighborhood development;

TDR provides options to direct 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.

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. It preserves farmland 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?

The community identifies specific preservation areas as "Sending Areas" and specific development districts as "Receiving Areas". "Sending Areas" may include prime agricultural lands, water supply or aquifer protection areas, river corridors, uplands and mountains, and unique natural areas or scenic landscapes identified for protection in the Open Space and Recreation Plan. "Receiving Areas" may include town and village centers areas where compact mixed use growth is desired and served by infrastructure. This may include districts such as a General Business District or Village Center Business District.

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, with the approval of a Special Permit. 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.

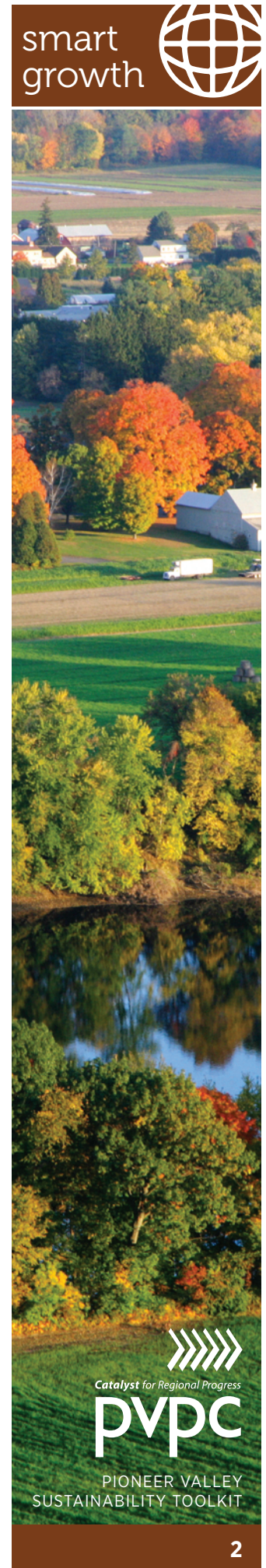
The amount of money required to purchase these development rights is generally negotiated between the landowners, based on market values. In exchange for the purchase price, landowners in the sending area place a deed restriction on their property.

Developers who buy development rights are acquiring the capacity to build higher density on existing lots in a receiving area. For example, in exchange for each residential building lot for which development rights are purchased in the Sending Area, developers could have several options for property in the Receiving Area, including:

- » receiving a 5% increase in maximum building coverage for a single commercial or industrial lot;
- » receiving 1.2 residential building units and an increase in residential building coverage;
- » receiving a reduction in required parking by 20 spaces.

DID YOU KNOW...

The Town of Hadley has completed a total of ten TDR projects, generating a total of \$338,772 in TDR funds. This money has been used to offset the match requirements for APR purchases in the community, and has leveraged \$3.8 million in state APR dollars. As a result, Hadley has been able to protect over 356 acres of prime farmland using TDR.





Econolodge in Hadley used the TDR bylaw to reduce the required amount of parking in exchange for a farmland preservation payment.

EXAMPLES FROM THE PIONEER VALLEY

Transfer of Development Rights Bylaws 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.

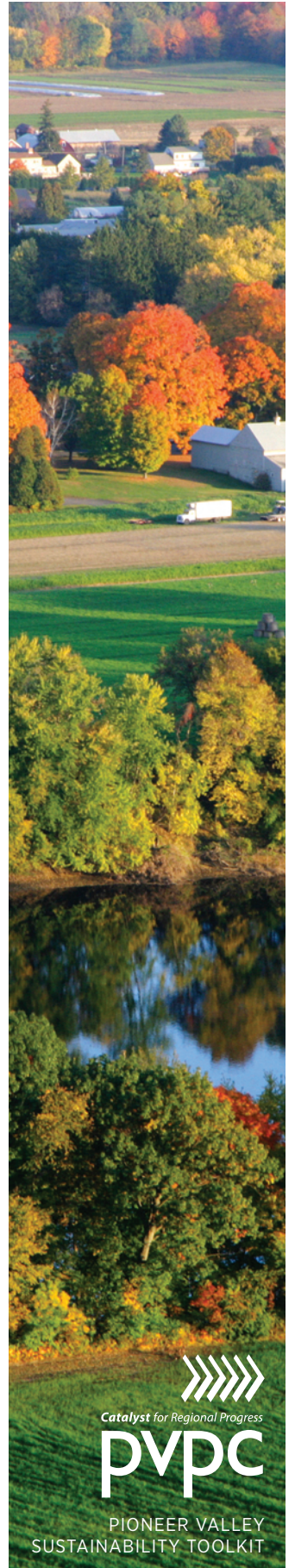
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Traditional Neighborhood Development



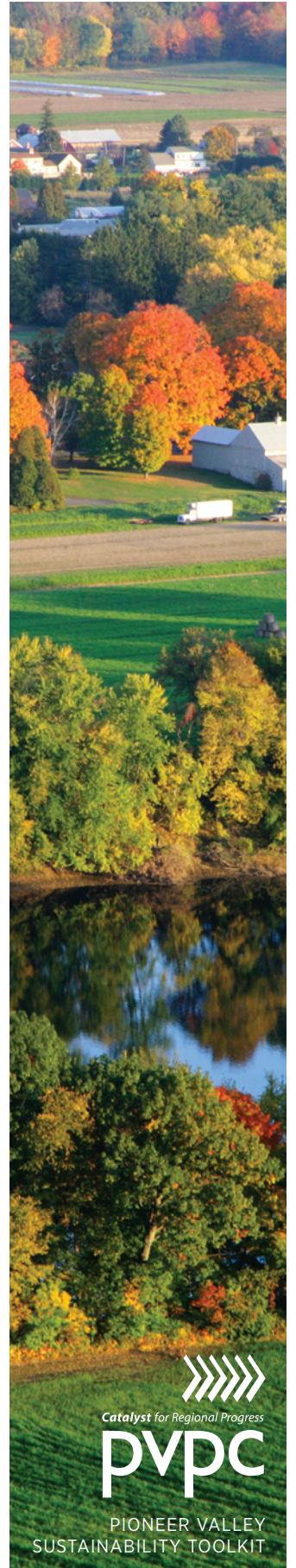
Village Commons, South Hadley

What is the objective of Traditional Neighborhood Development (TND)?

Traditional Neighborhood Development (TND) provides an alternative to traditional suburban sprawl by creating vibrant mixed use, pedestrian oriented neighborhoods revitalizing existing town centers, and creating new ones. By providing a balance of housing, shops, and public and civic spaces declining urban and village centers are stabilized and energized with new development that is in character with the traditional neighborhood.

Why is Traditional Neighborhood Development needed?

Higher density mixed-use developments with a variety of housing types in close proximity to shopping, jobs, parks, schools address many of the issues of both suburban sprawl and declining urban centers. TNDs preserve and replicate the characteristics of traditional New England town centers providing compact pedestrian friendly neighborhoods establishing a sense of place and identity. TNDs result in a reduction of car trips, protect environmental quality and open space, and increase the pedestrian/bicycling network. The community's tax base is strengthened, and declining neighborhoods are stabilized and revitalized.



How does Traditional Neighborhood Development work?

TND is unique in that it is flexible and can be used for small-scale rural villages as well as large-scale urban neighborhoods. It can be used for new developments or as infill in existing developed areas. This type of development is usually oriented around a public space with civic and commercial activities within easy walking/biking distance of the residents. Based on a ¼ mile maximum walking distance, a typical TND neighborhood scale is 10-15 acres. Higher residential densities are necessary to provide a population base sufficient to support the commercial and public functions of the TND. To ensure that projects incorporate the design and aesthetic elements which complement and strengthen the character of the neighborhood, TND incorporates form based and other standard zoning practices, as well as utilizing comprehensive design standards. Local history, character and architecture should be strongly considered and incorporated into the context, massing and scale of the development.

DID YOU KNOW...

TNDs are particularly well suited for preserving the rich character and sense of place of New England village centers, easily modified to fit each community's unique characteristics.

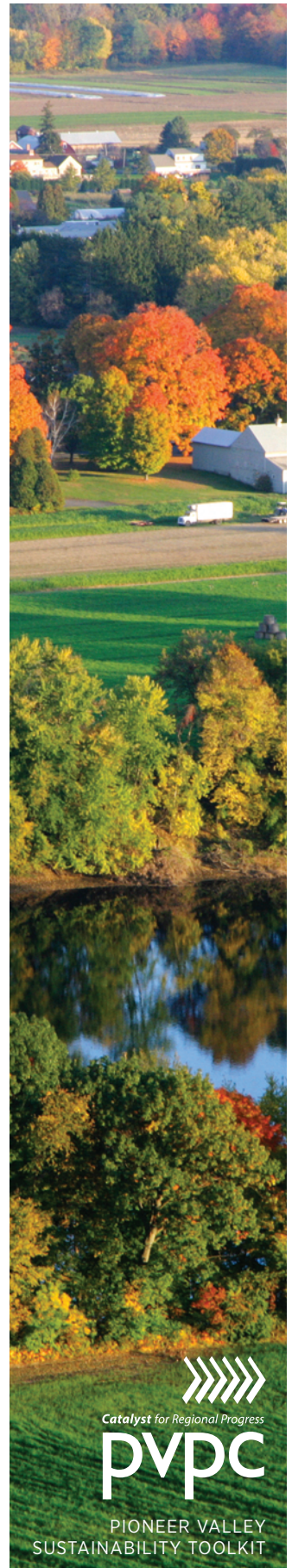
EXAMPLES FROM THE PIONEER VALLEY

Village Commons, South Hadley

Located in the center of South Hadley, proximate to Mount Holyoke College, this commercial center was constructed with a massing, scale and character integrating it into an old New England village center. The project replaced a number of historic buildings on the site which burned down and were raised in 1985. Comprised of eleven buildings the development presents a high density, 80,000 square foot commercial facility featuring eight restaurants, two luxury theaters, ten retail/service shops and over 30 professional offices creating more than 200 full and part-time jobs. It also includes 19 apartments.

Village at Hospital Hill, Northampton MA

This project represents a large scale comprehensive redevelopment of the former Northampton State Hospital. At build-out the proposed development will offer a full mix of residential (with varied housing types), assisted living, daycare, commercial, office, live/work artist studios and light industrial uses in a pedestrian/bike oriented campus.



EXAMPLES FROM OUTSIDE THE PIONEER VALLEY

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

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

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Transit Oriented Development



Roundhouse Parking Lot project, Northampton

What is the objective of Transit Oriented Development? (TOD)

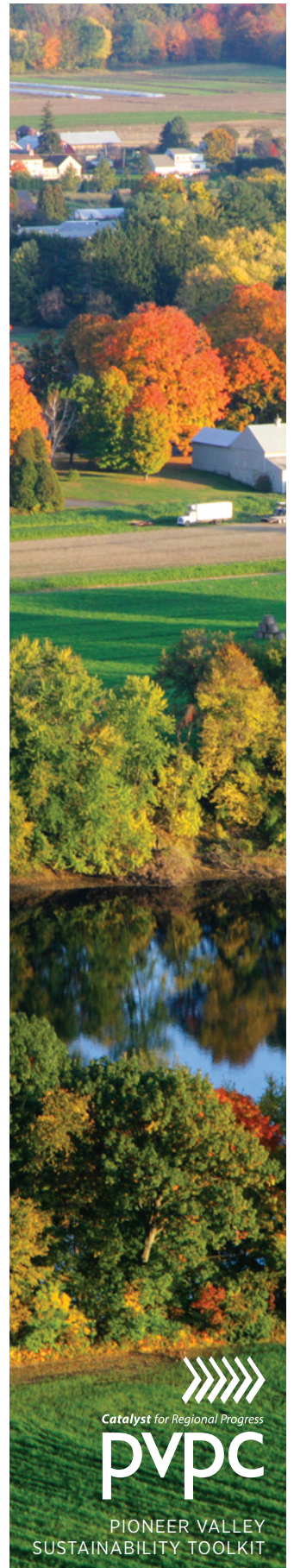
Transit Oriented Development (TOD) promotes a balance of jobs and housing, encourages the use of bus and other transit opportunities, while reducing single occupant vehicle trips and discouraging suburban sprawl. To begin to limit sprawl, improve air quality and provide access to goods, services and jobs in close proximity to residential areas, TODs offer opportunities for mixed-use development served by transit in higher density developments.

Why is Transit Oriented Development needed?

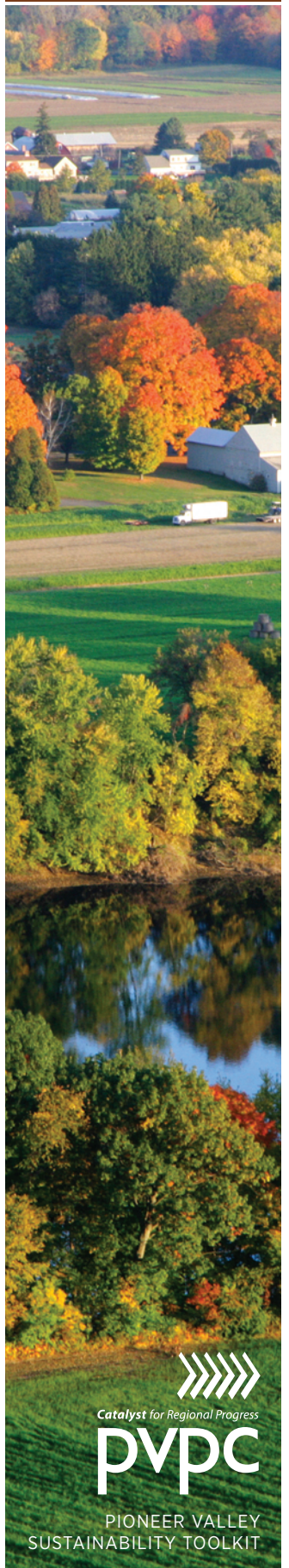
Concentrated mixed-use development and transit availability address the issues of sprawl, air quality, declining urban centers and variety in housing. TOD regulations can help limit sprawl by enabling mixed-uses and higher densities near transit stops with a good pedestrian access system. TODs reduce car trips, protect environmental quality and increase the pedestrian access network. The tax base is strengthened and new jobs infuse the local economy with increased activity.

How does Transit Oriented Development work?

Communities can create TOD zones within walking distance of major transit lines in urbanized areas, which allow for higher density and mixed-use. TODs typically consist of a mixed-use core commercial area adjacent to the transit stop. Surrounding the core commercial area is a mix of housing types, including small-lot single family, townhouses, condominiums, and apartments. TODs also include public uses, such as parks, plazas, greens, public buildings, and public services. Other transit and pedestrian-friendly strategies include: 1) Reducing parking requirements for developments in TOD zones



in anticipation of decreased automobile use, 2) Creating a comfortable pedestrian environment with tree-lined streets and sidewalks and well-defined transit stops to promote transit use, and 3) Providing incentives to developers for installing transit amenities such as bus shelters or benches.



DID YOU KNOW...

TODs are generally located within one-quarter to one-half mile from a transit stop.

EXAMPLES FROM THE PIONEER VALLEY

City of Northampton

The roundhouse parking lot project in the city of Northampton is an example of infill, brownfields re-development, and transit oriented development. The project is located in close proximity to the existing Peter Pan bus station and immediately adjacent to the primary PVTA transit pulse point for northern Hampshire County. The 146 PVTA/FRTA buses arrive and depart at this transit pulse point per work day. The project consists of a hotel, restaurant and conference space with a parking garage. In addition to transit access via the Peter Pan bus company and the PVTA/FRTA, the hotel will be running a bus shuttle service to the 5 colleges and Bradley International airport in Windsor Locks, CT. In addition to being serviced by the three sources of transit, the site is also located on a key route for bicyclists and pedestrians and is served by a local taxi company. The project is the hub of a city-identified TOD district that includes tax-credit affordable housing as well as high-end market housing.

EXAMPLES FROM OUTSIDE THE PIONEER VALLEY

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Wetlands Protection Bylaws

What are the Objectives of a Local Wetlands Protection Bylaw?

To increase community control over activities that impact wetland areas not regulated by the Massachusetts Wetlands Protection Act. Although the Wetlands Protection Act does offer communities an opportunity to protect wetland areas, it is too broad-based to address specific community concerns generated by development activities.

Why do we need Local Wetlands Protection Bylaws?

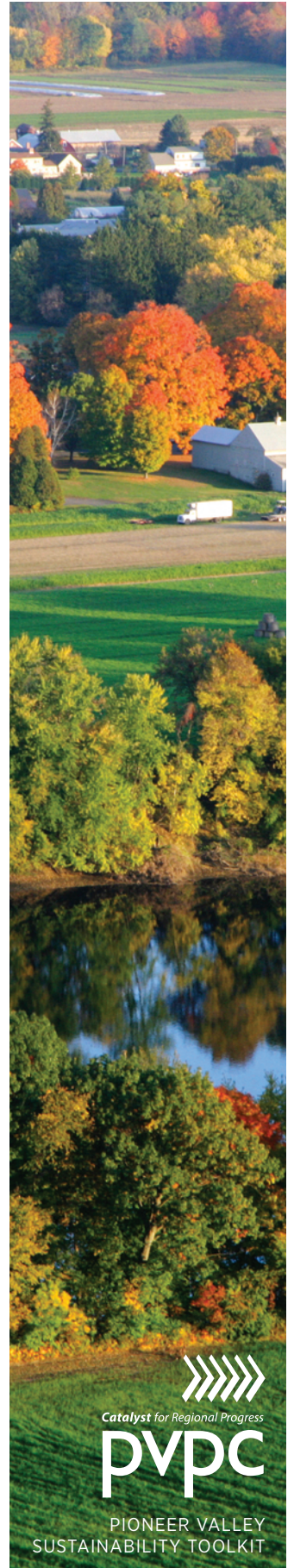
The 1968 Inland Wetlands Protection Act regulates dredging, filling, removing, and altering of wetlands. The Wetlands Act Amendments increased the scope of wetlands protected by the Act, including the addition of wildlife habitat as an interest of the Act. However, communities may desire additional control to address specific community concerns dealing with wetland areas.

Did you know that wetlands serve the following physical/hydrological functions?

- a) Flood Control
- b) Coastal Protection
- c) Ground Water Recharge
- d) Sediment Traps
- e) Atmospheric Equilibrium

Did you know that wetlands serve the following Chemical functions?

- a) Waste Treatment/Pollution Interception
- b) Biogeochemical Cycling



How do Local Wetlands Protection Bylaws Work?

A local wetlands protection bylaw could provide local regulation and greater protection of wetlands in the following areas:

- » Provide Conservation Commission jurisdiction over all isolated wetlands (i.e., vernal or seasonal ponds with amphibian habitat), some of which are currently unregulated by the Massachusetts Wetlands Protection Act;
- » Establish a one-hundred foot buffer zone (afforded by the Act to many wetland resource areas) for land subject to flooding;
- » Provide greater protection for wetland values such as recreation, aesthetics, erosion control, and wildlife which are not regulated by the Act;
- » Increase coordination between town boards on wetlands protection;
- » Define the required contents of a Notice of Intent;
- » Establish a system of fees based upon the complexity of a project, and difficulty of review.



Wetland area in Goshen; Source: PVPC

HOW AND WHERE ARE WETLANDS PROTECTION BYLAWS WORKING IN MASSACHUSETTS?

Case Study from the Pioneer Valley

Town of Belchertown

The Town of Belchertown in Hampshire County adopted a wetlands protection bylaw in 1989. The Wetland Protection District in Belchertown is an overlay protection district that applies to all lands within 100 feet of a wetland resource area as defined under MGL Ch. 131, Section 40, the Wetlands Protection Act, and Chapter 139, Wetlands Protection, of the Code of the Town of Belchertown. The purpose of the bylaw is to: (a) protect citizens from flooding, poor drainage, reduced property values, impaired water supplies and threats

to health and safety in wetlands and along streams and other watercourses; and (b) to complement the provisions of the Massachusetts Wetlands Protection Act, MGL Ch. 131, Section 40. Essentially, all uses in the underlying zoning districts whether by right or by special permit are still allowed. However, applicants have to submit to the Building Inspector the original or a certified copy, in addition to other requirements for a building permit, of: (a) a negative determination of applicability of the Massachusetts Wetlands Protection Act, MGL Ch. 131, Section 40, issued by the Conservation Commission, as described in that Act; or (b) an order of conditions, as defined in the Wetlands Protection Act, issued by either the Belchertown Conservation Commission or the Massachusetts Department of Environmental Protection, covering the proposed structures and related improvements.

A model bylaw or strategy is included in the Pioneer Valley Sustainability Toolkit.

FOR MORE INFORMATION, PLEASE CONTACT

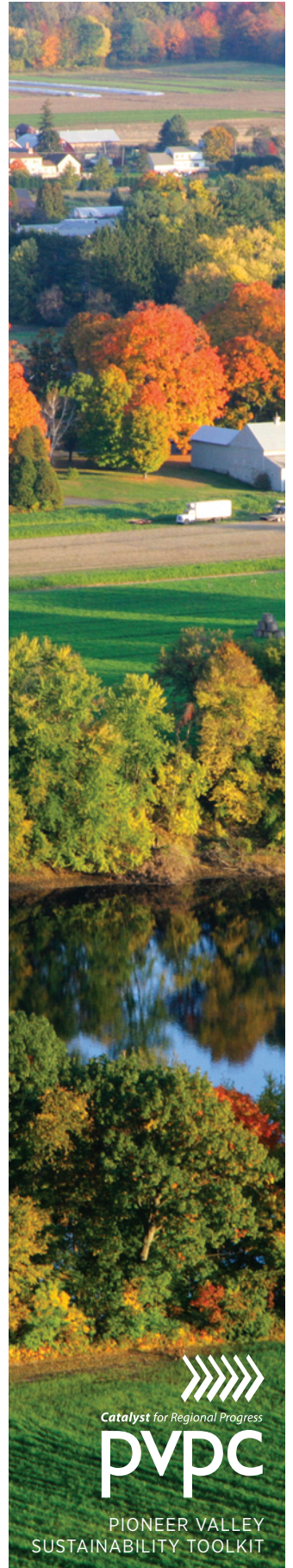
Pioneer Valley Planning Commission

413-781-6045

60 Congress Street, Floor 1

Springfield, MA 01104-3419

www.pvpc.org



Catalyst for Regional Progress

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PIONEER VALLEY
SUSTAINABILITY TOOLKIT

MODEL SMART GROWTH BYLAWS

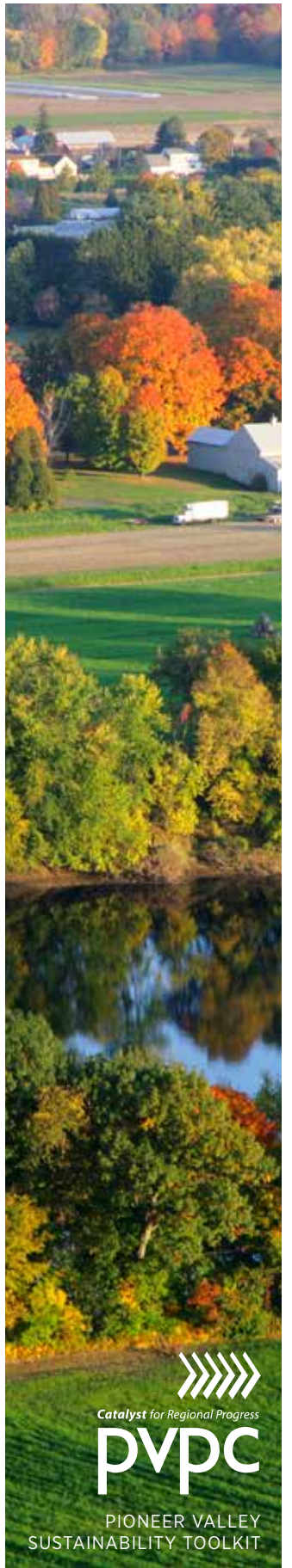


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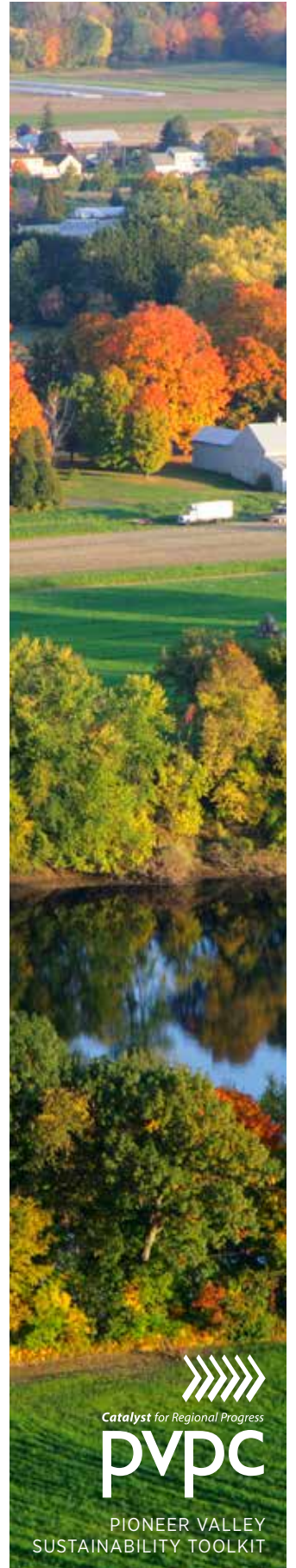
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Development Rights
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Model Bylaw 



Catalyst for Regional Progress

PVPC

PIONEER VALLEY
SUSTAINABILITY TOOLKIT

MODEL ACCESSORY APARTMENT BYLAW

Prepared by the Pioneer Valley Planning Commission

1.0 ACCESSORY APARTMENTS

1.1 **Purpose**

The purpose of the accessory apartment bylaw is to:

- a. Provide older homeowners with a means of obtaining, through tenants in accessory apartments, rental income, companionship, security, and services, and thereby to enable them to stay more comfortably in homes and neighborhoods they might otherwise be forced to leave;
- b. Add inexpensive rental units to the housing stock to meet the needs of smaller households, both young and old;
- c. Make housing units available to low and moderate-income households who might otherwise have difficulty finding homes within the town;
- d. Protect stability, property values, and the residential character of a neighborhood by ensuring that accessory apartments are installed only in owner-occupied houses and under such additional conditions as may be appropriate to further the purposes of this bylaw; and
- e. Legalize conversions to encourage compliance with the State Building Code.

1.2 **Definitions**

Accessory Apartment: A self-contained housing unit incorporated within or accessory to a single family dwelling complete with its own sleeping, cooking, and sanitary facilities and a separate means of egress.

Building, Attached: A building having any portion of one or more walls in common or within five feet of an adjacent building.

Building, Detached: A building having a five feet or more of open space on all sides.

Dwelling, Single-Family: A building designed or used exclusively as a residence and including only one dwelling unit.

Primary Residence: A building in which is conducted the principal use of the lot on which it is located. For residentially zoned lots, such a building would be a dwelling.

1.3 Accessory Apartment Standards

Accessory Apartments shall be allowed Special Permits in all districts. The Special Permit Granting Authority (SPGA) may authorize a Special Permit for a use known as Accessory Apartment in owner-occupied, single-family dwelling, or in a detached accessory structure appurtenant to the single-family dwelling, provided that the following standards and criteria are met:

- a. The apartment will be a complete, separate housekeeping unit that functions as a separate unit from the original unit.
- b. Only one apartment will be created on a single-family lot.
- c. The lot in which the single-family house is located must meet the minimum lot size requirement and must comply with other applicable zoning requirements for its district.
- d. The owner(s) of the residence in which the accessory apartment is located shall occupy at least one of the dwelling units on the premises.
- e. The accessory apartment shall be designed so that the appearance of the building remains that of a one-family residence as much as feasibly possible. In general, any new entrances shall be located on the side or rear of the building. Any exterior changes made must conform with the single-family character of the neighborhood.
- f. An addition to the original building is permitted provided that the addition does not increase the floor area or volume of the original building by more than one-third (33%) of the existing total residential space (excluding unfinished attic and basement, garage, porch, and patio). These same dimensional criteria shall apply to an Accessory Apartment constructed in a existing detached dwelling (such as a garage, barn, or carriage house), or to an Accessory Apartment constructed as part of a new detached dwelling.
- g. The accessory apartment shall be clearly a subordinate part of the single-family dwelling. It shall be no greater than one-third (33%) of the existing total residential space or eight hundred (800) square feet, which ever is less.
- h. At least two off-street parking spaces per dwelling unit are available for use by the owner-occupant(s) and tenant(s). Parking spaces shall be located to the side or the rear of the structure, to the extent feasible.
- i. For dwellings to be served by on-site septic system, the owner must obtain a Disposal Works Construction Permit from the Board of Health before a special permit

can be obtained. This is to ensure that the existing sewage disposal system is adequate for the proposed accessory apartment.

j. The construction of any accessory apartment must be in conformity with the State Building Code requirements.

1.4 Application Procedure

a. The procedure for the submission and approval of a Special Permit for an Accessory Apartment shall be the same as prescribed in the (Special Permit Section of the Zoning Bylaw) except it shall include a notarized letter of application from the owner(s) stating that he/she will occupy one of the dwelling units on the premises. A non-refundable fee shall be included with the application for an accessory apartment to cover the cost of processing the application and code inspections. The applicant shall also be responsible for the cost of legal notices. As part of the public hearing process, parties of interest, as defined in M.G.L. Chapter 40A, Sec. 11 must be notified.

b. Upon receiving a special permit, the owner(s) must file on subject property a Declaration of Covenants at the County Registry of Deeds. The Declaration shall state that the right to rent a temporary accessory apartment ceases upon transfer of title. A time-stamped copy of the recorded Declaration shall be provided to the Zoning Board of Appeals.

c. In order to provide for the development of housing units for disabled and handicapped individuals, the Planning Board will allow reasonable deviation from the stated conditions where necessary to install features that facilitate access and mobility for disabled persons.

1.5 Transfer of Ownership of a Dwelling with an Accessory Apartment

a. The temporary Special Permit for an Accessory Apartment shall terminate upon the sale of property or transfer of title of the dwelling, unless the Planning Board has approved a transfer of the Special Permit to the new owner.

b. The new owner(s) must apply for transfer of a Special Permit for an Accessory Apartment and shall submit a notarized letter of application stating that he/they will occupy one of the dwelling units on the premises and a written request to the Planning Board stating that conditions at the time of the original application remain unchanged. Minor changes may be approved without a hearing.

c. Upon receiving the transferred special permit, the new owner(s) must file on subject property a Declaration of Covenants at the County Registry of Deeds. The Declaration shall state that the right to rent a temporary accessory apartment ceases

upon transfer of title. A time-stamped copy of the recorded Declaration shall be provided to the Planning Board.

1.6 Accessory Apartments in Existence Before the Adoption of an Accessory Apartment Bylaw

a. Statement of Intent

To ensure that accessory apartments or conversions in existence before the adoption of this Accessory Apartment Bylaw are in compliance with the State Building Code Regulations.

b. Application Procedure

The Planning Board may authorize, under a Special Permit and in junction with the Building Inspector, use known as an Accessory Apartment. The board will review each existing use on a case-by-case basis to determine if the dwelling conforms to State Building Code Regulations.

The applicant must follow the same procedure described in this Section including the submission of a notarized letter declaring owner occupancy and a Declaration of Covenants.

1.7 Conflict with Other Laws

The provisions of this bylaw shall be considered supplemental of existing zoning bylaws. To the extent that a conflict exists between this bylaw and others, the more restrictive bylaw, or provisions therein, shall apply.

1.8 Severability

If any provision of this bylaw is held invalid by a court of competent jurisdiction, the remainder of the bylaw shall not be affected thereby. The invalidity of any section or parts of any section or sections of this bylaw shall not affect the validity of the remainder of the town's zoning bylaw.

MODEL AGRICULTURAL COMMISSION WARRANT ARTICLE

Prepared by the Pioneer Valley Planning Commission

1.0: Agricultural Commission

To see if the Town will vote to establish an Agricultural Commission to address and represent agricultural issues and interests in the Town of [NAME].

The purpose of the Commission is to preserve, revitalize and sustain the Town's agricultural industry and to promote agricultural based-economic activities. Said Commission once appointed shall develop a work plan to guide its activities as charged by the Board of Selectman. Such activities include, but are not limited to:

- Encourage the continued pursuit of agriculture in Town;
- Promote agricultural-based economic opportunities in Town;
- Work with Town Boards and other local organizations on projects and activities involving agricultural lands in Town;
- Mediate, advocate, educate, and negotiate on farming issues;
- Work for preservation of prime agricultural lands; and
- Pursue all initiatives appropriate to creating a sustainable agricultural community.

The Board of Selectman shall appoint a five-member commission, at least four of whom shall be town residents. The Commission shall consist of a minimum of two members whose primary or secondary source of income is derived from farming of agricultural-based enterprises in Town and another three who are interested in farming. Two members shall serve a term of three years, two members for a term of two years, and three years thereafter, and one member for a term of one year, and three years after. The Board of Selectman shall fill a vacancy based on the un-expired term of the vacancy in order to maintain the cycle of appointments, based on the recommendations of the Commission.

MODEL BICYCLE PARKING BYLAW

Prepared by Pioneer Valley Planning Commission

Bicycle Parking Bylaw

1.0 Purpose

The purpose of this bylaw is to provide adequate and safe facilities for the storage of bicycles.

2.0 Applicability

Bicycle parking facilities shall be provided for any new building, addition or enlargement of an existing building, or for any change in the occupancy of any new building that results in the need for additional auto parking facilities.

3.0 Exemptions

No bicycle parking spaces shall be required for single-family residences and two-family residences.

4.0 Bicycle Parking Spaces Required

Bicycle parking shall be provided as follows:

- a. For multi-family residences, a minimum of one bicycle parking space or locker for each two (2) dwelling units or portion thereof shall be provided.
- b. For college dormitories, a minimum of 1 bicycle parking space per 10 students shall be provided.
- c. For all other uses, except those uses exempted under Section 3.0, one bicycle parking space shall be provided for every 10 parking spaces required under the bylaw.
- d. In all cases where bicycle parking is required, a minimum of two (2) and a maximum of fifty (50) bicycle parking spaces shall be provided.
- e. The Special Permit Granting Authority may reduce the required number of bicycle parking spaces based on information provided by the applicant confirming that fewer bicycle parking spaces are required.
- f. A maximum of two (2) required vehicle parking spaces may be used for bicycle parking spaces.

5.0 Suggested Design Criteria for Bicycle Parking Facilities

- a. Accessory off-street parking for bicycles shall include provision for secure storage of bicycles. Such facilities shall provide lockable enclosed lockers or racks or equivalent structures in or upon which the user may lock a bicycle.
- b. Structures that require a user supplied locking device shall be designed to accommodate both chain and U-shaped locking devices and shall support the bicycle frame at two locations (not just the wheel).
- c. All lockers and racks must be securely anchored to the ground or the building structure to prevent the racks and lockers from being removed from the location.
- d. The surfacing of such facilities shall be designed and maintained to be mud and dust free. The use of rock or gravel areas for bicycle parking is permitting provided that edging materials, such as landscape timbers are used so that the bicycle parking area is clearly demarcated and the rock material is contained.
- e. Bicycle parking facilities shall be sufficiently separated from motor vehicle parking areas to protect parked bicycles from damage by motor vehicles. The separation may be accomplished through grade separation, distance or physical barrier, such as curbs, wheel stops, poles, vegetation, or other similar features.
- f. Required bicycle parking spaces shall be at least two (2) feet by six (6) feet per bicycle.
- g. An aisle, measuring a minimum of five (5) feet wide, shall be provided behind bicycle parking facilities to allow for maneuvering.
- h. Sufficient space, to be a minimum of 30 inches, shall be provided beside each parked bicycle to allow access. This access area may be shared by adjacent bicycles. Racks shall be installed a minimum of 24 inches from a parallel wall or other obstruction and 30 inches from a perpendicular wall.
- i. Bicycle parking facilities shall be located in a clearly designated safe and convenient location. Whenever possible, the bicycle parking shall be placed within 50 feet of building entrances and in well-lit areas.

j. When automobile parking spaces are provided in a structure, the same percentage of required bicycle parking spaces shall be located inside the structure or shall be located in other areas protected from the weather.

MODEL BROWNFIELDS TAX AGREEMENT

Based upon the Town of Andover's Brownfield's Tax Agreement

BROWNFIELDS TAX AGREEMENT

ARTICLE 27. To see if the City/Town of [City/Town Name] will vote to accept the provisions of Mass. G.L., Chapter 59, Section 59A, and to adopt a General Ordinance/Bylaw as follows:

MASSACHUSETTS BROWNFIELDS ACT - TAX AGREEMENTS

The City/Town of [City/Town Name] is authorized, pursuant to Massachusetts General Laws, Chapter 59, Section 59A, as amended, to enter into agreements regarding payment or abatements of real estate taxes, and/or interest, and/or penalties relative to sites or portions of sites within the City/Town of [City/Town Name], from or at which there has been a release of oil or hazardous materials. The following are necessary conditions and components of any such agreement:

- (a) The site or a portion thereof must be one from, or at which, there has been a contaminated release of oil or hazardous material;
- (b) The site or a portion thereof is zoned for commercial or industrial uses;
- (c) The agreement must be for the purpose of environmental cleanup and redevelopment of such site, and shall require submission of any plans to address such;
- (d) The agreement must provide:
 - (i) the principal amount due of outstanding taxes, interest and penalties, before abatement of any amount thereof;
 - (ii) the amount of taxes, interest and penalties to be abated, if any;

- (iii) the net amount of taxes, interest and penalties due after abatement;
 - (iv) the percent of interest to accrue, if determined applicable;
 - (v) the inception date of payment;
 - (vi) the date of final payment; and
 - (vii) late penalties and other terms of repayment.
- (e) Agreements can only be made with an eligible owner as defined under M.G.L. Chapter 21E, Section 2. Eligible owners are new, "innocent" purchasers who did not own the site at the time the oil or hazardous material was released and did not cause or contribute to its release;
- (f) Such agreements shall be negotiated by the Town Manager/Board of Selectmen (with the assistance of the various departmental staff members), the City/Town Treasurer and the Board of Assessors;
- (g) Such agreements shall be subject to the approval vote of the City Council/Board of Selectmen;
- (h) Such agreements, as required by said M.G.L. Chapter 59, Section 59A, shall be signed by the eligible property owner and the Chair of the City Council/Board of Selectmen;
- (i) Such agreements shall be notarized and attested to by the City/Town Clerk;
- (j) Such agreements shall contain any other provisions as may be required by law, ordinance or regulation of the Department of Revenue;
- (k) In the event any such agreement reduces the tax to be paid, abatements must be processed and charged to the overlays for the fiscal years of the taxes abated;
- (1) Copies of the executive agreement shall be provided to the eligible property owner, the City Council/Board of Selectmen, and the following state and federal agencies; Massachusetts Department of Revenue (Property Tax Bureau),

Massachusetts Department of Environmental Protection and
United States Environmental Protection Agency.

MODEL SMART GROWTH ZONING BYLAW

Developed by the Department of Housing and Community Development

COMMENTS: The Regulations state that the Smart Growth Zoning must be all-inclusive. This means that the development of a Project within the District shall be governed solely by the Smart Growth Zoning, without reference to any standards or procedures contained elsewhere in the Zoning Bylaw.

SECTION [x]: _____ SMART GROWTH OVERLAY DISTRICT (SGOD)

1.0 Purpose

The purpose of this Section [x] is to establish a _____ Smart Growth Overlay District, to encourage smart growth in accordance with the purposes of G. L. Chapter 40R.

[add other objectives as applicable]

COMMENTS: Since the Smart Growth Zoning must be all-inclusive – that is, no other provisions of the Zoning Bylaw are applicable to a Project being developed pursuant to the Smart Growth Zoning within a District -- the Department recommends that the Smart Growth Zoning should contain a purpose section. The purpose section should state that the Smart Growth Zoning will encourage smart growth in accordance with the purposes of G.L. Chapter 40R.

2.0 Definitions

For purposes of this Section [x], the following definitions shall apply. All capitalized terms shall be defined in accordance with the definitions established under the Enabling Laws or Section 2.0, or as set forth in the PAA Regulations. To the extent that there is any conflict between the definitions set forth in Section 2.0 or the PAA Regulations and the Enabling Laws, the terms of the Enabling Laws shall govern.

Administering Agency – the local housing authority or other qualified housing entity designated by [the PAA, chief executive, or other designated municipal official], pursuant to Section 6.2, to review and implement the Affordability requirements affecting Projects under Section 6.0.

Affordable Homeownership Unit - an Affordable Housing unit required to be sold to an Eligible Household.

Affordable Housing - housing that is affordable to and occupied by Eligible Households.

Affordable Housing Restriction - a deed restriction of Affordable Housing meeting statutory requirements in G.L. Chapter 184, Section 31 and the requirements of Section 6.5 of this Bylaw.

Affordable Rental Unit - an Affordable Housing unit required to be rented to an Eligible Household.

Applicant – the individual or entity that submits a Project for Plan Approval.

As-of-right - a use allowed under Section 5.0 without recourse to a special permit, variance, zoning amendment, or other form of zoning relief. A Project that requires Plan Approval by the PAA pursuant to Sections 9.0 through 13.0 shall be considered an as-of-right Project.

Department or DHCD - the Massachusetts Department of Housing and Community Development.

Design Standards – means provisions of Section 13.0 or design standard provisions of the PAA Regulations, made applicable to Projects within the SGOD that are subject to the Plan Approval process.

Eligible Household - an individual or household whose annual income is less than 80 percent of the area-wide median income as determined by the United States Department of Housing and Urban Development (HUD), adjusted for household size, with income computed using HUD's rules for attribution of income to assets.

Comments: The Smart Growth Zoning may further decrease the maximum income limits of eligible households (below 80 percent of the area-wide median income as determined by HUD). The Municipality shall be required to prove to the Department in its submission that any such decrease will not “unduly restrict” opportunities for development within the proposed District under the Smart Growth Zoning: that means that the decrease may not add unreasonable costs or unreasonably impair the economic feasibility of proposed Projects.

Enabling Laws - G.L. Chapter 40R and 760 CMR 59.00.

Mixed-Use Development Project – a Project containing a mix of residential uses and non-residential uses, as allowed in Section 5.2, and subject to all applicable provisions of this Section [x].

PAA Regulations – the rules and regulations of the PAA adopted pursuant to Section 9.3.

Plan Approval - standards and procedures which [certain categories of] Projects in the SGOD must meet pursuant to Sections 9.0 through 13.0 and the Enabling Laws.

COMMENTS: A Municipality has the option, in Section 9.1, either to subject all Projects within the SGOD to the Plan Approval process, or to limit the review process to certain categories of Projects.

Plan Approval Authority (PAA) - The local approval authority authorized under Section 9.2 to conduct the Plan Approval process for purposes of reviewing Project applications and issuing Plan Approval decisions within the SGOD.

Project - a Residential Project or Mixed-use Development Project undertaken within the SGOD in accordance with the requirements of this Section [x].

Residential Project - a Project that consists solely of residential, parking, and accessory uses, as further defined in Section 5.1.

SGOD – the Smart Growth Overlay District established in accordance with this Section [x].

Zoning Bylaw - the Zoning Bylaw of the [name of community].

[add other definitions as required, either here or in the PAA Regulations]

COMMENTS: Because of the requirement in the Regulations that the local Smart Growth Zoning must be all-inclusive, it must contain a definitions Section with all defined terms, rather than referring the reader to other sections of the local zoning code. In particular, to satisfy the requirements of Chapter 40R and the 40R Regulations regarding Affordable Housing, the following definitions are required by the Department:

*Administering Agency
Affordable Homeownership Unit
Affordable Housing
Affordable Housing Restriction
Affordable Rental Unit
Eligible Household*

The sample bylaw includes certain definitions required by the text. Other definitions are likely to be required (for example, terms used in relation to the use and dimensional provisions of Sections 5.0 and 7.0) The drafter may choose to locate certain text elements, including Design Standard (see Section 13.0) and certain definitions, in the PAA Regulations, rather than in the Smart Growth Zoning, Note, however, that under the 40R Regulations any change in the PAA Regulations must be reviewed and approved by the Department.

3.0 Overlay District

3.1 Establishment. The [District Name] Smart Growth Overlay District, hereinafter referred to as the “SGOD,” is an overlay district having a land area of approximately __ acres in size that is superimposed over the underlying zoning district (s) and is shown on the Zoning Map as set forth on the map entitled “[Name of District] Smart Growth Overlay District, dated __, prepared by __.” This map is hereby made a part of the Zoning By-law and is on file in the Office of the [Town/City] Clerk.

COMMENTS: The Smart Growth Zoning must specify that the District is an overlay district. The Department will further require that the Smart Growth Zoning sufficiently identify the smart growth district overlay map. The Smart Growth Zoning must state that the map is part of the local zoning bylaw and is on file in the office of the municipal clerk.

3.2 Subdistricts. The SGOD contains the following subdistricts: [Single-family Subdistrict / Multi-family Subdistrict / Mixed-use Subdistrict / Non-residential Subdistrict / Substantially Developed Subdistrict].

COMMENTS: A District may contain one or more sub-districts. The Smart Growth Zoning may limit a sub-district to certain type(s) of residential use(s), or the minimum allowable density may vary for the permitted residential use(s) so long as each residential sub-district meets the minimum allowable as-of-right density requirements (see COMMENTS under Section 7.0).

Chapter 40R authorizes municipalities to permit business, commercial or other uses that are consistent with primary residential use. Therefore, a District may also contain one or more sub-districts in which Mixed-use Development Projects are allowed, or in which only non-residential uses are allowed.

If a District includes “Substantially Developed Land,” as defined under the 40R Regulations, it may contain a separate Substantially Developed Sub-district. See COMMENTS under Section 5.0 for permitted uses within a Substantially Developed Sub-district, and under Section 7.0 below for dimensional requirements applying within a Substantially Developed Sub-district.

4.0 Applicability of SGOD

4.1 Applicability of SGOD. An applicant may seek development of a Project located within the SGOD in accordance with the provisions of the Enabling Laws and this Section [x], including a request for Plan Approval by the PAA, if necessary. In such case, notwithstanding anything to the contrary in the Zoning Bylaw, such application shall not be subject to any other provisions of the Zoning Bylaw, including limitations upon the issuance of building permits for residential uses related to a rate of development or phased growth limitation or to a local moratorium on the issuance of such permits, or to other building permit or dwelling unit limitations.

COMMENTS: The 40R Regulations state that Projects within a District shall not be subject to limitation of the issuance of building permits for residential uses or a local moratorium on the issuance of such permits. Therefore, the Smart Growth Zoning must specify that Projects in the SGOD are not subject to any such provisions within the Zoning Bylaw. It is also recommended that the Smart Growth Zoning state that a local rate of development provision (if any) does not apply to Projects in the SGOD.

4.2 Underlying Zoning. The SGOD is an overlay district superimposed on all underlying zoning districts. The regulations for use, dimension, and all other provisions of the Zoning Bylaw governing the underlying zoning district(s) shall remain in full force, except for those Projects undergoing development pursuant to this Section [x]. Within the boundaries of the

SGOD, a developer may elect either to develop a Project in accordance with the requirements of the Smart Growth Zoning, or to develop a project in accordance with requirements of the regulations for use, dimension, and all other provisions of the Zoning Bylaw governing the underlying zoning district(s).

COMMENTS: Chapter 40R and the 40R Regulations state that within the boundaries of a District, a developer may elect either to develop a Project in accordance with the requirements of the Smart Growth Zoning, or to develop a project in accordance with the requirements of the Underlying Zoning. Therefore, for the sake of clarity the Smart Growth Zoning must acknowledge that the underlying zoning remains in effect, except for Projects specifically being developed under the Smart Growth Zoning.

4.3 Administration, Enforcement, and Appeals. The provisions of this Section [x] shall be administered by the Building Commissioner, except as otherwise provided herein. Any legal appeal arising out of a Plan Approval decision by the PAA under Sections 9 through 13 shall be governed by the applicable provisions of G. L. Chapter 40R. Any other request for enforcement or appeal arising under this Section [x] shall be governed by the applicable provisions of G. L. Chapter 40A..

5.0 Permitted Uses

The following uses are permitted as-of-right for Projects within the SGOD.

5.1 Residential Projects. A Residential Project within the SGOD may include:

- a) [Single-family, 2 and 3 family, and/or Multi-family] Residential Use(s);
- b) Parking accessory to any of the above permitted uses, including surface, garage-under, and structured parking (e.g., parking garages); and
- c) Accessory uses customarily incidental to any of the above permitted uses.

[Insert additional text if there are sub-districts within the District, and the permitted residential uses vary among the sub-districts.]

COMMENTS: Chapter 40R and the 40R Regulations state that Residential Projects must be permitted as of right, although they may be subject to Plan Approval by the PAA (see definition of “as-of-right” in Section 2 above). If there are sub-districts within the District, the Smart Growth Zoning must specify which types of residential uses are allowed within each sub-district.

Note that Chapter 40R and the 40R Regulations state that within a Substantially Developed Sub-district, the Smart Growth Zoning must permit the as-of-right construction of additional housing units in existing residential buildings or additions thereto or replacements thereof. Drafters should consult with DHCD on this and other issues if the Smart Growth Zoning will include provisions for a Substantially Developed Sub-district. See also Section 7.2.

5.2 Mixed-use Development Projects. A Mixed-use Development Project within the SGOD may include:

- a) [Single-family, 2 and 3 family, and/or Multi-family] Residential Use(s), provided that the minimum allowable as-of-right density requirements for residential use specified in Section 7.1 shall apply to the residential portion of any Mixed-use Development Project;
- b) Any of the following Non-residential uses: [specify permitted commercial, institutional, industrial, or other non-residential uses]
- c) Parking accessory to any of the above permitted uses, including surface, garage-under, and structured parking (e.g., parking garages); and
- d) Accessory uses customarily incidental to any of the above permitted uses.

[Insert additional text if there are sub-districts within the District, and Mixed-use Development Projects are allowed in some but not all of the sub-districts.]

COMMENTS: Chapter 40R and the 40R Regulations state that if the Smart Growth Zoning allows Mixed-use Development Projects, such projects must also be allowed as-of-right. The minimum allowable as-of-right density requirements for residential use apply to the residential portion of a mixed-use development project. The Smart Growth Zoning may limit Mixed-use Development Projects to certain sub-districts of a District.

Under Chapter 40R and the 40R Regulations, provisions of the Smart Growth Zoning and/or the Design Standards may require that the non-residential elements of any Mixed-Use Development Project are planned and designed “in an integral manner to complement the residential uses, and help foster vibrant, workable, livable, and attractive neighborhoods” consistent with the smart growth goals of the Act. For further discussion of this issue, see the Design Standards guidance document.

The total gross floor area devoted to Non-residential uses within a Mixed-use Development Project shall not exceed [___%] of the total gross floor area of the Project.

COMMENTS: The 40R Regulations state that the Smart Growth Zoning must specify the minimum portion of a mixed-use development project that must be devoted to residential use.

5.3 Other Uses. Any of the following non-residential uses may be permitted as-of-right, by Plan Approval, [or by special permit]

- a) [specify business, commercial, or other uses]

COMMENTS: Chapter 40R allows a municipality to permit business, commercial, or other uses that are consistent with the permitted primary residential use in a District. Such uses may be permitted as-of-

right, through the Plan Approval process, or (in the case of projects consisting solely of non-residential uses) by special permit review.

6.0 Housing and Housing Affordability

6.1 Number of Affordable Housing Units. For all Projects [containing at least 13 residential units], not less than twenty percent (20%) of housing units constructed shall be Affordable Housing. For purposes of calculating the number of units of Affordable Housing required within a Project, any fractional unit of 0.5 or greater shall be deemed to constitute a whole unit. [A Project shall not be segmented to evade the Affordability threshold set forth above.]

COMMENTS: Chapter 40R and the 40R Regulations require that under the Smart Growth Zoning, not less than 20 percent of all units constructed within Projects containing at least 13 units shall be Affordable. The 20% affordability standard and the 13-unit threshold apply to all units in a Project that is developed under the Smart Growth Zoning and is subject to this Section 6. Therefore, the Smart Growth Zoning must contain the above language.

The 40R Regulations state that the Smart Growth zoning must require that Projects are not segmented to evade the size threshold for the Affordability requirements. As discussed below, the Municipality also has the option to apply the Affordability requirements to smaller Projects, or to all Projects within the District. In the latter case, the bracketed sentence on segmentation would not be required.

The Smart Growth Zoning and/or the Community Housing Plan shall contain mechanisms to ensure that the total number of Affordable units constructed in the District equals not less than twenty percent (20%) of the total number of all units constructed within Projects in the District. Such mechanisms might include some or all of the following:

*Applying the 20% affordability standard to some or all Projects with fewer than 13 units;
Increasing the affordability standard beyond 20% for certain categories of Projects; and
Identifying specific Projects within the District that are projected to have significantly greater than 20% of their units Affordable (for example, Projects undertaken by a local housing authority or community development corporation).*

The Municipality shall be required to prove to the Department in its submission that its use of such mechanisms will not “unduly restrict” opportunities for development within the proposed District under the Smart Growth Zoning: that means that the mechanisms may not add unreasonable costs or unreasonably impair the economic feasibility of proposed Projects. Note that for the purposes of satisfying the twenty percent (20%) overall Affordability requirement, any project located within the geographic boundaries of the District, and which receives a comprehensive permit under M.G.L. c.40B after the date upon which the application was submitted to the Department, shall be treated as if it were a Project developed under the Smart Growth Zoning.

6.2 Administering Agency. An administering agency which may be the local housing authority or other qualified housing entity (the “Administering Agency”) shall be designated by the [PAA, chief executive, or other designated municipal official] (the “designating official”). In a case where the Administering Agency cannot adequately carry out its administrative duties, upon certification of this fact by the designating official or by DHCD such duties shall devolve to and thereafter be administered by a qualified housing entity designated by the designating official or, in the absence of such timely designation, by an entity designated by the DHCD. In any event, such Administering Agency shall ensure the following, both prior to issuance of a Building Permit for a Project within the SGOD, and on a continuing basis thereafter, as the case may be:

1. prices of Affordable Homeownership Units are properly computed; rental amounts of Affordable Rental Units are properly computed;
2. income eligibility of households applying for Affordable Housing is properly and reliably determined;
3. the housing marketing and resident selection plan conform to all requirements and are properly administered;
4. sales and rentals are made to Eligible Households chosen in accordance with the housing marketing and resident selection plan with appropriate unit size for each household being properly determined and proper preference being given; and
5. Affordable Housing Restrictions meeting the requirements of this section are recorded with the proper registry of deeds.

COMMENTS: Chapter 40R and the 40R Regulations state that the Smart Growth Zoning shall contain provisions to ensure that there shall be effective monitoring and enforcement of the affordable housing restriction during the term of Affordability. Therefore, the Smart Growth Zoning must contain this provision, or language of substantially equal effect.

6.3 Submission Requirements. As part of any application for Plan Approval for a Project within the SGOD submitted under Sections 9.0 through 13.0 (or, for Projects not requiring Plan Approval, prior to submission of any application for a Building Permit), the Applicant must submit the following documents to the PAA and the Administering Agency:

- 1) evidence that the Project complies with the cost and eligibility requirements of Section 6.4;
- 2) Project plans that demonstrate compliance with the requirements of this Section 6.3 and Section 6.5; and
- 3) a form of Affordable Housing Restriction that satisfies the requirements of Section 6.6.

These documents in combination, to be submitted with an application for Plan Approval (or, for Projects not requiring Plan Approval, prior to submission of any application for a Building Permit), shall include details about construction related to the provision, within the development, of units that are accessible to the disabled.

COMMENTS: Chapter 40R and the 40R Regulations require within a District the development of housing which is appropriate for a diverse population, including households with children, other households, individuals, households including individuals with disabilities, and the elderly. Therefore, the Smart Growth Zoning must contain this provision, or language of substantially equal effect.

6.4 Cost and Eligibility Requirements. Affordable Housing shall comply with the following requirements:

1. Affordable Housing required to be offered for rent or sale shall be rented or sold to and occupied only by Eligible Households.
2. For an Affordable Rental Unit, the monthly rent payment, including utilities and parking, shall not exceed 30 percent of the maximum monthly income permissible for an Eligible Household, assuming a family size equal to the number of bedrooms in the unit plus one, unless other affordable program rent limits approved by the DHCD shall apply.
3. For an Affordable Homeownership Unit the monthly housing payment, including mortgage principal and interest, private mortgage insurance, property taxes, condominium and/or homeowner's association fees, insurance, and parking, shall not exceed 30 percent of the maximum monthly income permissible for an Eligible Household, assuming a family size equal to the number of bedrooms in the unit plus one.

Prior to the granting of any Building Permit or Plan Approval for a Project, the Applicant must demonstrate, to the satisfaction of the Administering Agency, that the method by which such affordable rents or affordable purchase prices are computed shall be consistent with state or federal guidelines for affordability applicable to [name of community].

COMMENTS: The Smart Growth Zoning must contain this provision, or language of substantially equal effect. Chapter 40R and the 40R Regulations require assurances in the Smart Growth Zoning that under the affordable housing restriction on an Affordable unit, it shall be occupied by an eligible household paying an affordable rent or affordable purchase price during the term of the restriction. The Smart Growth Zoning shall contain provisions specifying the method by which such affordable rents or affordable purchase prices shall be computed.

6.5 Design and Construction. Units of Affordable Housing shall be finished housing units. Units of Affordable Housing shall be dispersed throughout the Project of which they are part and be comparable in initial construction quality and exterior design to the other housing units in the Project. The total number of bedrooms in the Affordable Housing shall, insofar as

practicable, be proportionate to the total number of bedrooms in all units in the Project of which the Affordable Housing is part.

COMMENTS: The Smart Growth Zoning must contain this provision, or language of substantially equal effect.

6.6 Affordable Housing Restriction. Each Project shall be subject to an Affordable Housing Restriction which is recorded with the appropriate registry of deeds or district registry of the Land Court and which contains the following:

1. specification of the term of the affordable housing restriction which shall be no less than thirty years;
2. the name and address of the Administering Agency with a designation of its power to monitor and enforce the affordable housing restriction;
3. a description of the Affordable Homeownership Unit, if any, by address and number of bedrooms; and a description of the overall quantity and number of bedrooms and number of bedroom types of Affordable Rental Units in a Project or portion of a Project which are rental. Such restriction shall apply individually to the specifically identified Affordable Homeownership Unit and shall apply to a percentage of rental units of a rental Project or the rental portion of a Project without specific unit identification.
4. reference to a housing marketing and resident selection plan, to which the Affordable Housing is subject, and which includes an affirmative fair housing marketing program, including public notice and a fair resident selection process. The housing marketing and selection plan may provide for preferences in resident selection to the extent consistent with applicable law; the plan shall designate the household size appropriate for a unit with respect to bedroom size and provide that the preference for such Unit shall be given to a household of the appropriate size;
5. a requirement that buyers or tenants will be selected at the initial sale or initial rental and upon all subsequent sales and rentals from a list of Eligible Households compiled in accordance with the housing marketing and selection plan;
6. reference to the formula pursuant to which rent of a rental unit or the maximum resale price of a homeownership will be set;
7. designation of the priority of the Affordable Housing Restriction over other mortgages and restrictions, provided that a first mortgage of a Homeownership Housing Unit to a commercial lender in an amount less than maximum resale price may have priority over the Affordable Housing Restriction if required by then current practice of commercial mortgage lenders;
8. a requirement that only an Eligible Household may reside in Affordable Housing and that notice of any lease of any Affordable Rental Unit shall be given to the Administering Agency;

9. provision for effective monitoring and enforcement of the terms and provisions of the affordable housing restriction by the Administering Agency;
10. provision that the restriction on an Affordable Homeownership Unit shall run in favor of the Administering Agency and/or the municipality, in a form approved by municipal counsel, and shall limit initial sale and re-sale to and occupancy by an Eligible Household;
11. provision that the restriction on Affordable Rental Units in a rental Project or rental portion of a Project shall run with the rental Project or rental portion of a Project and shall run in favor of the Administering Agency and/or the municipality, in a form approved by municipal counsel, and shall limit rental and occupancy to an Eligible Household;
12. provision that the owner[s] or manager[s] of Affordable Rental Unit[s] shall file an annual report to the Administering Agency, in a form specified by that agency certifying compliance with the Affordability provisions of this Bylaw and containing such other information as may be reasonably requested in order to ensure affordability; and
13. a requirement that residents in Affordable Housing provide such information as the Administering Agency may reasonably request in order to ensure affordability.

COMMENTS: Chapter 40R and the 40R Regulations state that the Smart Growth Zoning shall contain provisions to ensure that there shall be effective monitoring and enforcement of the affordable housing restriction during the term of Affordability. Therefore, the Smart Growth Zoning must contain this provision, or language of substantially equal effect.

6.7 Costs of Housing Marketing and Selection Plan. The housing marketing and selection plan may make provision for payment by the Project applicant of reasonable costs to the Administering Agency to develop, advertise, and maintain the list of Eligible Households and to monitor and enforce compliance with affordability requirements. Such payment shall not exceed one-half (1/2%) percent of the amount of rents of Affordable Rental Units (payable annually) or one (1%) percent of the sale or resale prices of Affordable Homeownership Units (payable upon each such sale or resale), as applicable.

COMMENTS: To ensure that the costs of the marketing and enforcement measures are not unduly burdensome, the Smart Growth Zoning must contain this provision, or language of substantially equal effect.

6.8 Age Restrictions. Nothing in this Section [x] shall permit the imposition of restrictions on age upon all Projects throughout the entire SGOD. However, the Administering Agency may, in its review of a submission under Section 6.3, allow a specific Project within the SGOD designated exclusively for the elderly, persons with disabilities, or for assisted living, provided that any such Project shall be in compliance with all applicable fair housing laws and not less

than twenty-five percent (25%) of the housing units in such a restricted Project shall be restricted as Affordable units. Any Project which includes age-restricted residential units shall comply with applicable federal, state and local fair housing laws and regulations.

COMMENTS: Chapter 40R and the 40R Regulations state that the Smart Growth Zoning for the proposed District shall not impose restrictions on age or any other forms of occupancy restrictions upon the District as a whole. This provision does not preclude the development of specific Projects within the District that may be exclusively for the elderly, persons with disabilities, or for assisted living, provided that any such Project shall be in compliance with all applicable fair housing laws. Not less than twenty-five percent (25%) of the housing units in such a Project shall be Affordable. Therefore, the Smart Growth Zoning must contain this provision, or language of substantially equal effect.

6.9 Phasing. For any Project that is approved and developed in phases in accordance with Section 9.4, the proportion of Affordable Housing Units (and the proportion of Existing Zoned Units to Bonus Units as defined in 760 CMR 59.04 1(h)) shall be consistent across all phases.

COMMENTS: To address the proportionality requirements of the 40R Regulations, the Smart Growth Zoning must contain this provision, or language of substantially equal effect.

6.10 No Waiver. Notwithstanding anything to the contrary herein, the Affordability provisions in this Section 6.0 shall not be waived.

COMMENTS: The 40R Regulations state that the Affordability requirements may not be waived as part of the Plan Approval process for a Project. Therefore, the Smart Growth Zoning must contain this provision.

7.0 Dimensional and Density Requirements

7.1 Table of Requirements. Notwithstanding anything to the contrary in this Zoning Bylaw, the dimensional requirements applicable in the SGOD are as follows:

[Insert applicable dimensional requirements. Insert additional provisions if there are sub-districts within the District, and the dimensional requirements vary among the sub-districts.]

COMMENTS: Without limitation, the Smart Growth Zoning shall set out the dimensional, use, parking, and other standards applicable to Projects within the District (including within any Substantially Developed sub-district) including but not limited to height limits, setbacks, lot areas, lot dimensions, unit to lot ratios, floor area ratios, lot coverage ratios, and open space ratios. (For discussion of parking ratios, parking locations, and roadway design standards, see Sections 8.0 and 13.0.)

For large Projects containing multiple buildings and uses, it may preserve greater flexibility for minimum lot size, setback, and yard standards to apply to the Project site as a whole, and not to internal dimensions.

The Smart Growth Zoning must provide for any one or more of the following minimum allowable as-of-right density requirements unless the Department has previously approved a density reduction:

- 1. a density of at least 8 units per acre for Developable Land zoned for single-family residential use;*
- 2. a density of at least 12 units per acre for Developable Land zoned for 2- and/or 3-family residential use; or*
- 3. a density of at least 20 units per acre for Developable Land zoned for multi-family residential use.*

If the SGOD is anticipated to contain only a single Project, then restricting the total number of residential units developable within the SGOD is permissible, provided that the maximum number will permit the SGOD to achieve the minimum applicable as-of right density required by chapter 40R.

A District may contain one or more sub-districts. The allowable residential density and other dimensional requirements may vary within different sub-districts (even for the same permitted residential use), so long as each residential sub-district meets the minimum allowable as-of-right density requirements. For Substantially Developed Sub-districts, see COMMENTS on Section 7.2 below.

Under Chapter 40R and the 40R Regulations, a Municipality may adopt Design Standards to ensure that the physical character of Projects within the District will be “complementary to nearby buildings and structures,” and will provide for “high-density quality development consistent with the character of building types, streetscapes, and other community features traditionally found in densely settled areas of the Municipality or in the region of the Municipality.” On the possible inclusion of the Design Standards within the Smart Growth Zoning, see COMMENTS on Section 13. For discussion of the relationship between dimensional requirements and Design Standards in meeting these goals, see the Design Standards guidance document.

7.2 Dimensional Waivers in Substantially Developed Sub-district. The PAA may, in order to encourage the development of infill housing units on undeveloped lots within a Substantially Developed Sub-district, grant a waiver to the dimensional standards of Section 7.1, in accordance with Section 11.3.

COMMENTS: The Chapter 40R Regulations allow that for some or all of the “substantially developed land” (as defined in the Regulations) within a District, the Smart Growth Zoning need not satisfy the minimum As-of-right residential densities, so long as the allowable residential densities in the Substantially Developed sub-district are no less than those in the Underlying Zoning. Within the sub-district, the Smart Growth Zoning shall modify the dimensional and other applicable standards of the Underlying Zoning when the Smart Growth Zoning provides for a greater residential density than the Underlying Zoning, in order to permit the As-of-right construction of infill housing on existing vacant lots. The Smart Growth Zoning may impose reasonable lot area, frontage, setback and other dimensional requirements within such Substantially Developed sub-districts, consistent with neighborhood building and use patterns, and building, fire, and safety codes.

8.0 Parking Requirements

The parking requirements applicable for Projects within the SGOD are as follows.

8.1 Number of parking spaces. Unless otherwise approved by the PAA, the following minimum [and maximum] numbers of off-street parking spaces shall be provided by use, either in surface parking, within garages or other structures, [or on-street:]

[Insert applicable parking requirements]

The PAA may allow for additional visitor parking spaces beyond the ___ maximum spaces per unit if deemed appropriate given the design, layout and density of the proposed residential or other development. The PAA may allow for a decrease in the required parking as provided in Sections 8.2 and 8.3 below.

COMMENTS: To support the smart growth goals of Chapter 40R and encourage alternatives to automobile travel, the Department encourages communities to consider provisions allowing the reduction of minimum parking requirements beyond what is commonly required. Particularly for locations near transit stations, defining maximum as well as minimum parking requirements can further support the smart growth goals of Chapter 40R. For further discussion of this issue, see the Design Standards guidance document.

8.2 Shared Parking. Notwithstanding anything to the contrary herein, the use of shared parking to fulfill parking demands noted above that occur at different times of day is strongly encouraged. Minimum parking requirements above may be reduced by the PAA through the Plan Approval process (or, for Projects not requiring Plan Approval, prior to submission of any application for a Building Permit), if the applicant can demonstrate that shared spaces will meet parking demands by using accepted methodologies (e.g. the Urban Land Institute Shared Parking Report, ITE Shared Parking Guidelines, or other approved studies).

COMMENTS: The Department encourages communities to consider provisions allowing the reduction of minimum parking requirements if parking is shared by different uses, within Mixed-use Development Projects or otherwise.

8.3 Reduction in parking requirements. Notwithstanding anything to the contrary herein, any minimum required amount of parking may be reduced by the PAA through the Plan Approval process (or, for Projects not requiring Plan Approval, prior to submission of any application for a Building Permit), if the applicant can demonstrate that the lesser amount of parking will not cause excessive congestion, endanger public safety, or that lesser amount of parking will provide positive environmental or other benefits, taking into consideration:

- a) the availability of surplus off street parking in the vicinity of the use being served and/or the proximity of a bus stop or transit station;
- b) the availability of public or commercial parking facilities in the vicinity of the use being served;

- c) shared use of off street parking spaces serving other uses having peak user demands at different times;
- d) age or other occupancy restrictions which are likely to result in a lower level of auto usage;
- e) impact of the parking requirement on the physical environment of the affected lot or the adjacent lots including reduction in green space, destruction of significant existing trees and other vegetation, destruction of existing dwelling units, or loss of pedestrian amenities along public ways; and
- f) such other factors as may be considered by the PAA.

COMMENTS: The Department encourages communities to consider provisions allowing the reduction of minimum parking requirements.

8.4 Location of Parking. Any surface parking lot shall, to the maximum extent feasible, be located at the rear or side of a building, relative to any principal street, public open space, or pedestrian way.

COMMENTS: For further discussion of issues relating to the location and design of parking, in order to achieve Chapter 40R's goal of creating "high-density quality development consistent with the character of building types, streetscapes, and other community features traditionally found in densely settled areas of the Municipality or in the region of the Municipality," see the Design Standards guidance document.

9.0 Plan APPROVAL of projects: general provisions

The 40R Regulations state that the Plan Approval provisions of the Smart Growth Zoning and/or any separate Design Standards must be clearly written, fairly and consistently applied, and allow for flexibility and creativity, consistent with the goals of the Act. The contents of the following Sections 9.0 through 13.0 are intended to satisfy these regulatory requirements. For any community that subjects Projects to Plan Approval, the Smart Growth Zoning must contain these provisions, or language of substantially equivalent effect.

9.1 Plan Approval. An Application for Plan Approval shall be reviewed by the PAA for consistency with the purpose and intent of Sections 9.0 through 13.0. Such Plan Approval process shall be construed as an as-of-right review and approval process as required by and in accordance with the Enabling Laws. The following categories of Projects shall be subject to the Plan Approval process:

- a) Any Residential Project containing at least [13] residential units;
- b) Any Mixed-use Development Project;
- [c) any project consisting solely of non-residential uses; and

- d) Any Project seeking a waiver].

COMMENTS: The 40R Regulations state that if the Smart Growth Zoning provides for Plan Approval of Projects within the District, it shall specify the categories of Projects that will be subject to Plan Approval (defined by size, type, or otherwise). The sample bylaw suggests that a reasonable threshold of review for Residential Projects would be the size of Project that would be subject to the Affordability requirements of Section 6 – see COMMENTS on that section. The sample bylaw also suggests that all Mixed-use Development Projects and all projects consisting solely of non-residential uses should be subject to Plan Approval, to ensure that the non-residential elements are planned and designed in an integral manner to complement the residential uses – see Sections 5.2 and 13.4.

9.2 Plan Approval Authority (PAA). The [name of local approval authority], consistent with G.L. Chapter 40R and 760 CMR 59.00, shall be the Plan Approval Authority (the “PAA”), and it is authorized to conduct the Plan Approval process for purposes of reviewing Project applications and issuing Plan Approval decisions within the SGOD.

COMMENTS: The 40R Regulations state that if the Smart Growth Zoning provides for Plan Approval of Projects within the District, it shall specify the Approving Authority. Therefore, the Department will require the Smart Growth Zoning to contain this provision if Projects are subject to Plan Approval.

9.3 PAA Regulations. The Plan Approval Authority may adopt administrative rules and regulations relative to Plan Approval. Such rules and regulations must be approved by the Department of Housing and Community Development

COMMENTS: If the Smart Growth Zoning empowers the PAA to adopt rules and regulations for the Plan Approval of Projects, such regulations must be dated and approved by DHCD.

9.4 Project Phasing. An Applicant may propose, in a Plan Approval submission, that a Project be developed in phases, provided that the submission shows the full buildout of the Project and all associated impacts as of the completion of the final phase, and subject to the approval of the PAA. Any phased project shall comply with the provisions of Section 6.9.

COMMENTS: The 40R Regulations permit Projects to be phased; see also Section 11.4 below. Therefore, the Department will require the Smart Growth Zoning to contain this provision. (However, the 40R Regulations also state that the Smart Growth Zoning must require that Projects are not segmented to evade the size threshold for the Affordability requirements. See Section 6.1.)

10.0 PLAN APPROVAL PROCEDURES

10.1 Preapplication. Prior to the submittal of a Plan Approval submission, a “Concept Plan” may be submitted to help guide the development of the definitive submission for Project buildout and individual elements thereof. Such Concept Plan should reflect the following:

1. Overall building envelope areas;

2. Open space and natural resource areas; and
3. General site improvements, groupings of buildings, and proposed land uses.

The Concept Plan is intended to be used as a tool for both the applicant and the PAA to ensure that the proposed Project design will be consistent with the Design Standards and other requirements of the SGOD.

COMMENTS: Voluntary pre-application provisions are recommended, although Chapter 40R does not permit a municipality to require a mandatory pre-application process.

10.2 Required Submittals. An application for Plan Approval shall be submitted to the PAA on the form provided by the PAA, [along with application fee(s)] which shall be as set forth in the PAA Regulations. The application shall be accompanied by such plans and documents as may be required and set forth in the PAA Regulations. For any Project that is subject to the Affordability requirements of Section 6.0, the application shall be accompanied by all materials required under Section 6.3. All site plans shall be prepared by a certified architect, landscape architect, and/or a civil engineer registered in the Commonwealth of Massachusetts. All landscape plans shall be prepared by a certified landscape architect registered in the Commonwealth of Massachusetts. All building elevations shall be prepared by a certified architect registered in the Commonwealth of Massachusetts. All plans shall be signed and stamped, and drawings prepared at a scale of [one inch equals forty feet (1"=40') or larger], or at a scale as approved in advance by the PAA.

COMMENTS: The 40R Regulations state that if the Smart Growth Zoning provides for Plan Approval of Projects within the District, it shall specify the procedures for such review, including the contents of an application for approval of a Project. The Department recommends that the form of application, and rules governing the content of the application to be filed with the PAA, be included in the PAA Regulations, rather than including such requirements in the Smart Growth Zoning. Note that the PAA Regulations will be subject to review and approval by the Department. Where filing fees are required, documentation must be submitted justifying the required fee(s).

10.3 Filing. An applicant for Plan Approval shall file the required number of copies of the application form and the other required submittals as set forth in the PAA Regulations with the [City/Town] Clerk and a copy of the application including the date of filing certified by the [City/Town] Clerk shall be filed forthwith with the PAA.

COMMENTS: The Department will require the Smart Growth Zoning to contain this provision if Projects are subject to Plan Approval.

10.4 Circulation to Other Boards. Upon receipt of the Application, the PAA shall immediately provide a copy of the application materials to the [Select Board / City Council], Board of Appeals, Board of Health, Conservation Commission, Fire Department, Police Department, Building Commissioner, Department of Public Works, the Administering Agency (for any Project subject to the Affordability requirements of Section 6.0), and other municipal officers,

agencies or boards for comment, and any such board, agency or officer shall provide any written comments within 60 days of its receipt of a copy of the plan and application for approval.

COMMENTS: If an application is to be referred to any municipal officer, agency or board, including but not limited to the Administering Agency referenced in Section 6.0, the Department will require the Smart Growth Zoning to contain this provision.

10.5 Hearing. The PAA shall hold a public hearing for which notice has been given as provided in Section 11 of G.L. Chapter 40A. The decision of the PAA shall be made, and a written notice of the decision filed with the [City/ Town] Clerk, within 120 days of the receipt of the application by the [City/ Town] Clerk. The required time limits for such action may be extended by written agreement between the applicant and the PAA, with a copy of such agreement being filed in the office of the [City / Town] Clerk. Failure of the PAA to take action within said 120 days or extended time, if applicable, shall be deemed to be an approval of the Plan Approval application.

COMMENTS: The Department will require the Smart Growth Zoning to contain this provision if Projects are subject to Plan Approval.

10.6 Peer Review. The applicant shall be required to pay for reasonable consulting fees to provide peer review of the Plan Approval application, pursuant to G.L. Chapter 40R, Section 11(a). Such fees shall be held by the [City / Town] in a separate account and used only for expenses associated with the review of the application by outside consultants, including, but not limited to, attorneys, engineers, urban designers, housing consultants, planners, and others. Any surplus remaining after the completion of such review, including any interest accrued, shall be returned to the applicant forthwith.

COMMENTS: If an application is to be reviewed by outside consultants, the Department will require the Smart Growth Zoning to contain this provision.

11.0 PLAN APPROVAL DecisionS

11.1 Plan Approval. Plan Approval shall be granted where the PAA finds that:

1. the applicant has submitted the required fees and information as set forth in the PAA Regulations; and
2. the Project as described in the application meets all of the requirements and standards set forth in this Section [x] and the PAA Regulations, or a waiver has been granted therefrom; and
3. any extraordinary adverse potential impacts of the Project on nearby properties have been adequately mitigated.

For a Project subject to the Affordability requirements of Section 6.0, compliance with condition (2) above shall include written confirmation by the Administering Agency that all requirements of that Section have been satisfied. The PAA may attach conditions to the Plan Approval decision that are necessary to ensure substantial compliance with this Section [x], or to mitigate any extraordinary adverse potential impacts of the Project on nearby properties.

COMMENTS: The 40R Regulations state that if the Smart Growth Zoning provides for Plan Approval of Projects within the District, it shall specify the criteria upon which the Approving Authority may condition its approval. The Department will require the Smart Growth Zoning to contain this provision if Projects are subject to Plan Approval.

11.2 Plan Disapproval. A Plan Approval application may be disapproved only where the PAA finds that:

1. the applicant has not submitted the required fees and information as set forth in the Regulations; or
2. the Project as described in the application does not meet all of the requirements and standards set forth in this Section [x] and the PAA Regulations, or that a requested waiver therefrom has not been granted; or
3. it is not possible to adequately mitigate significant adverse project impacts on nearby properties by means of suitable conditions.

COMMENTS: The 40R Regulations state that if the Smart Growth Zoning provides for Plan Approval of Projects within the District, it shall specify the criteria upon which the Approving Authority may disapprove a proposed Project, or condition its approval. Chapter 40R states that a proposed Project may be denied Plan Approval only on the grounds that:

- 1) *the Project does not meet the conditions and requirements set forth in the Smart Growth Zoning;*
- 2) *the applicant failed to submit information and fees required by the Smart Growth Zoning and necessary for an adequate and timely review of the design of the Project or potential Project impacts; or*
- 3) *it is not possible to adequately mitigate significant adverse Project impacts on nearby properties by means of suitable conditions.*

To implement this provision, the Department will require the Smart Growth Zoning to contain this provision if Projects are subject to Plan Approval.

11.3 Waivers. Upon the request of the Applicant, the Plan Approval Authority may waive dimensional and other requirements of Section [x], including the Design Standards, in the interests of design flexibility and overall project quality, and upon a finding of consistency of such variation with the overall purpose and objectives of the SGOD, or if it finds that such

waiver will allow the Project to achieve the density, Affordability, mix of uses, and/or physical character allowable under this Section [x].

COMMENTS: Chapter 40R states that the Smart Growth Zoning may allow the Approving Authority, through the Plan Approval process, to waive specific dimensional and other standards (other than Affordability requirements) otherwise applicable to a Project, if it finds that the waiver will allow the Project to achieve the density, Affordability, mix of uses, and/or physical character allowable under the Smart Growth Zoning, and that the Project is consistent with the Design Standards. The 40R Regulations state that the waiver criteria must be defined in the Smart Growth Zoning. Therefore, if the community intends to grant waivers through the Plan Approval process, the Smart Growth Zoning must contain this provision.

11.4 Project Phasing. The PAA, as a condition of any Plan Approval, may allow a Project to be phased at the request of the Applicant, or it may require a Project to be phased for the purpose of coordinating its development with the construction of Planned Infrastructure Improvements (as that term is defined under 760 CMR 59.00), or to mitigate any extraordinary adverse Project impacts on nearby properties. For Projects that are approved and developed in phases, the proportion of Affordable to market rate units shall be consistent across all phases, and the proportion of Existing Zoned Units to Bonus Units (as those terms are defined under 760 CMR 59.00) shall be consistent across all phases.

COMMENTS: The Chapter 40R Regulations state that the Smart Growth Zoning may permit the Plan Approval approvals of proposed Projects to be phased for the purpose of coordinating development with the construction of Planned Infrastructure Upgrades or that are required to mitigate any extraordinary adverse Project impacts on neighboring properties. For Projects that are approved and developed in phases, the proportion of Affordable units and the proportion of Existing Zoned Units to Bonus Units shall be consistent across all phases. Therefore, the Department will require the Smart Growth Zoning to contain this provision if Projects are subject to Plan Approval.

11.5 Form of Decision. The PAA shall issue to the applicant a copy of its decision containing the name and address of the owner, identifying the land affected, and the plans that were the subject of the decision, and certifying that a copy of the decision has been filed with the [City / Town] Clerk and that all plans referred to in the decision are on file with the PAA. If twenty (20) days have elapsed after the decision has been filed in the office of the [City / Town] Clerk without an appeal having been filed or if such appeal, having been filed, is dismissed or denied, the [City/Town] Clerk shall so certify on a copy of the decision. If a plan is approved by reason of the failure of the PAA to timely act, the [City/ Town] Clerk shall make such certification on a copy of the application. A copy of the decision or application bearing such certification shall be recorded in the registry of deeds for the county and district in which the land is located and indexed in the grantor index under the name of the owner of record or recorded and noted on the owner's certificate of title. The fee for recording or registering shall be paid by the applicant.

COMMENTS: The Department will require the Smart Growth Zoning to contain this provision if Projects are subject to Plan Approval.

11.6 Validity of Decision. A Plan Approval shall remain valid and shall run with the land indefinitely, provided that construction has commenced within two years after the decision is issued, which time shall be extended by the time required to adjudicate any appeal from such approval and which time shall also be extended if the Project proponent is actively pursuing other required permits for the Project or there is other good cause for the failure to commence construction, or as may be provided in a Plan Approval for a multi-phase Project.

COMMENTS: The Department recommends that the Smart Growth Zoning contain this provision if Projects are subject to Plan Approval.

12.0 Change in Plans after Approval by PAA

12.1 Minor Change. After Plan Approval, an applicant may apply to make minor changes in a Project involving minor utility or building orientation adjustments, or minor adjustments to parking or other site details that do not affect the overall buildout or building envelope of the site, or provision of open space, number of housing units, or housing need or affordability features. Such minor changes must be submitted to the PAA on redlined prints of the approved plan, reflecting the proposed change, and on application forms provided by the PAA. The PAA may authorize such changes at any regularly scheduled meeting, without the need to hold a public hearing. The PAA shall set forth any decision to approve or deny such minor change by motion and written decision, and provide a copy to the applicant for filing with the [City/Town] Clerk.

COMMENTS: The Department recommends that the Smart Growth Zoning contain this provision if Projects are subject to Plan Approval.

12.2 Major Change. Those changes deemed by the PAA to constitute a major change in a Project because of the nature of the change in relation to the prior approved plan, or because such change cannot be appropriately characterized as a minor change as described above, shall be processed by the PAA as a new application for Plan Approval pursuant to Sections 9.0 - through 13.0.

COMMENTS: The Department recommends that the Smart Growth Zoning contain this provision if Projects are subject to Plan Approval

13.0 Design Standards

13.1 Adoption of Design Standards. Any Project undergoing the Plan Approval process shall be subject to design standards [as set forth below in this Section 13.0 (“Design Standards”)] [or] [referenced in the ordinance or bylaw but contained in a separate document].

13.2 Purpose. The Design Standards are adopted to ensure that the physical character of Projects within the SGOD:

- 1) will be complementary to nearby buildings and structures;
- 2) will be consistent with the Comprehensive Housing Plan, an applicable master plan, an area specific plan, or any other plan document adopted by the [City / Town]; and
- 3) will provide for high-density quality development consistent with the character of building types, streetscapes, and other community features traditionally found in densely settled areas of the [City / Town] or in the region of the [City / Town].

COMMENTS: The Design Standards may address some or all of the following factors:

- a) the scale, proportions, and exterior appearance of buildings;*
- b) the placement, alignment, width, and grade of streets and sidewalks;*
- c) the type and location of infrastructure;*
- d) the location of building and garage entrances;*
- e) off-street parking;*
- f) the protection of significant natural site features;*
- g) the location and design of on-site open spaces;*
- h) landscaping;*
- i) exterior signs; and*
- j) buffering in relation to adjacent properties.*

13.4 Mixed-use Development Projects. The Design Standards may require that the non-residential elements of any Mixed-Use Development Project are planned and designed in an integral manner to complement the residential uses, and help foster vibrant, workable, livable, and attractive neighborhoods consistent with the smart growth goals of the Enabling Act and this Section [x].

COMMENTS: Under the Chapter 40R Regulations, the Municipality has the option either to include the Design Standards within the Smart Growth Zoning, or to make them a part of the PAA Regulations. In either case, they must be reviewed and approved by the Department before they can take effect. If the Design Standards are contained within the PAA Regulations, the Department recommends that the Smart Growth Zoning include Sections 13.2 through 13.4, setting forth the statutory standards of Chapter 40R that must guide the PAA in adopting Design Standards.

The Municipality must demonstrate to the satisfaction of the Department that its Design Standards will not “unduly restrict” the development of Projects in the District: that means that the Design Standards may not add unreasonable costs or unreasonably impair the economic feasibility of proposed Projects. The Department may disapprove a proposed District if the Design Standards fail to meet this test.

14.0 SEVERABILITY.

If any provision of this Section [x] is found to be invalid by a court of competent jurisdiction, the remainder of Section [x] shall not be affected but shall remain in full force. The invalidity of any provision of this Section [x] shall not affect the validity of the remainder of the [Town's/City's Zoning Bylaw/Ordinance].

COMMENTS: The Department recommends that the Smart Growth Zoning should contain this section.

MODEL BYLAW FOR COMMERCIAL AND INDUSTRIAL DEVELOPMENT AND PERFORMANCE STANDARDS

Prepared by Pioneer Valley Planning Commission

1.0 COMMERCIAL AND INDUSTRIAL DEVELOPMENT AND PERFORMANCE STANDARDS

1.1 Commercial and Industrial Development and Performance Standards

1.11 Purpose

The purpose of these Commercial and Industrial Development and Performance Standards is to promote well-designed commercial and industrial developments and to minimize the adverse impacts of such development on community character, traffic safety, environmental quality and neighboring properties.

1.12 General Application

All projects or uses requiring Special Permit, Special Permit with Site Plan Approval, or Site Plan Review - Administrative Review must demonstrate compliance with the commercial performance standards herein.

a. Access and Traffic Impacts

Applicants must demonstrate that the project will minimize traffic and safety impacts on roadways.

- i. The number of curb cuts on town roads shall be minimized. To the extent feasible access to businesses shall be provided via one of the following:
 - 1) Access via existing side street.
 - 2) Access via a cul-de-sac or loop road shared by adjacent lots or premises.
- ii. One driveway per business shall be permitted as a matter of right. Where deemed necessary by the special permit granting authority, two driveways may be permitted as part of the Site Plan Approval process, which shall be clearly marked "entrance" and "exit".
- iii. Curb cuts shall be limited to the minimum width for safe entering and exiting, and shall in no case exceed 24 feet in width.
- iv. No new curb cut shall be allowed that is closer to any existing curb cut than 200 linear feet. In addition, new curb cuts on state and local roads shall be discouraged and developers shall be encouraged to seek access via a common driveway serving an adjacent lot or premises.
- v. Driveways and Circulation

- 1) Driveways shall be no greater than sixteen (16) feet in width.
- 2) Aisles shall be not less than twenty (20) feet in width.
- 3) No portion of an entrance or exit driveway shall be closer than fifty (50) feet to the curb line of any intersecting street, nor closer than fifty (50) feet to any portion of an existing driveway on the same or adjacent lot.
- 4) Pedestrian walkways shall be integrated into the design of the lot. Where a walkway crosses a vehicular path, the walkway shall be defined through the use of a different paving material or painted lines.
- 5) All driveways shall be designed to afford motorist exiting to roadways with a safe sight distance.

vi. The proposed development shall provide safe interior circulation within its site by separating pedestrian and vehicular traffic.

vii. In each case where a new building(s) or a new use of more than 3,000 square feet total floor area is proposed, or where any proposed enlargement of a building would result in a building having more than 3,000 square feet total floor area, a traffic impact statement shall be prepared. The traffic impact statement shall contain:

- 1) A detailed assessment of the traffic safety impacts of the proposed project or use on the carrying capacity of any adjacent roads, including the projected number of motor vehicle trips to enter or depart from the site estimated for daily hour and peak hour traffic levels, road capacities and impacts on intersections.
- 2) Existing and proposed traffic flow patterns at the site including entrances and egresses, loading and unloading areas, and curb cuts on site and within one hundred (100) feet of the site.
- 3) An interior traffic and pedestrian circulation plan designed to minimize conflicts and safety problems.

viii. Adequate pedestrian and bicycle access shall be provided as follows:

- 1) Sidewalks shall be provided to provide access to adjacent properties and between individual businesses within a development
- 2) If the property directly abuts a bikeway right-of-way, a paved access route to the bikeway shall be provided.
- 3) Adequate parking for bicycles.

ix. The Planning Board may require the following additional information for projects proposing over ten thousand (10,000) square feet of buildings and structures:

- 1) A plan to minimize traffic and safety impacts through such means as physical design and layout concepts, staggered employee work schedules, promoting use of public transit or carpooling, the preparation of a trip reduction plan, or other appropriate means.
- 2) An interior traffic and pedestrian circulation plan designed to minimize conflicts and safety problems.

b. Parking

Proposed projects or uses must comply with Parking and Off-street Loading requirements and the following standards:

- i. To the extent feasible, parking areas shall be located to the side or rear of the structure, and be shared with adjacent businesses.
- ii. Parking areas shall be located to the side or rear of the structure. No parking shall be permitted within the required front setback of the structure.
- iii. 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.
- iv. Whenever feasible, pedestrian walkways shall be integrated into the design of the lot. Where a walkway crosses a vehicular path, the walkway shall be defined through the use of a different paving material or painted lines.
- v. Parking and Loading Area Screening and Buffering
 - 1) Vegetative or structural screens shall be established on the perimeter of all parking and loading areas to prevent direct views of parked vehicles from streets and sidewalks, avoid spill-over light, glare, noise, or exhaust fumes onto adjacent properties and to provide the parking area with a reasonable measure of shade when trees reach maturity.
 - 2) Vegetative or structural screens shall be no less than five (5) feet high and shall be visually impervious throughout the year. Screens may be a hedge, wall, fence, or combination of these choices. A land berm may be used to provide up to fifty (50) percent of the required height. The height of any screen shall decrease where driveways approach sidewalks, walking paths, and streets in order to provide adequate visibility of pedestrians from motor vehicles and to maintain a clear line of sight for vehicles entering the roadway.
- vi. Parking Area Landscaping

- 1) No less than fifteen (15) percent of the area of a parking lot, not including the perimeter area, shall be permanently landscaped using planting strips, planting diamonds, hedges, bushes, groundcovers, trees, and other vegetation. Buffer and screen plantings shall only count toward the required landscaping when they occur in areas other than the perimeter of the parking lot.
- 2) The applicant shall plant and maintain a minimum of one (1) deciduous tree per eight (8) parking spaces constructed. Trees shall have a minimum size of three (3) inch caliper at the time of planting.
- 3) Plant materials used to meet the requirements of this Bylaw shall be of specimen quality and conform to the American Standard For Nursery Stock, American Standards Institute, Inc., 230 Southern Building, Washington, DC 20005 and shall be planted according to accepted horticultural standards.
- 4) Planting strips shall be at least six (6) feet in width and shall respond to the needs of storing snow, locating light poles, and providing safe pedestrian access.
- 5) Evergreen trees shall be a minimum of four (4) feet tall at the time of planting.
- 6) Every effort shall be made to integrate existing mature trees on the site into the proposed landscape plan. Existing trees which are used to meet the requirements of this section shall be protected during construction using the following standards:
 - (a) Fencing or other protective barrier shall be used around trees on construction sites.
 - (b) Changes in the normal drainage patterns shall be avoided and appropriate protection shall be provided for trees if a grade change is necessary in the surrounding area.
 - (c) Vehicular (including construction machinery) and pedestrian traffic shall be kept away from trees to prevent soil compaction and destruction of the root system.
 - (d) If a tree is damaged during construction the applicant shall file a revised landscape plan with the Planning Board detailing an alternative planting schedule which shall meet the standards for landscaping set forth in this Bylaw.

c. Landscaping

- i. A landscaped buffer strip at least 20 ft. wide, continuous except for approved driveways, shall be established adjacent to any public road to visually separate parking and other uses from the road. The buffer strip shall be planted with grass, medium height shrubs, and shade trees (minimum 3-inch caliper, planted at least every 50 feet along the road frontage). At all street or driveway intersections, trees or shrubs shall be

set back a sufficient distance from such intersection so that they do not present a traffic visibility hazard.

- ii. Exposed storage areas, machinery, service areas, truck loading areas, utility buildings and structures and other unsightly uses shall be screened from view from neighboring properties and streets using dense, hardy evergreen plantings, or earthen berms or wall or tight fence complemented by evergreen plantings.
- iii. All landscaped areas shall be properly maintained. Shrubs or trees which die shall be replaced within one growing season.
- iv. Landscaping shall be in conformance with existing town bylaws.
- v. Completion of the landscaping requirements may be postponed due to seasonal weather conditions for a period not to exceed six (6) months from the time of project completion.

d. Appearance/Architectural Design

Architectural design shall be compatible with the rural/historic character and scale of building in the neighborhood and the Town of __through the use of appropriate building materials, screening, breaks in roof and wall lines 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. In making its decision, the Planning Board may consider whether the building design is compatible with the following design guidelines: 1) exterior facades are faced with wood, metal or vinyl clapboards, or stone, or brick; 2) exterior façade treatment is compatible on all four sides; 3) rooflines are peaked.

e. Storm Water Management

- i. The rate of surface run-off from a site shall not be increased after construction. If needed to meet this requirement and to maximize groundwater recharge, increased run-off from impervious surfaces shall be recharged on site by being diverted to vegetated swales, infiltration areas, or detention basins. Dry wells shall be used only where other methods are infeasible and shall require oil, grease, and sediment traps to facilitate removal of contaminants.
- ii. Neighboring properties shall not be adversely affected by flooding from excessive run-off. Run-off shall not result in pollution of streams, water bodies or groundwater.
- iii. The use of proven, alternative paving systems, such as porous paving, is highly encouraged to reduce the amount of impervious surface on developed sites.
- iv. The use of shared stormwater management structures and facilities is highly encouraged.

f. Erosion Control

Erosion of soil and sedimentation of streams and water bodies shall be minimized by using the following erosion control practices:

- i. Exposed or disturbed areas due to stripping of vegetation, soil removal, and regrading shall be permanently stabilized within six months of occupancy of a structure.
- ii. During construction, temporary vegetation and/or mulching shall be used to protect exposed areas from erosion. Until a disturbed area is permanently stabilized, sediment in run-off water shall be trapped by using siltation fencing, staked hay bales, stone check dams or sedimentation traps.
- iii. Permanent erosion control and vegetative measures shall be in accordance with the erosion/sedimentation/vegetative practices recommended by the Natural Resources Conservation Service (NRCS).
- iv. All slopes exceeding 15% resulting from site grading shall be covered with four (4) inches of topsoil and planted with a vegetative cover sufficient to prevent erosion, or stabilized by a retaining wall.
- v. Dust control shall be used during grading operations if the grading is to occur within 200 feet of an occupied residence or place or business. Dust control methods may consist of grading fine soils on calm days only or damping the ground with water.

g. Water Quality

All outside storage facilities for fuel, hazardous materials or waste, and potentially harmful raw materials shall be located within an impervious, diked containment area adequate to hold one hundred ten (110 %) percent of the total volume of liquid kept within the storage area.

h. Explosive Materials

- i. No highly flammable or explosive liquids, solids or gases shall be stored in bulk above ground, unless prior written approval of the Fire Chief has been obtained by the applicant. The project shall also meet any relevant federal and state regulations.
- ii. Propane gas tanks in 250 pound cylinders (or smaller) shall be exempt from these safety regulations.

i. Lighting

- i. Any outdoor lighting fixture newly installed or replaced shall be shielded so that it does not produce a strong, direct light beyond the property boundaries.

ii. No light post shall be taller than sixteen (16) feet, except that the Planning Board may waive this requirement upon finding that the use of taller light standards – up to twenty-five (25) feet in height – results in a more functional site figuration.

j. Noise

i. No person owning, leasing or controlling the operation of any source of sound shall willfully, negligently or through failure to provide necessary equipment or to take necessary precautions, cause unnecessary emissions from said source of sound that may cause noise pollution, in accordance with Massachusetts Department of Environmental Protection regulations 310 CMR 7.10.

ii. Noise pollution shall be defined as any sound which exceeds the ambient noise level designated for the receiving land use category, when measured at or within the property boundary for the receiving land use, plus any sound which:

- (a) Endangers the safety of, or could cause injury to the health of humans or animals;
- (b) Annoys or disturbs a reasonable person of normal sensitivities;
- (c) Endangers or injures personal or real property.

iii. Sound Level Limits by Receiving Land Use

(a) Except as provided in (c) below, no person shall operate or cause to be operated any source of sound in a manner that creates a sound level which exceeds the ambient noise level set forth for the receiving land use category in the following table when measured at or within the property boundary of the receiving land use.

Table 1-1. Sound Level Limits

Receiving Land Use Category	
Item	
Sound Level Limit (DBA)	
Residential A, B and C	
Daytime	60
Open Space	
All Other Times	50
Business	
At All Times	65
Commercial	
At All Times	70

Notes for Table One:

DAYTIME – The time between the hours of seven ante meridian (7:00 A.M.) and six post meridian (6:00 P.M.) each week excepting Sunday in accordance with the time system locally in effect.

DECIBEL (DB) – The unit by which the sound level is measured.

SOUND LEVEL – The weighted sound level obtained by the use of a sound level meter and frequency weighting network such as A, B, or C as specified in the American National Standards Institute specifications for sound level meters. (ANSI.)

iv. Restrictions on Noise Emitted from Construction Sites

(a) No person shall engage in or cause very loud construction activities on a site abutting residential use between the hours of 9 P.M. of one and 7 A.M. of the following day.

(b) It shall be unlawful of any person to operate any construction device on any construction site if the operation of that device emits noise measured at the lot line of the affected property in excess of the following values:

Table Two. Construction Site Noise Limits

Use of Affected Property
L 10 Level
Maximum Noise Level
Residential A, B and C
75 DBA
86 DBA
Business
80 DBA
-
Commercial
85 DBA
-
Public Way
85 DBA
-

Notes for Table Two:

A-WEIGHTED SOUND LEVEL – The sound pressure measured on a sound level meter using the A-weighting network. The level read is designated DB(A) or DBA.

L-10 - The A-weighted sound level exceeded 10% of the time.

(c) The L 10 level shall be determined by making 100 observations on the A-weighted network with the sound level meter at slow response at ten (10) second intervals. During any of these observations if a measurement is substantially affected by a source outside of the construction site, these measurements will not be

considered. Observations will be continued until 100 valid observations have been recorded. The L 10 level will be equivalent to the tenth highest level recorded.

(d) If the person taking measurements estimates that outside noise sources contribute greatly to the noise of the construction site, the aforementioned procedure shall be repeated when construction is inactive in order to correctly determine the L 10 level. The L 10 level during construction must be greater than the background L 10 level by at least 5 DBA to be considered in violation of the provisions of this regulation.

k. Utilities

Electric, telecommunications, and other such utilities shall be underground where physically and environmentally feasible.

l. Dust and Odors

No person having control of any dust or odor generating operators or construction or demolition shall permit emissions of dust or odor which cause or contribute to a condition of air pollution, in accordance with Massachusetts Department of Environmental Protection regulations 310 CMR 7.09.

m. Heat, glare, vibration and radiation

No heat, glare, or vibration shall be discernible from the outside of any structure, and all radiation shall be contained within a structure.

n. Storage

All materials, supplies and equipment shall be stored in accordance with Fire Prevention Standards of the National Board of Fire Underwriters and shall be screened from view from public ways or abutting properties.

MODEL COMMERCIAL CORRIDOR SITE PLAN APPROVAL BYLAW

Prepared by Pioneer Valley Planning Commission

10-9-07

1.0 COMMERCIAL SITE PLAN APPROVAL

1.1 Purposes

- (1) To promote the safety of vehicular and pedestrian movement with the site and in relation to the adjacent areas, highway traffic safety and protect the capability of state and local roads to conduct traffic smoothly;
- (2) To promote an attractive and viable commercial district and expand the commercial tax base of the Town/City;
- (3) To protect the rural character, aesthetic visual qualities, natural environmental features, historical features and property values of the Town/City and neighboring properties; and
- (4) To discourage unlimited commercial "strip development" and curb cuts along highways, and encourage commercial growth in nodes and clusters.

1.2 Projects Requiring Site Plan Approval

Within the Business, Limited Business or Industrial Districts, no special permit or building permit shall be issued and no application for such permits shall be accepted for any of the following uses:

- (1) The construction or exterior alteration of a business structure;
- (2) The construction or exterior alteration of an industrial structure;
- (3) Any expansion or change in use of a business or industrial structure;

Unless a site plan has been endorsed by the Planning Board, after consultation with other boards, including but not limited to the following: Building Inspector, Board of Health, Board of Selectmen, Historical Commission, Conservation Commission, Highway Department, Fire Department and Police Department. The Planning Board may waive any or all requirements of site plan review for external enlargements of less than 10% of the existing floor area.

1.3 Exemption From Site Plan Approval

Site plan approval shall not be required for:

- (1) The construction or enlargement of any single family or two family dwelling or building accessory to such dwelling; or

- (2) Any building used exclusively for agriculture, horticulture or floriculture.

1.4 Applications for Site Plan Approval

- (1) Each application for Site Plan Approval shall be submitted to the Planning Board by the current owner of record, accompanied by nine (9) copies of the site plan.
- (2) The Planning Board shall obtain with each submission, a deposit sufficient to cover any expenses connected with a public hearing and review of plans, including the costs of any engineering or planning consultant services necessary for review purposes.

1.5 Required Site Plan Contents

All site plans 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. All site plans shall be on standard 24" x 36" sheets at a scale of 1 inch equals 20 feet, and contain the following additional information:

- (1) Name of the project, locus, date and scale plan;
- (2) Name and address of the owner of record, developer, and seal of the engineer, landscape architect or architect;
- (3) The location and boundaries of the lot, adjacent streets or ways, and the location and owner's names of all adjacent properties and those within 300 feet of the property line, and all zoning district boundaries;
- (4) Existing and proposed topography at the two foot contour interval the location of wetlands, streams, water bodies, drainage swales, areas subject to flooding and base flood elevations and unique natural land features;
- (5) Existing and proposed structures, including dimensions and elevations; and all exterior entrances and exits;
- (6) The location of parking and loading areas, public and private ways, driveways, walkways, access and egress points;
- (7) The location and description of all proposed septic systems, percolation test when necessary, water supply, storm drainage systems including existing and proposed drainlines, culverts, drainage swales, catchbasins, drainage calculations, and subdrainage along with soil logs, utilities, hydrants, manholes, lighting fixtures, and refuse and other waste disposal methods;
- (8) Proposed landscape features including the location and a description of buffers, screening, fencing, and plantings, including the size and type of plant material;

- (9) The location, dimensions, height, color, illumination and characteristics of existing and proposed signs;
- (10) The location and a description of proposed open space or recreation areas;
- (11) The plan shall describe estimated daily and peak-hour vehicle trips to be generated by the site and traffic flow patterns for vehicles and pedestrians showing adequate access to and from the site and adequate circulation within the site. A detailed traffic impact statement is required for use as specified in Section H-(1)-(f);
- (12) A plan for the control of erosion, dust, and silt, both during and after construction sequencing, temporary and permanent erosion control, and protection of water bodies;
- (13) For alterations to any existing or new business/commercial/industrial uses a table containing the following information:
 - A. Maximum area of building to be used for selling, offices, business, industrial or other uses.
 - B. Maximum number of employees where applicable.
 - C. Maximum seating capacity where applicable.
 - D. Number of parking spaces existing or required for the intended use.
- (14) Elevation plans at a scale of 1/4" – 1'0" for all exterior facades of the proposed structure(s) and/or existing facades plus addition(s) showing design features and indicating the type and color of material to be used.

The Planning Board may waive any information requirements it judges to be unnecessary to the review of a particular plan.

1.6 Procedures for Site Plan Review

(1) Referral to Municipal Boards and Departments

The Planning Board shall transmit one copy each to the Building Inspector, Board of Health, Conservation Commission, Highway Department, Historical Committee, Fire Department, and Police Department, who shall review the application and submit their recommendations and comments to the Planning Board concerning:

- A. The adequacy of the data and methodology used by the applicant to determine the impacts of the proposed development;
- B. The effects of the projected impacts of the proposed development; and
- C. Recommended conditions or remedial measures to accommodate or mitigate the expected impacts of the proposed development.

Failure of Boards to make recommendations within 35 days of the referral of the Application shall be deemed to be lack of opposition.

(2) Public Hearing

The Planning Board shall hold a public hearing within sixty-five (65) days of the receipt of an application and after due consideration of the recommendations received, the Board shall take final action within 90 days from the time of hearing.

(3) The period of review for a special permit requiring site plan approval shall be the same as any other special permit and shall conform to the requirements of Chapter 40A, Sec.9, "Special Permits". Specifically, a joint public hearing to address the Special Permit application and Site Plan Approval application shall be held within sixty-five (65) days of the filing of a special permit application with the Planning Board or Board of Appeals. The Planning Board shall then have 90 days following the public hearing in which to act.

1.7 Site Plan Review Criteria

In reviewing and evaluating the site plan, and in making a final determination regarding site plan approval, the Planning Board shall consider the following criteria:

- (1) The site plan complies with the Commercial Development and Performance Standards contained in Section 1.10;
- (2) The site plan minimizes traffic and safety impacts of the proposed development on adjacent highways or roads, and maximizes the convenience and safety of vehicular and pedestrian movement within the site;
- (3) The proposed development, to the extent feasible: a) is integrated into the existing landscape and protects abutting properties; b) minimizes adverse environmental impacts on such features as wetlands, floodplains, and aquifer recharge areas; c) minimizes obstruction of scenic views from publicly accessible locations; d) preserves unique natural or historical features; e) minimizes tree, vegetation, and soil removal and grade changes, f) maximizes open space retention; and g) screens objectionable features from neighboring properties and roadways.
- (4) The architectural design, layout and landscaping of the proposed development is in harmony with the historic, rural character of the neighborhood and the Town/City of [Town/City Name].
- (5) The proposed development is served with adequate water supply and waste disposal systems and will not place excessive demands on Town/City services and infrastructure.
- (6) The site plan shows adequate measures to prevent pollution of surface or groundwater, to minimize erosion and sedimentation, and to prevent changes in groundwater levels, increased run-off and potential for flooding.

1.8 Modifications to the Site Plan

Before approval of the site plan, the Planning Board may request that the applicant make modifications in the proposed design of the project or provide additional information to ensure that the above criteria are met.

1.9 Decision on Site Plan Approval

The Planning Board's final action in writing shall consist of either:

- A. Approval of the site plan based on a determination that the proposed project will constitute a suitable development and is in compliance with the standards set forth in this bylaw;
- B. Disapproval of the site plan based on a determination that the proposed project does not meet the standards for review set forth in this bylaw; or
- C. Approval of the project subject to any conditions, modifications and restrictions which will ensure that the project meets the standards and criteria in this bylaw/ordinance.

1.10 Commercial Development and Performance Standards

In order to receive site plan approval, all projects or uses must demonstrate compliance with the commercial development standards herein.

(1) Access Standards

- A. Applicants must demonstrate that the project will minimize traffic and safety impacts on highways. The number of curb cuts on state and local roads shall be minimized. To the extent feasible, access to businesses shall be provided via one of the following:
 - i. Access via a common driveway serving adjacent lots or premises;
 - ii. Access via an existing side street;
 - iii. Access via cul-de-sac or loop road shared by adjacent lots or premises.
- B. One driveway per business shall be permitted as a matter of right. Where deemed necessary by the Special Permit Granting Authority, two driveways may be permitted as part of the Site Plan Approval process which shall be clearly marketed "entrance" and "exit".
- C. Curb cuts shall be limited to the minimum width for safe entering and exiting, and shall in no case exceed 24 feet in width.
- D. All driveways shall be designed to afford motorists exiting to highways with safe sight distance.
- E. The proposed development shall assure safe interior circulation within its site by separating pedestrian, bicycle and vehicular traffic.

(2) Traffic Impact Statement

A traffic impact statement shall be prepared, which shall contain:

- A. Traffic flow patterns at the site including entrances and egresses, loading and unloading areas, and curb cuts on site and within one hundred feet of the site.
- B. A detailed assessment of the traffic safety impacts of the proposed project or use on the carrying capacity of any adjacent highway or road, including the projected number of motor vehicle trips to enter or depart from the site estimated for daily hour and peak hour traffic levels, road capacities, and impacts on intersections.
- C. A plan to minimize traffic and safety impacts through such means as physical design and layout concepts, staggered employee work schedules, promoting use of public transit or carpooling, or other appropriate means.
- D. An interior traffic and pedestrian circulation plan designed to minimize conflicts and safety problems.
- E. Adequate pedestrian and bicycle access shall be provided. Sidewalks shall be provided to provide access to adjacent properties and between individual businesses within a development.

(3) Trip Reduction Plan

In each case where a new building(s) or new use of more than 10,000 square feet shall prepare and submit a "Trip Reduction Plan" which clearly identifies a combination of transportation systems management strategies which are designed to reduce anticipated vehicle trips by 35%. These strategies should include, but are not limited to:

- A. Vanpool/Carpool incentive programs, such as employer subsidies for vanpools/carpools, preferred vanpool/carpool parking, ride matching services, and providing parking at the vanpool/carpool pick-up site.
- B. Allowing and encouraging flexible work hours and flexible work weeks.
- C. Encouraging pedestrian and bicycle commute modes by providing on-site bicycle parking storage, locker room facilities, bike and walking paths, and similar features.
- D. Site designs which are conducive to transit or vanpool use, such as convenient, weather protected transit shelters.
- E. Encouraging employee and customer use of transit services, including providing transit subsidies for improved transit service and accessibility.
- F. Provision of on-site services, retail opportunities, and housing if allowed in the zone.
- G. Naming a full-time or part-time transportation systems management coordinator to oversee implementing all strategies identified in the "Trip Reduction Plan."

(4) Parking Standards

Proposed projects or uses must comply with Parking and Off-street Loading requirements in Section V-D and the following standards:

- A. Parking areas shall be located to the side or rear of the structure. No parking shall be permitted within the required front yard of a structure.
- B. To the extent feasible, parking areas shall be shared with adjacent businesses.
- C. For developments which make a long-term commitment to actively promote employee and public use of transit, ridesharing, and other means to reduce single occupant vehicle (SOV) trips, minimum parking standards may be reduced by a percentage to be determined by the Planning Board based upon the adequacy of trip reduction plans submitted in accordance with Section H-1.

(5) Landscaping

- a. A landscaped buffer strip at least fifteen (15) feet wide, continuous except for approved driveways, shall be established adjacent to any public road to visually separate parking and other uses from the road. The buffer strip shall be planted with grass, medium height shrubs, and shade trees (minimum 2-inch caliper, planted at least every 50 feet along the road frontage). At all street or driveway intersections, trees or shrubs shall be set back a sufficient distance from such intersections so that they do not present a traffic visibility hazard. The sidewalk required above shall be incorporated into the buffer strip.
- b. Large parking areas shall be subdivided with landscaped islands so that no paved parking surface shall extend more than 80 feet in width. At least one tree (minimum 2: caliper) per 35 parking spaces shall be provided.
- c. Exposed storage areas, machinery, service areas, truck loading areas, utility buildings and structures and other unsightly uses shall be screened from view from neighboring properties and streets using dense, hardy evergreen planting, or earthen beams, or wall or tight fence complemented by evergreen plantings.
- d. All landscaped areas shall be properly maintained. Shrubs or trees which die shall be replaced within one growing season.

(6) Appearance/Architectural Design

- a. Architectural design shall be compatible with the rural/historic character and scale of buildings in the neighborhood and the Town/City through the use of appropriate building materials, screening, breaks in roof and wall lines and other architectural techniques. Variation in detail, form and siting should be used to provide visual interest and avoid monotony. Proposed buildings should relate harmoniously to each other with adequate light, air, circulation, and separation between buildings. In making its decision, the Planning Board may consider whether the building design is compatible with the following design guidelines: 1) exterior facades are faced with wood, metal or vinyl clapboards, or stone

or brick; 2) exterior façade treatment is compatible on all four sides; 3) rooflines are peaked.

b. The Planning Board may adopt such regulations as may be necessary to further specify design standards.

(7) Storm Water Runoff

a. The rate of surface water run-off from a site shall not be increased after construction. If needed to meet this requirement and to maximize groundwater recharge, increased runoff from impervious surfaces shall be recharged on site by being diverted to vegetated surfaces for infiltration or through the use of detention ponds. Dry wells shall be used only where other methods are infeasible and shall require oil, grease, and sediment traps to facilitate removal of contaminants.

b. Neighboring properties shall not be adversely affected by flooding from excessive run-off.

(8) Erosion Control

Erosion of soil and sedimentation of streams and waterbodies shall be minimized by using the following erosion control practices:

a. Exposed or disturbed areas due to stripping of vegetation, soil removal, and grading shall be permanently stabilized within six months of occupancy of a structure.

b. During construction, temporary vegetation and/or mulching shall be used to protect exposed areas from erosion. Until a disturbed area is permanently stabilized, sediment in runoff water shall be trapped by using staked haybales or sedimentation traps.

c. Permanent erosion control and vegetative measures shall be in accordance with the erosion/sedimentation/vegetative practices recommended by the Soil Conservation Service.

d. All slopes exceeding 15% resulting from site grading shall be either covered with 4 inches of topsoil and planted with a vegetative cover sufficient to prevent erosion or be stabilized by a retaining wall.

e. Dust control shall be used during grading operations if the grading is to occur within 200 feet of an occupied residence or place of business. Dust control methods may consist of grading fine soils on calm days only or dampening the ground with water.

(9) Water Quality

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 liquid kept within the storage area.

(10) Explosive Materials

a. No highly flammable or explosive liquids, solids, or gases shall be stored in bulk above ground, unless they are located in anchored tanks at least seventy-five (75) feet from any lot line, Town/City way, or interior roadway plus all relevant federal and state regulations shall also be met. Underground storage tanks are prohibited.

b. Propane gas tanks in 100-lb. cylinders (or smaller) shall be exempt from these safety regulations.

(11) Lighting

a. Any outdoor lighting fixture newly installed or replaced shall be shielded so that it does not produce a strong, direct light beyond the property boundaries;

b. No light standard shall be taller than fifteen (15) feet.

(12) Vibration

a. No vibration shall be transmitted outside the property where it originates.

1.9 Enforcement

(1) The Planning Board may require the posting of a bond or other adequate security to assure compliance with the plan and conditions and may suspend any permit or license when work is not performed as required.

(2) Any special permit issued under this section shall lapse within one (1) year if a substantial use thereof has not commenced sooner except for good cause. The time required to pursue and await determination of a judicial appeal pursuant to Chapter 40a of the General Laws shall be included within the one (1) year time limit.

(3) The Planning Board may periodically amend or add rules and regulations relating to the procedures and administration of this section.

Model Complete Streets Bylaw / Ordinance

Pioneer Valley Planning Commission, September 2014

Adapted from Complete Streets Policies for the City of Birmingham, AL and City of Somerville, MA

WHEREAS, "Complete Streets" are defined as streets that are designed to accommodate all users, including, but not limited to, motorists, pedestrians, bicyclists, and transit riders; and

WHEREAS, "Complete Streets" can include a range of elements to accommodate all users, including, but not limited to, sidewalks, signage, paved shoulders, bicycle lanes, cycle tracks, traffic lanes shared with motorist including sharrows and other bicycle pavement marking, crosswalks and other pavement marking for pedestrians, pedestrian control signalization, bicycle actuated traffic signals, bus pull outs, curb cuts, raised crosswalks, roundabouts, traffic islands and other traffic calming measures; and

WHEREAS, The Massachusetts Project Development & Design Guide (2006) states that traffic calming measures are physical elements intended to reduce vehicle speeds and improve driver attentiveness and are most often applied to existing streets where vehicle operating speeds are in conflict with or incompatible with pedestrian and bicycle activity; and

WHEREAS, Complete Streets support economic growth and community stability by providing accessible and efficient connections between home, school, work, recreation and retail destinations by improving the pedestrian and vehicular environments throughout communities; and

WHEREAS, Complete Streets enhance safe walking and bicycling options for school-age children, in recognition of the objectives of the national Safe Routes to School program and the U.S. Centers for Disease Control and Prevention's "Physical Activity Guidelines"; and

WHEREAS, Complete Streets will help the **[city/town]** to reduce greenhouse gas emissions as more residents choose an alternative to the single occupant vehicle, thereby improving air quality, alleviating public health concerns such as asthma, and making possible more green space and flood control by decreasing demand for parking lots; and

WHEREAS, Complete Streets can play a role by reducing pedestrian and bicyclist injuries and deaths, reducing traffic congestion, improving air quality both by promoting alternative forms of transportation and by helping to improve traffic flow; and

WHEREAS, the people of the **[city/town]** have expressed a strong desire for increased transportation options, including walking, cycling, and transit; and

WHEREAS, A Complete Streets **[ordinance/bylaw]** for **[city/town]** will integrate Complete Streets planning into all types of projects, including new construction, reconstruction, rehabilitation, repair, and maintenance during the construction, reconstruction or other changes of transportation facilities on streets and redevelopment projects;

NOW, THEREFORE, be it ordained by the **[adopting body]**, in session assembled, that the **[name of municipal codes]** is hereby amended as follows:

The addition of **[code citation]** as follows:

1. **[city/town]** shall enhance the safety, access, convenience and comfort of all users of all ages and abilities, providing for equality in use between pedestrians (including people requiring mobility aids), bicyclists, transit users, motorists and freight drivers, through the design, operation and maintenance of the transportation network so as to create a connected network of facilities accommodating each mode of travel that is consistent with and supportive of the local community, recognizing that all streets are different and that the needs of various users will need to be balanced in a flexible manner to achieve Complete Streets.
2. **[city/town]** will incorporate Complete Street elements into public transportation projects in order to provide appropriate accommodation for bicyclists, pedestrians, transit users and persons of all abilities, while promoting safe operation for all users, in comprehensive and connected networks in a manner consistent with, and supportive of, the surrounding community.
3. As feasible, **[city/town]** shall incorporate Complete Streets Infrastructure into existing streets to improve the safety and convenience of users, construct and enhance the transportation network for each category of users, and foster economic development and new employment.
4. **[city/town]** recognizes that Complete Streets may be achieved through single elements incorporated into a particular project or incrementally through a series of smaller improvements or maintenance activities over time.
5. **[city/town]** shall approach every transportation project and program as an opportunity to improve streets and the transportation network for all users, including conducting, once per year, a “rules of the road” education campaign to better inform pedestrians, cyclists and motorists of **[city/town]**/state traffic regulations and best practices for safely walking, bicycling and driving on complete streets. This work shall be done by **[applicable municipal boards, appointed officials, and departments]** and in cooperation with other departments, agencies, jurisdictions and associations.
6. **[city/town]** shall follow the following adopted design standards:
 - Massachusetts Project Development & Design Guide (2006)
 - National Association of City Transportation Officials Urban Bikeway Design Guide
 - ITE Designing Walkable Urban Thoroughfares: A Context Sensitive Approach
 - An ITE Recommended Practice report guidelines
 - American Association of State Highway and Transportation Officials (AASHTO) Green Book

At a minimum, requirements will be the following:

- a. In developed areas, continuous sidewalks should be provided on both sides of a roadway, minimizing the number of pedestrian crossings required. [If sidewalks are only on one side],

- the sidewalk should be provided on the side that minimizes the number of pedestrian crossings.
- b. Pedestrian requirements must be fully considered in the design of intersections [including taking into consideration the following concerns: crossings and pedestrian curb cut ramp locations; minimizing curb radius at corners; walking speed, pedestrian flow capacity, traffic control, yielding and delays].
 - c. All new and reconstructed sidewalks must be accessible to and usable by person with disabilities in accordance with the Americans with Disabilities Act and the Massachusetts Architectural Access Board.
 - d. Dedicated bicycle facilities, including conventional and physically separated bike lanes or cycle tracks, must be fully considered and implemented in the design of streets and intersections, wherever possible.
 - e. Along roadway segments, separation of motor vehicle and non-motorized users should be provided by implementing cycle tracks, buffered or conventional bicycle lanes, bicycle boxes, shoulders, or buffered sidewalks.
 - f. Where motorized and non-motorized users cannot be separated, traffic calming should be prioritized to implement a low-speed shared street [not to exceed 30 mph prima facie or posted speed] compatible with bicycle and pedestrian speeds on non-federal aid eligible roads.
7. Bicycle, pedestrian, and transit facilities shall be incorporated, when applicable and practical, in all street projects, re-construction, re-paving, and re-habilitation projects, with only the following exceptions:
- If bicycles or pedestrians are prohibited by law from using the facility.
 - If the cost of establishing bikeways or walkways as part of the project would be disproportionate in cost or to anticipated future use (not the current use).
 - If the existing right of way is constrained in a manner that inhibits simple addition of transit, bicycle, or pedestrian improvements. In this case, the **[city/town]** shall consider alternatives such as lane reduction, lane narrowing, on-street parking relocation or reduction, shoulders, signage, traffic calming, or enforcement.
 - If such facilities would constitute a threat to public safety or health in the determination of the **[city/town]** Traffic Engineer in consultation with the **[applicable department]**.
8. All initial planning and design studies, health impact assessments, environmental reviews, and other project reviews for projects requiring funding or approval by **[city/town]** shall make effort to (1) evaluate the effect of the proposed project on safe travel by all users, and (2) identify measures to mitigate any adverse impacts on such travel that are identified.

9. In design guidelines, **[city/town]** shall coordinate templates with street classifications and revise them to include Complete Streets Infrastructure, such as bicycle lanes and cycle tracks, sidewalks, street crossings, curb geometries, and planting strips. The design of new or reconstructed facilities should anticipate and support likely future demand for bicycling, walking and transit facilities.

ADOPTED AND SIGNED this _____, _____

ATTEST

DRAFT

Model Complete Streets Resolution

Pioneer Valley Planning Commission, September 2014

Adapted from Complete Streets Policies for the City of Birmingham, AL and City of Somerville, MA

WHEREAS, "Complete Streets" are defined as streets that are designed to accommodate all users, including, but not limited to, motorists, pedestrians, bicyclists, and transit riders; and

WHEREAS, "Complete Streets" can include a range of elements to accommodate all users, including, but not limited to, sidewalks, signage, paved shoulders, bicycle lanes, cycle tracks, traffic lanes shared with motorist including sharrows and other bicycle pavement marking, crosswalks and other pavement marking for pedestrians, pedestrian control signalization, bicycle actuated traffic signals, bus pull outs, curb cuts, raised crosswalks, roundabouts, traffic islands and other traffic calming measures; and

WHEREAS, The Massachusetts Project Development & Design Guide (2006) states that traffic calming measures are physical elements intended to reduce vehicle speeds and improve driver attentiveness and are most often applied to existing streets where vehicle operating speeds are in conflict with or incompatible with pedestrian and bicycle activity; and

WHEREAS, Complete Streets support economic growth and community stability by providing accessible and efficient connections between home, school, work, recreation and retail destinations by improving the pedestrian and vehicular environments throughout communities; and

WHEREAS, Complete Streets enhance safe walking and bicycling options for school-age children, in recognition of the objectives of the national Safe Routes to School program and the U.S. Centers for Disease Control and Prevention's "Physical Activity Guidelines"; and

WHEREAS, Complete Streets will help the **[city/town]** to reduce greenhouse gas emissions as more residents choose an alternative to the single occupant vehicle, thereby improving air quality, alleviating public health concerns such as asthma, and making possible more green space and flood control by decreasing demand for parking lots; and

WHEREAS, Complete Streets can play a role by reducing pedestrian and bicyclist injuries and deaths, reducing traffic congestion, improving air quality both by promoting alternative forms of transportation and by helping to improve traffic flow; and

WHEREAS, the people of the **[city/town]** have expressed a strong desire for increased transportation options, including walking, cycling, and transit; and

WHEREAS, implementation of Complete Streets will vary depending on the surrounding land uses, densities, and general context, but street and transportation plans should always be guided by the principle that streets should promote multiple transportation options for all people;

NOW, THEREFORE BE IT RESOLVED that the **[adopting body]** strongly endorses a Complete Streets approach for the **[city/town]** to enhance transportation options and to improve quality of life for the residents of **[city/town]** as follows:

1. **[city/town]** shall, to the maximum extent practical, scope, plan, design, construct, operate, and maintain all **[city/town]** streets to provide a comprehensive and integrated network of facilities for people of all ages and abilities traveling by foot, bicycle, automobile, public transportation, and commercial vehicle.
2. Such improvements shall be consistent with and supportive of the local community, and early consideration shall be given to any project's land use and transportation context.
3. Bicycle, pedestrian, and transit facilities shall be incorporated, when applicable and practical, in all street projects, re-construction, re-paving, and re-habilitation projects, with only the following exceptions:
 - If bicycles or pedestrians are prohibited by law from using the facility.
 - If the cost of establishing bikeways or walkways as part of the project would be disproportionate in cost or to anticipated future use (not the current use).
 - If the existing right of way is constrained in a manner that inhibits simple addition of transit, bicycle, or pedestrian improvements. In this case, the **[city/town]** shall consider alternatives such as lane reduction, lane narrowing, on-street parking relocation or reduction, shoulders, signage, traffic calming, or enforcement.
 - If such facilities would constitute a threat to public safety or health in the determination of the **[city/town]** Traffic Engineer in consultation with the **[applicable municipal department]**.
4. **[city/town]** shall, to the maximum extent practical, follow the latest adopted design standards when implementing this policy, including but not limited to:
 - a. Guidance issued by the:
 - Massachusetts Project Development & Design Guide (2006)
 - National Association of City Transportation Officials Urban Bikeway Design Guide
 - ITE Designing Walkable Urban Thoroughfares: A Context Sensitive Approach
 - An ITE Recommended Practice report guidelines
 - American Association of State Highway and Transportation Officials (AASHTO) Green Book
 - b. Application of design standards shall be flexible, recognizing that all streets are not alike and that user needs should be balanced, and innovative or non-traditional design options shall be considered.
5. The **[city/town]** Engineer shall develop implementation strategies that include revising and updating processes, procedures, design and construction manuals, recommended traffic control devices, standard construction specifications and other guidance to assist in this resolution's implementation.

BE IT FURTHER RESOLVED that the **[city/town]** will work with the Massachusetts Department of Transportation and community organizations to achieve the goals set forth in this Complete Streets policy.

ADOPTED AND SIGNED this _____, _____

ATTEST

DRAFT

MODEL CONSERVATION DEVELOPMENT ZONING BYLAW

*Prepared by the Pioneer Valley Planning Commission, with funding provided by the
Highland Communities Initiative
April 2010*

1.0 Conservation Development

1.01 Purposes

The purposes of this bylaw are to:

- (1) Promote compact development using flexible development standards;
- (2) Protect open space for use as farmland, forestry, recreation, or wildlife habitat;
- (3) Protect the town's rural character, natural resources, environmentally sensitive areas, or scenic views;
- (4) Increase use of sustainable or green energy sources in residential development; and
- (5) Preserve or enhance rural town character, including scenic roads and town centers.

1.02 Definitions

Conservation Development: A form of residential development allowed in all districts by right with Site Plan Review, whereby the options of common driveways and flexible area and frontage requirements are utilized to create permanent open space and avoid standard Approval Not Required and subdivision development.

Common Driveway: A vehicular access from a road to more than one (1) {but no more than six (6)} residential units, built in accordance with the common driveway standards stated in Section 1.08 of this bylaw.

Existing Resources / Site Analysis Map: A map which identifies, locates, and describes noteworthy features to be designed around through sensitive subdivision layouts, such as vegetation, wetlands, steep slopes, farmland soils, historic or cultural features, threatened or endangered species, unusual geological formations, and scenic views or viewsheds.

Low Impact Development (LID): A land-planning and engineering design approach to managing stormwater runoff which emphasizes use of on-site natural features to protect water quality. Low Impact Developments are designed to reflect natural hydrology, minimize impervious surfaces, treat stormwater in small decentralized structures, preserve portions of the site in natural conditions, and use natural topography for drainageways and storage.

Site Context Map: A map that illustrates the proposed development in connection to its surrounding neighborhood and shows major natural resource areas or features that cross parcel lines.

1.03 Conservation Development Allowed By Right with Site Plan Review

Conservation Development in accordance with this bylaw shall be allowed by right with Site Plan Review in all zoning districts. Any person creating {two} or more lots available for residential use, whether or not by subdivision, may apply for Conservation Development under this section. Conservation Development shall be encouraged within the town and shall be the preferred method of development wherever the purposes in Section 1.01 would be served.

1.04 Criteria for Site Plan Review

In reviewing applications for Conservation Development, the Planning Board may consider whether the application complies substantially with the following Site Plan Review criteria. The Planning Board may impose reasonable conditions at the expense of the applicant, including performance guarantees, to promote these criteria.

1.041 All dwellings shall, to the greatest extent possible, be located out of view from any road, unless valuable natural resources or farmland located to the rear of the property render building in view of the road more desirable.

1.042 Conservation Development shall create permanently protected conservation land. All land within a Conservation Development not in use for building lots shall be placed in permanent conservation.

1.043 The portion of a parcel placed in conservation shall, to the greatest extent possible, be that which is most valuable or productive as a natural resource, wildlife habitat, farmland, or forestry land.

1.044 Conservation Development shall result in the creation of fewer curb cuts and vehicular access points to a public way than would occur under standard Approval Not Required or Subdivision Development.

1.045 Conservation Development may result in a net increase in density of dwellings on the parcel, up to {ten percent (10%) or one (1) lot} over the density which could reasonably be expected to occur under standard Approval Not Required or Subdivision Development.

1.046 Stormwater runoff generated from land development and land use conversion activities shall not be discharged directly to a wetland, local water body, municipal drainage system, or abutting property, without adequate treatment.

1.047 Conservation Development shall employ Low Impact Development techniques and Renewable Energy techniques to the maximum extent practicable, as described in Sections 1.072 and 1.113 herein.

1.048 In Conservation Development, each structure shall be integrated into the existing landscape on the property, to the extent feasible, so as to minimize its visual impact through use of vegetative and structural screening, landscaping, grading, and placement on or into the surface of the lot.

1.05 Application Procedure

1.051 Any application for Conservation Development shall include all contents and follow all procedures in the Site Plan Review section, Section ____ of the {TOWN NAME} zoning bylaw.

1.052 Any application for Conservation Development shall clearly state the terms by which the development shall meet the criteria listed in Section 1.04 of this zoning bylaw.

1.053 In addition to the Site Plan Review requirements listed in Section ____ of the {TOWN} zoning bylaw, a Site Context Map and Existing Resources / Site Analysis Map shall be submitted to the Planning Board. These maps shall be used by the applicant in the preparation of a preliminary design plan.

1.054 The applicant is very strongly encouraged to request a concept meeting at a regular business meeting of the Planning Board. If one is requested, the Planning Board may invite the Conservation Commission, Board of Health, Historical Commission, and {INSERT THE NAMES OF ANY OTHER APPROPRIATE BOARDS}. The purpose of a concept meeting is to minimize the applicant's costs of engineering and other technical experts, and to commence discussions with the Planning Board at the earliest possible stage in the development. At the meeting, the applicant may outline the proposed development, seek preliminary feedback from the Planning Board and/or its technical experts, and set a timetable for submittal of a formal application.

1.06 Flexible Dimensional Standards

Conservation Developments shall utilize the flexible area and frontage provisions of this bylaw for the purpose of minimizing the destruction of natural resources while maximizing availability of open space, farmland, and rural character.

1.061 Flexible Frontage in Conservation Developments

(1) The frontage of the total parcel from which the lots of Conservation Development are created shall equal or exceed one half the total frontage length otherwise required for the sum of all lots created under standard Subdivision Regulations. (For example, to create a six-lot Conservation Development in a zone where there is a 200 foot frontage requirement, the parcel must have a minimum of 600 foot contiguous frontage along one road.)

(2) Provided that all other requirements of this bylaw are met, there shall be no frontage required for individual lots within Conservation Development, with the exception described in Section 1.061(3) below.

(3) Any building lot which fronts on an existing public road shall have {200} foot frontage. This provision shall not apply to permanent conservation land.

1.062 Flexible Area in Conservation Developments

(1) There is no minimum lot size for individual lots, provided the lot meets Title V standards. The average lot size for all lots created shall be at least {two (2) acres}.

(2) The total number of building lots which can be created from any parcel shall be determined by subtracting the area of all wetlands (as defined by the {TOWN NAME} Conservation Commission) and slopes of greater than fifteen percent (15%) from the total parcel area, and dividing the resulting area by the required average lot size of {two acres}.

(3) All land not used for building lots shall be placed in permanent conservation in accordance with Section 1.10 of this bylaw, but not less than {40%} of the total land area.

(4) To the extent feasible and practical, building lots shall be located out of view of town roads, while all protected open space shall be located along, or in view of, town roads.

1.063 Flexible Setback Requirements

(1) Maximum front setback requirements are {25} feet from a common driveway and {150} feet from a public way.

(2) There are no minimum setback requirements for rear or side yard setbacks.

1.07 **Additional Development Standards**

1.071 Stormwater Management

The design and development of Conservation Development shall minimize off-site stormwater runoff, promote on-site infiltration, and minimize the discharge of pollutants to ground and surface water. Natural topography and existing land cover should be maintained and protected to the maximum extent practicable. Conservation Development shall meet the following requirements:

(1) Untreated, direct stormwater discharges to wetlands and surface waters are not allowed;

- (2) Post-development peak discharge rates should not exceed pre-development peak rates;
- (3) Erosion and sediment controls must be implemented to remove eighty percent (80%) of the average annual load of total suspended solids;
- (4) All stormwater treatment systems or Best Management Practices must have operation and maintenance plans to ensure that systems function as designed.

1.072 Low Impact Development

All Conservation Developments shall employ the following Low Impact Development techniques to the maximum extent practicable:

- (1) Vegetated Swales - shallow drainage channels with thick grasses or vegetation that slow runoff, filter it, trap pollutants and promote infiltration into the ground;
- (2) Cisterns and Rain Barrels – water tanks that store rainwater for landscaping and gardens;
- (3) Bioretention Areas or Rain Gardens – bioretention “cells” are shallow depressions filled with sandy soil, topped with mulch and planted with dense vegetation, that collect, treat and infiltrate rainwater;
- (4) Low Impact Roadways – narrow roadways to reduce impervious cover, which employ open-section layouts without curbs and gutters, flanked by grass filter strips and swales for stormwater infiltration;
- (5) Permeable Paving – paving surfaces used for driveways, parking, walkways and patios that allow rainwater to percolate into the ground, including porous asphalt or concrete, paving stones and manufactured “grass pavers” made of concrete or plastic ;
- (6) Green Roofs – vegetated roof systems that capture and store rainfall in a lightweight engineered soil medium, where water is taken up by plants and returned to the atmosphere.

1.08 Common Driveways

1.081 Common Driveways shall be allowed with Site Plan Review in accordance with the provisions of this section. Where applicable, under the Subdivision Regulations, Common Driveways may be allowed in place of a subdivision road.

1.082 No more than {six (6) lots} shall be served by a Common Driveway. The driveway shall lie entirely within the lots being served.

1.083 Frontage along the length of any Common Driveway shall in no way be used to satisfy frontage requirements as specified in the Zoning Bylaw; furthermore, no Common Driveway shall be accepted as a public road; nor shall the town under any circumstances be held liable for construction, reconstruction, maintenance, or snow removal on any Common Driveway, unless by contract duly entered into by the town and all landowners served by the Common Driveway.

1.084 The landowners of all residences served by a Common Driveway shall be granted a Right-of-Way for the use of the Common Driveway. Such Right-of-Way shall be recorded in the {COUNTY NAME} County Registry of Deeds prior to the recording and the deeding out of any of the lots within the Conservation Development, together with a statement of covenants as follows:

- (1) The Common Driveway shall at no time be used to satisfy frontage requirements under the zoning bylaw;
- (2) The Common Driveway shall at no time become the responsibility or liability of the town;
- (3) Each landowner served by the Common Driveway shall be liable and responsible for the repair and maintenance of any portion of the Common Driveway to which they have the exclusive Right-of-Way (such as a spur serving solely one parcel); and
- (4) Each landowner served by the Common Driveway shall be responsible and liable for the repair and maintenance of all portions of the Common Driveway to which more than one landowner holds a Right-of-Way.

1.085 The applicant shall prepare a Maintenance and Repair Agreement that will provide provisions for services, maintenance, and enforcement for the common driveway and shall be entered into by the affected property owners. Such Agreement shall be recorded in the {COUNTY NAME} County Registry of Deeds prior to the recording and the deeding out of any of the lots within the Conservation

Development

1.086 Common Driveway Standards

- (1) A common driveway shall have a minimum roadway width of {sixteen (16) feet and a maximum of twenty (20) feet}, in addition to an easement of sufficient width to assure proper drainage and maintenance.
- (2) A common driveway shall not be longer than {six hundred (600) feet} in length.
- (3) The slope or grade of a Common Driveway shall in no place exceed {eight percent (8%)} if unpaved or {twelve percent (12%)} if paved.
- (4) The common drive shall intersect a public way at an angle of not less than eighty (80) degrees.
- (5) The minimum curvature of a common driveway shall be sufficient for a fire engine to negotiate, generally no less than a radius of fifty (50) feet.
- (6) There shall be a turnaround area at the end of the Common Driveway; such turnaround shall accommodate safe and convenient turning by fire trucks and other emergency vehicles. Design of the turnaround area shall also be approved by the town's Fire Department.
- (7) Other standards may be set based on site configurations, including requirements for drainage.
- (8) The common driveway shall be constructed of a minimum 15" gravel base, with a surface layer consisting of three successive layers of ¾"-size crushed traprock stone, ½"-size crushed traprock stone, and ¼"-size crushed traprock stone, with a crown sufficient for drainage.
- (9) Drainage shall be adequate to dispose of surface runoff. Low Impact Development standards for stormwater management are preferred, but culverts shall be installed if deemed necessary by the Planning Board.
- (8) These standards may be waived when, in the opinion of the Planning Board, such action is in the public interest and not inconsistent with the purpose and intent of the {TOWN} Zoning Bylaw.

1.09 Utility Requirements

1.091 On-site Sewage Disposal

The following standards shall apply to developments requiring on-site sewage disposal:

(1) The applicant shall submit a septic system design prepared by a certified engineer and approved by the Board of Health and a plan illustrating the location of water supply wells with the application.

(2) All Conservation Developments must meet the minimum state Environmental Code (Title V) requirements for minimum setbacks between private water supply wells and septic tanks or soil absorption systems (310 CMR 15.211).

(3) All Conservation Developments must meet the minimum state Environmental Code (Title V) requirements for nitrogen loading limitations (310 CMR 15.214-15.217). For Conservation Developments with individual lot sizes less than 40,000 square feet, applicants must meet the following standards:

(a) Applicants must designate, on a plan, specific areas of common open space as "nitrogen credit land", based on the following equation:

$$(40,000 \text{ square feet} \times \text{number of Conservation Development lots}) - (\text{total square feet in proposed Conservation Development lots}) = \text{square feet of required nitrogen credit land in common conservation lands}$$

(b) Nitrogen credit land must meet DEP qualifications contained in "Guidelines for Title 5 Aggregation of Flows and Nitrogen Loading 310CMR15.216"

(c) All designated nitrogen credit land must be permanently restricted from further development under a "Grant of Title 5 Nitrogen Loading Restriction and Easement on Nitrogen Credit Land".

After approval of the Conservation Development Plan, applicants must apply to the Board of Health and the Mass. Department of Environmental Protection (DEP) for an aggregate determination of nitrogen loading under 310 CMR 15.216.

(d) Septic tanks must be installed on individually-owned lots. Nitrogen Credit Land must be at least 100 feet from all private wells.

1.092 Water Supply

In order to meet state Title V requirements for separation distances between drinking water wells and septic systems, private drinking water supply wells may be located in the common open space for a Conservation Development, provided that the provisions of Section 1.12 for a homeowners' association are met.

1.10 Conservation Land

1.101 Conservation Land Requirements

- 1) A minimum of {forty percent (40%) } of the total development parcel must be permanently protected as conservation land. At least seventy percent (70%) of the conservation land shall be retained in contiguous areas, unless approved by the Planning Board.
- 2) Watercourses, lakes, ponds, wetlands, floodplains, and steep slopes over twenty-five percent (25%) may be included in conservation land calculations not to exceed twenty-five percent (25%) of the total protected conservation lands.
- 3) The Planning Board may permit up to three percent (3%) of the conservation land to be paved or built upon for structures accessory to the dedicated use of open space (i.e. pedestrian walks, bicycle paths, playgrounds, farm-related structures).
- 4) All recreational facilities, common areas, and conservation land shall be reasonably accessible to all residents of the development.

1.102 Land Protection Methods for Conservation Land

- 1) All land not devoted to buildings, lots, roads and other development shall be permanently protected as conservation land for recreation, open space, forestry or agricultural uses which preserve the land in its natural condition.
- 2) The final owner of the conservation land and the conservation restriction are strongly recommended to develop a conservation management plan that will address proper management and future maintenance of this natural resource.
- 3) Further subdivision of conservation land, except for easements for underground utilities or drinking water supply wells, shall be prohibited.
- 4) If the land is not donated to the Town or conservation organization duly recognized as such pursuant to M.G.L. c. 180 and IRC Section 170(h) for conservation purposes, then a permanent conservation restriction is required in accordance with the provisions of M.G.L. c.184 §§ 31-33, as amended. The conservation restriction must be held by the Town or a non-profit organization dedicated to conserving open space.

1.103 Maintenance of Conservation Land

1) Prior to final approval of the Conservation Development, all required covenants, grants of easements, or conveyance for the conservation land must be submitted to the Planning Board and Town Counsel for review and approval prior to the recording and the deeding out of any of the lots within the Conservation Development.

2) Where applicable, if any portion of the conservation land is conveyed to a non-profit homeowners association or trust of the homeowners of the dwelling units in the Conservation Development, then the following shall be required. In order to ensure that the grantee will properly maintain the land deeded to it under this section, the applicant shall cause to be recorded in the appropriate Registry of Deeds, a Declaration of Covenants and Restrictions which shall, at a minimum, provide for:

a) Mandatory membership in an established homeowners association or trust, as a requirement of ownership of any residential unit or lot in the Conservation Development;

b) Provisions for maintenance assessments of all owners of residential units or lots in order to ensure that the conservation land is maintained in a condition suitable for the approved uses; failure to pay such assessment shall create an automatic lien upon written notice to any property owner failing to pay the assessment on the property assessed, enforceable by the association or trust;

c) Provision which, so far as possible under the existing law, will ensure that the restrictions placed on the use of the conservation land will not terminate by operation of law. The developer of the Conservation Development shall be responsible for the maintenance of the common land and any other facilities to be held in common until such time as the grantee is capable of assuming said responsibility.

3) Prior to the issuance of a building permit for an approved Conservation Development, proposed conservation land shall be clearly marked, and all efforts shall be taken by the developer to prohibit any disturbance of the delineated conservation lands during the construction process.

1.11 **Additional Considerations**

1.111 Trails. Where there is an existing local or regional trail network on land adjacent to a proposed Conservation Development, the applicant may be required to preserve or enhance the existing trail network with trail corridors through the site.

1.112 Enhancing Conservation Land Connectivity

Where there is existing conservation land adjacent to a proposed Conservation Development, the applicant may be required to locate the development's conservation land so that it expands or enhances the connectivity of such lands, where feasible.

1.113 Renewable Energy

Conservation Developments may employ the following Renewable Energy techniques to the maximum extent practicable:

- (1) Streets, roads and common driveways shall be laid out primarily on an east-west axis to maximize solar gain;
- (2) Homes and buildings shall be oriented to maximize passive solar gain, by having the longest side of the structure facing south, while maximizing windows facing south;
- (3) Solar access should be maintained for all buildings. New structures shall not cast shadows that reduce solar access for other structures;
- (4) Homes and buildings should use renewable energy sources as feasible.

1.12 Homeowners' Association

1.121 A qualified homeowners' association shall be created prior to the conveyance of any lot in Conservation Development for which such an association is required.

1.122 The association shall be responsible for the permanent maintenance of all commonly-owned amenities, (e.g. common conservation lands, stormwater facilities, recreational facilities, utility easements), except where such responsibility is assumed by another owner of the amenities.

1.123 A homeowners association agreement or covenant shall be submitted with the Conservation Development application guaranteeing continuing maintenance of and the development of a capital expense fund for such commonly-owned amenities, and assessing each lot a share of maintenance expenses. The articles of formation of the qualified homeowners' association shall be prepared by a licensed attorney. Such agreement shall be subject to the review and approval of Town Counsel and the Planning Board, and shall be recorded in the {COUNTY NAME} County Registry of Deeds. The Planning Board may commission further legal review of any documents submitted, the cost of which shall be borne by the applicant.

1.124 Such agreements or covenants shall provide that in the event that the homeowners association fails to maintain the commonly-owned amenities

reasonable order and condition, in accordance with the agreements or covenants, the Town of {TOWN NAME} may, after notice to the homeowners association enter upon such land and maintain it in order to preserve the taxable values of the properties within the development and to prevent the commonly-owned amenities from becoming a public nuisance. The costs of such maintenance by the Town of {TOWN NAME} shall be assessing each lot a share of maintenance expenses within the Conservation Development.

1.124 Additional details regarding the creation and formation of the homeowners association can be found in the {TOWN NAME} Planning Board Rules and Regulations.

1.13 Conflict with Other Laws

The provisions of this bylaw shall be considered supplemental of existing zoning bylaws. To the extent that a conflict exists between this bylaw and others, the more restrictive bylaw or provision thereof shall apply.

1.14 Severability

If any provision of this bylaw is held invalid by a court of competent jurisdiction, the remainder of the bylaw shall not be affected thereby. The invalidity in whole or in part of any section or sections of this bylaw shall not affect the validity of the remainder of the town's bylaws.

MODEL CREATIVE DEVELOPMENT BYLAW

Prepared by Pioneer Valley Planning Commission 01/10/06

1.0 Creative Development Allowed

Creative Development in accordance with this bylaw shall be allowed by Special Permit in any Residential zoning district, except not in the Floodplain District. Any person creating two or more lots available for residential use, whether or not by subdivision may apply for a special permit under this section. Creative Development shall be encouraged within the town, and shall be the preferred method of development wherever the following purposes would be served.

1.1 Purpose

The purpose of this bylaw is to encourage creative and innovative development patterns which promote the following:

- A. Preservation or enhancement of rural town character, including scenic roads and town centers;
- B. Provision for alternative to strip residential development lining roadsides in the town, and encouragement of development out of view from the road;
- C. Protection of natural resources, historic or archeological structures or sites, or scenic views;
- D. Protection of open space for use as farmland, woodlot or forestry, recreation, or wildlife habitat;
- E. Provision of affordable housing, or housing for the elderly, handicapped, or others with special needs.

1.2 Criteria for Evaluation

No special permit for Creative Development shall be issued unless the application therefore complies substantially with the following criteria:

- A. All dwellings shall, to the greatest extent possible, be located out of view from any road unless valuable natural resources or farmland located to the rear of the property render building in view of the road more desirable.
- B. The Creative Development shall create permanent open space. All land within the Creative Development not in use for building lots shall be placed in permanent open space.
- C. The portion of a parcel placed in open space shall, to the greatest extent possible, be that which is most valuable or productive as a natural resource, wildlife habitat, farmland, or forestry land.
- D. The Creative Development shall result in the creation of less curb cuts or vehicular access points to a public way than would reasonably be expected to occur under Standard ANR or Subdivision Development.

- E. The Creative Development shall result in no net increase in density of dwellings on the parcel over the density which could reasonably be expected to occur on the parcel under Standard ANR or Subdivision Development.

1.3 Terms of Special Permit

Any Special Permit for Creative Development shall state clearly the terms by which the development shall meet the above-listed criteria. The Special Permit granted shall state the acreage and location of open space provided under Section 1.22; shall identify the natural resources or farmland to be protected under Section 1.23 and any specific measures to be taken for their protection; shall specify the number and location of dwellings under Section 1.21 and curb cuts under Section 1.24; and shall state the number of units, if any, to be constructed under Section 1.26, including their location and the method by which their creation shall be assured, such as by covenant or easement.

1.4 Definitions

Creative Development: shall mean a form of residential development allowed in all districts by special permit, whereby the options of common driveways and flexible area and frontage requirements are utilized to create permanent open space and avoid standard ANR and subdivision development.

Common Driveway: shall mean a vehicular access from a road to more than one but no more than six residential units, built in accordance with the common driveway standards stated below, where allowed by special permit.

Affordable Housing Units: are those dwelling units which may be purchased by individuals or families with incomes between 80% and 120% of the median income for the Standard Metropolitan Statistical Area, provided that expenditure for housing costs does not exceed 30% of the gross annual income of the purchaser.

Housing Costs: for affordable housing units shall mean the annual payments necessary based on current available mortgage interest rates, a 30-year mortgage term, and a 10% down payment.

Median Income: shall mean the median income figure established for the applicable Standard Metropolitan Statistical Area, as established by annually updated U.S. Department of Housing and Urban Development median gross family income data.

1.5 Common Driveways

- A. Common Driveways Allowed - Common Driveways shall be allowed by Special Permit in accordance with the provisions of this section. Where applicable, under the Subdivision Regulations, common driveways may be allowed in place of a subdivision road.
- B. Up to Six Lots Served - No more than six lots shall be served by a common driveway. The driveway shall lie entirely within the lots being served.
- C. Driveway Not to be Used as Frontage - Frontage along the length of any common driveway shall in no way be used to satisfy frontage requirements as specified in the Zoning Bylaw; furthermore, no common driveway shall be accepted as a public road; nor shall the town

under any circumstances be held liable for construction, reconstruction, maintenance, or snow removal on any common driveway, unless by contract duly entered into by the town and all landowners served by the common driveway.

D. Driveway Right-of-Way - The landowners of all residences served by a common driveway shall be granted a Right-of-Way for the use of the common driveway. Such Right-of-Way shall be recorded in the Hampshire County Registry of Deeds, together with a statement of covenants as follows:

- (1) The common driveway shall at no time be used to satisfy frontage requirements under the zoning bylaw;
- (2) The common driveway shall at no time become the responsibility or liability of the town;
- (3) Each landowner served by the common driveway shall be liable and responsible in whole for the repair and maintenance of any portion of the common driveway to which they have the exclusive Right-of-Way (such as a spur serving solely one parcel); and
- (4) Each landowner served by the common driveway shall be jointly and severally responsible and liable for the repair and maintenance of all portions of the common driveway to which more than one landowner holds a Right-of-Way.

E. Common Driveway Standards

(1) Alignment and Dimensions

- a. The width of the right of way shall be 40 ft.
- b. The minimum width of the common driveway surface shall be 18 ft.
- c. The common drive shall have 3 ft. gravel shoulders on each side.
- d. The slope or grade of a common drive shall in no place exceed 8% if unpaved; or 12% if paved.
- e. The common drive shall intersect a public way at an angle of not less than 80 degrees.
- f. The minimum curvature of a common driveway shall be sufficient for a fire engine to negotiate, generally no less than a radius of 50 ft.
- g. There shall be a turnaround area at the resident end of the driveway such turnaround shall accommodate safe and convenient turning by fire trucks and other emergency vehicles.
- h. The maximum length of a common driveway shall be 500 feet.
- i. Other standards may be set based on site configurations, including requirements for drainage.
- j. These standards may be waived when, in the opinion of the Planning Board, such

action is in the public interest and not inconsistent with the purpose and intent of the Zoning Bylaw.

(2) Construction

- a. The common driveway shall be constructed of a minimum 15" gravel base with an oil and stone top layer of 1/2" consisting of three successive layers of 3/4" crushed traprock stone, 1/2" crushed traprock stone and 1/4" crushed traprock stone, with a crown sufficient for drainage.
- b. Drainage shall be adequate to dispose of surface runoff. Culverts shall be installed if deemed necessary by the Planning Board.
- c. These construction standards may be waived if, in the opinion of the Planning Board, such action is in the public interest and not inconsistent with the purpose and intent of the Zoning Bylaw.

(3) Alignment and Dimensions

- a. The common driveway, at its intersection with the street, must provide a leveling-off area with a slope no greater than 1% for the first 20 feet and a slope no greater than 5% for the next 30 feet.
- b. Minimum safe sight distance must be provided at the intersection of a common driveway with a street.

- F. Street Numbers and Identification - Each common driveway shall be assigned one street number; each residence served by the common driveway shall be assigned a letter to use together with the common driveway number for purposes of address and identification. All common driveways shall be clearly marked at the intersection of the driveway and the frontage road by a sign stating the driveway number, house letters, and names of house residents, sufficiently readable from the road to serve the purpose of emergency identification. The fire chief and/or highway department may make more specific requirements for driveway marking.
- G. Home offices, home occupations, bed and breakfasts, and other home business uses may be permitted in any dwelling served by a common driveway where the dwelling containing such home business has at least 200 foot frontage on an approved road, and is otherwise shown not to cause nuisance to adjoining landowners and other landowners sharing the common driveway.
- H. There shall be a minimum of 400 feet between the entrances of any two common driveways onto any road.
- I. Common driveway design shall to the greatest extent possible minimize adverse impact to wetlands, farmland, or other natural resources; allow reasonable, safe, and less environmentally damaging access to lots characterized by slopes or ledges; and result in the preservation of rural character through reduction of number of access ways; and retention of existing vegetation and topography.

1.6 Creative Development Using Flexible Area and Frontage Standards

A. Creative Developments shall utilize the flexible area and frontage provisions of this bylaw, in coordination with Section 1.5 regarding Common Driveways, for the purpose of minimizing the destruction of natural resources while maximizing availability of open space, farmland, and rural character.

B. Flexible Frontage in Creative Developments

- (1) The frontage of the parcel from which the lots of a creative development are created (whether or not by subdivision) shall equal or exceed one half the total frontage length otherwise required for the sum of all lots created as shown in the Table of Creative Development Dimensional Requirements (Table 1). For example, to create a six-lot creative development in a Residential Zone where there is a 175 foot frontage requirement, the parcel must have a minimum of 525 foot contiguous frontage along one road.
- (2) Provided that all other requirements of this bylaw are met, there shall be no frontage required for individual lots within a Creative Development, with the exception described in Section 1.6(B)(3) below.
- (3) Any building lot which fronts on an existing public road shall have the frontage required in the Table of Dimensional Regulations. This provision shall not apply to protected open space.

C. Flexible Area in Creative Developments

- (1) Individual lot areas may be as small as the minimum lot sizes shown in Table 1, provided that the average size for all lots created, including any land reserved as open space, shall be no smaller than the required average lot size, shown in Table 1.
- (2) The total number of building lots which can be created from any parcel shall be determined by dividing the total parcel area by the required average lot size shown in Table 1.
- (3) All land not used for building lots shall be placed in permanent open space in accordance with Section 1.9 of this bylaw, but not less than 25% of the total land area.
- (4) Estate or Flag Lots shall not be permitted in a Creative Development.

D. Other Dimensional Requirements

All lots within a Creative Development shall meet the front, rear and side yard requirements specified in Table 1.

E. Site Design Standards

Each structure shall be integrated into the existing landscape on the property so as to minimize its visual impact through use of vegetative and structural screening, landscaping, grading, and placement on or into the surface of the lot.

1.7 Creative Development Using Farmland Preservation Standards

Where a parcel for which a special permit under this bylaw is sought is presently used for agriculture, the preferred method of residential development shall be as follows:

- A. All lots to be used for residential development shall be of the minimum area permitted under this bylaw as shown in Table 5. All land not used for residential building lots shall be permanently preserved as open space in accordance with Section 1.9. At least one-half of the total parcel shall be so preserved.
- B. The total parcel frontage required shall be determined in accordance with the flexible frontage standards described in Section 1.6(B) and Table 1.
- C. All buildings, roads and driveways shall be located away from soils which are most suitable for agriculture (based on U.S. Soil Conservation Service classifications for prime farmland soils and soils of state and local importance) to the maximum practical extent. This provision does not apply to the location of on-site septic disposal facilities which must be placed in soils meeting the Massachusetts Environmental Code.
- D. All roads, driveways, drainage systems and utilities shall be laid out in a manner so as to have the least possible impact on agricultural lands and uses.
- E. All buildings, homes, and structures shall be located a minimum of 100 feet from agricultural land and shall be separated from agricultural uses by a 75-foot wide buffer strip of trees and fencing sufficient to minimize conflicts between farming operations and residences.
- F. All Creative Developments under this section shall comply with the dimensional standards in Section 1.6(D) and site design standards in Section 1.6(E).

1.8 On-Site Sewage Disposal

The following standards shall apply to developments requiring on-site sewage disposal:

- A. The applicant shall submit a septic system design prepared by a certified engineer and approved by the Board of Health and a plan illustrating the location of water supply wells with the special permit application. Septic systems shall be placed in the development to maximize the distance between systems.
- B. No Creative Development shall be approved unless the applicant can demonstrate to the satisfaction of the Planning Board that the potential for groundwater pollution is no greater from the proposed creative development than would be expected from a conventional subdivision with single-family houses on lots meeting the normal size requirements located on the same parcel.

1.9 Protection of Open Land

The following standards shall apply to open land to be protected as part of a Creative Development:

- A. All remaining open land shall be permanently protected by one of the following methods:

- (1) A permanent conservation easement or deed restriction conveyed to the town with town approval or to a non-profit trust or conservation organization whose principal purpose is to conserve farmland or open space. At a minimum, such an easement or restriction shall entail the use of management practices that ensure existing fields or pastures, if any, will be plowed or mowed at least once every year.
- (2) Ownership in fee simple conveyed to the Town with Town approval or to a non-profit farm trust, open space or conservation organization as a gift or for consideration.
- (3) If the protected open space is farmland, farmland owners are not required to sell the part of their property which is to become permanent agricultural open space, provided that they do convey the development rights of that open space in a conservation easement prohibiting future development of this property to Town with Town approval or to a non-profit trust or conservation restriction.

B. A non-profit, homeowner's association shall be established, requiring membership of each lot owner in the Creative Development. The association shall be responsible for the permanent maintenance of all community water and wastewater systems, common open space, recreational and thoroughfare facilities. A homeowner's association agreement or covenant shall be submitted with the special permit application guaranteeing continuing maintenance of such common utilities, land and facilities, and assessing each lot a share of maintenance expenses. Such agreement shall be subject to the review and approval of Town Counsel and the Planning Board.

C. Creative Development With Affordable Housing

- (1) A Creative Development with Affordable Housing shall be defined as any creative development which includes 25% or more of its units for low and/or moderate income people and which is subsidized by federal, state or local programs, or proposed by the Housing Authority, or by a non-profit or limited dividend partnership, or any development which includes non-subsidized housing units priced to be affordable to people whose income is equal to or less than 120% of the median income for the Standard Metropolitan Statistical Area and which provides that the mix of affordable and market rate housing built in any one year is equivalent to the overall mix for the entire development, and which further provides that resale restrictions are established by the developer which ensure that the affordable units remain affordable for a period of forty years.
- (2) For a Creative Development with Affordable Housing, the Special Permit Granting Authority may reduce the requirement in Table 1 for the protection of permanent open space to 10% of the total parcel, and may reduce the total parcel frontage required to 75% of the frontage requirements in Table 1.
- (3) The provisions of Section 1.2(E) shall remain in effect for Creative Developments with Affordable Housing.

TABLE 1 - TABLE OF CREATIVE DEVELOPMENT DIMENSIONAL REQUIREMENTS

DEVELOPMENT TYPE	LOT SIZE**	REQUIRED OPEN SPACE	TOTAL PARCEL FRONTAGE REQUIRED	FRONT YARD	SIDE YARD
Standard Subdivision or ANR Development	60,000 in R-R District	None	175 ft per lot in R-R District	50 ft. in R-R District	30 ft. in R-R District
	40,000 in R-N District	None	140 ft per lot in R-N District	35 ft in R-N District	20 ft. in R-N District
	30,000 in R-V District	None	130 ft per lot in R-V District	30 ft in R-V District	15 ft in R-V District
Creative Development - Using Flexible Area	30,000 sq. ft. minimum* and 60,000 sq. ft. average in R-R District	All land not used for building lots; minimum 25% of the parcel	87.5 ft. per lot in R-R District	25 ft. from a common driveway, 150 ft. from a public way	30 ft. in R-R
	30,000 sq. ft. minimum and 40,000 sq. ft. average in R-N District. *	All land not used for building lots; minimum 25% of the parcel	70 ft. per lot in R-N District	25 ft. from a common driveway 150 ft. from a public way	20 ft in R-N
Creative Development - Using Farmland Preservation Standards	30,000 sq. ft. in R-R District.	Minimum 50% of the parcel	87.5 ft. per lot in R-R District	25 ft. from a common driveway 150 ft. from a public way	30 ft. in R-R
	30,000 sq. ft. in R-N District.	Minimum 50% of the parcel	70 ft. per lot in R-N District	25 ft. from a common driveway 150 ft. from a public way	20 ft. in R-N
	30,000 sq. ft in R-V District	Minimum 50% of the parcel	65 ft. per lot in R-V District	25 ft. from a common driveway, 150 ft. from a public way	15 ft. in R-V
* provided that average lot size requirements for creative development are met after wetlands and slopes greater than 15% have been excluded, provided that open space requirements are met.					
** per dwelling unit					

MODEL GREEN DEVELOPMENT PERFORMANCE STANDARDS

Prepared by the Pioneer Valley Planning Commission Draft - Updated 9-4-14

10.8 GREEN DEVELOPMENT PERFORMANCE STANDARDS

10.81 Purpose

- A. The purpose of these Green Development Performance Standards is to encourage high quality developments that preserve and enhance natural resources and the environment. The standards seek to:
1. preserve or restore wildlife habitat, farmland and natural site features;
 2. encourage orientation of buildings to make use of solar energy and natural light;
 3. protect and recharge water resources, including water supply aquifers and reservoir watersheds;
 4. encourage reuse and recycling;
 5. promote use of alternative transportation, including walking, biking and mass transit;
 6. minimize energy consumption, reduce fossil fuel use, and promote use of clean energy sources;
 7. reduce greenhouse gas emissions, air pollution and urban heat island effects;
 8. encourage conservation of potable water;
 9. minimize light pollution;
 10. prevent degradation of natural and landscape features as part of the development process, and;
 11. implement the goals of the Master Plan.

10.82 Applicability

10.821 Site Plan Approval with Green Development Standards

All commercial, industrial, multi-family residential, mixed use and civic projects or uses shall demonstrate compliance to the Planning Board with the Green Site Design Standards and the Green Development Performance Standards for Site Plan Approval herein, before a Building Permit may be issued. Applicants shall, to the maximum extent practicable, meet the standards for:

- (a) Limits to Site Disturbance (see Section 10.861)
- (b) Tree Preservation (see Section 10.862)
- (c) Building Siting for Solar Access (see Section 10.863)
- (d) Site and Context Assessment (see Section 10.871)

- (e) Landscaping and Water Reduction (see Section 10.872)
- (f) Farmland Protection (see Section 10.873)
- (g) Parking and Trip Reduction (see Section 10.874)
- (h) Pedestrian and Bicycle Access (see Section 10.875)
- (i) Hazardous Materials (see Section 10.876)
- (j) Light Pollution (see Section 10.877)
- (k) Collection and Storage of Recyclables (see Section 10.878)
- (l) Construction Waste Management and Topsoil Recovery (see Section 10.879)
- (m) Heat Island Reduction (see Section 10.8795)

10.822 Standards for Subdivisions

All residential subdivisions shall, to the maximum extent practicable, comply with the Subdivision Regulations, and the applicable zoning regulations herein, which include:

- (a) Limits to Site Disturbance (see Section 10.861)
- (b) Tree Preservation (see Section 10.862)
- (c) Solar Access (see Section 10.863)
- (d) Site and Context Assessment (see Section 10.871)
- (e) Landscaping and Water Reduction (see Section 10.872)
- (f) Farmland Protection (see Section 10.873)
- (g) Pedestrian and Bicycle Access (see Section 10.875)
- (h) Construction Waste Management and Topsoil Recovery (see Section 10.879)

10.823 Incentivized Standards for Density Bonuses

In addition to applicable standards noted in Section 10.82 above, applicants seeking a density bonus under this bylaw shall apply for a Special Permit from the Planning Board, and demonstrate compliance with the Incentivized Green Development Standards in Section 10.88.

10.824 Applicability to Uses Protected by M.G.L. c. 40A, Section 3

The application of performance standards set forth herein shall be applied subject to the limitations imposed by M.G.L. c. 40A, Section 3.

10.83 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.

Critical Root Zone (CRZ): The critical root zone (also known as essential root zone) is the portion of a tree's root system that is the minimum necessary to maintain the stability and vitality of the tree. It can be calculated by using the following formula: tree trunk diameter at breast height X 2, then convert to feet. For example, for a tree with a trunk diameter of 10 inches, the critical root zone would have a diameter of 20 feet.

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

Floor Area Ratio: The ratio of the total floor area of buildings on a certain location to the size of the land of that location.

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.

Land in Agricultural Use: Land used in producing or raising one or more of the following agricultural commodities for commercial purposes: 1) animals including but not limited to livestock, poultry and bees; 2) fruits, vegetables, berries, nuts, maple syrup and other foods for human consumption; 3) feed, seed, forage, tobacco, flowers, sod, nursery and greenhouse products, ornamental plants or shrubs.

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, green street and parking designs, 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.

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.

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

Specimen Trees: Trees that are of large diameter in excess of 24 inches measured at a height of 4.5 feet, have historic significance or are part of an historic site, are designated as a champion tree by

town, state or federal government, are a rare, threatened or endangered species, or have exceptional beauty in canopy or shape.

10.84 Submission Requirements

10.841 Submission Requirements for Site Plan Approval with Green Development Standards

- (a) Applicants for all commercial, industrial, multi-family residential, mixed use and civic projects shall comply with all submission requirements in the Site Plan Approval section of the Zoning Bylaw, as well as the following additional requirements:
 - (1) Plans shall be prepared by, and contain the original seal of, a registered architect, landscape architect, or professional engineer unless this requirement is waived by the Planning Board because they deem this requirement unnecessary due to the simplicity of the project, and
 - (2) All site plans shall be at a scale of 1 inch equals 40 feet, with additional narrative as necessary. All plans shall be submitted on standard 24" x 36" sheets, as well as in digital (PDF) format.
 - (3) Plans shall include 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:
 - a. Note any wooded environmentally sensitive areas, such as floodplains, stream corridors, steep slopes, rare species habitat or wetland buffer zones.
 - b. Indicate whether each tree or grouping of trees are recommended for preservation, transplant, or removal.
 - c. Describe provisions for the protection, maintenance and management of trees to be preserved, including the location of protective fencing, and replacement of 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.
 - d. 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.
 - (4) Plans shall include drainage calculations and subdrainage along with soil logs;
 - (5) Provide the location, dimensions, height, color, illumination and characteristics of existing and proposed signs;
 - (6) Include a table containing the following information:

- a. Maximum area of building to be used for sales offices, business, industrial or other uses;
 - b. Maximum number of employees, where applicable;
 - c. Maximum seating capacity, where applicable; Number of parking spaces existing or required for the intended uses.
- (7) The plan shall describe estimated daily and peak-hour vehicle trips to be generated by the site and traffic flow patterns for vehicles and pedestrians showing adequate access to and from the site and adequate circulation within the site.
- (8) A detailed Traffic Impact Statement is required in each case where a proposed new building, use or project will contain more than 10,000 square feet, or will include one of the following uses which generates high volumes of trips: automobile service station, fast-food or drive-in restaurant, convenience store, or bank. The Traffic Impact Statement shall contain:
- a. Traffic flow patterns at the site including entrances and egresses, loading and unloading areas, and curb cuts on site and within one hundred feet of the site;
- (9) A detailed assessment of the traffic safety impacts of the proposed project or use on the carrying capacity of any adjacent highway or road, including the projected number of motor vehicle trips to enter or depart from the site estimated for daily hour and peak hour traffic levels, road capacities, and impacts on intersections;
- a. A plan to minimize traffic and safety impacts through such means as physical design and layout concepts, staggered employee work schedules, promoting use of public transit or carpooling, or other appropriate means;
 - b. An interior traffic and pedestrian circulation plan designed to minimize conflicts with safety problems.
- (10) The plan shall illustrate the location and contain a description of proposed open space or recreation areas.
- (11) A plan for the control of erosion, dust and silt, both during and after construction, temporary and permanent erosion control, and protection of water bodies is required.
- (b) The Planning Board may waive any information requirements it judges to be unnecessary to the review of a particular plan.

10.85 Procedural Requirements

The Planning Board shall be the Site Plan Approval Authority on applications for Site Plan Approval, and may adopt and revise reasonable regulations for the administration of this Section.

10.851 Filing and Referral to Town Boards and Departments, Plan Review

- (a) The applicant shall file five copies of the application for Site Plan Approval with the Planning Board.
- (b) The Planning Board shall follow procedures in the Site Plan Approval section of the Zoning Bylaw for referral and review of a Site Plan Approval application, and for a public hearing on an application.

10.852 Decision on Site Plan Approval

- (a) The Planning Board shall review an application for Site Plan Approval for completeness, and then make a determination as to whether the application is in compliance with the standards in this bylaw.
- (b) The Planning Board shall make decision on applications for Site Plan Approval within 90 days following the public hearing.
- (c) Failure to take final action upon an application within these time limits shall be deemed to be a grant of the permit applied for.
- (d) The approval authority shall not approve an application for Site Plan Approval, unless they find the Site Development Plan maximizes consistency with the Green Site Design Standards and Green Development Standards which are applicable to the project.
- (e) Before approval of a Site Plan, the approval authority may request that the applicant make modifications in the proposed design of the project or provide additional information to ensure that the above criteria are met.
- (f) Final action on applications for Site Plan Approval shall consist of either:
 - (1) A determination that the proposed project will constitute a suitable development and is in compliance with the criteria and standards set forth in this bylaw; or,
 - (2) Approval subject to any conditions, modifications and restrictions, which will ensure that the project meets the standards and criteria in this bylaw.

10.86 Green Site Design Standards

For all multi-family residential, commercial, industrial and civic projects, the Planning Board shall review and evaluate whether the Site Development Plan maximizes consistency with the following Green Site Design Standards. The Planning Board shall have the discretion to waive standards that it deems not applicable to a given project.

10.861 Limits to Site Disturbance

- (a) No clearing or site disturbance may occur on a parcel before a Building Permit is issued, except for normal agricultural activities and commercial logging in accordance with a state Forest Cutting Practices Act permit.
- (b) Applicants shall demonstrate that they will, to the extent feasible, minimize land clearing, alteration of natural topography and features, destruction of vegetation, soil compaction, destruction of wildlife habitat, prevent pollution of water resources,

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 to avoid impacts to rare and endangered species and wildlife habitat on a site, including Biomap Core Habitat and Priority Habitat areas, and to maintain contiguous forested areas.
- (g) Sites shall be designed to prevent impacts to aquifer recharge areas and water supply reservoir watershed areas for public drinking water supplies;
- (h) Limit-of-work controls (also known 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. Timely re-vegetation of disturbed areas shall occur immediately after grading is complete. In no case shall land be left unstabilized over the winter season.
- (k) Except on urban and infill sites where higher density development has been determined to be desirable, 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.

10.862 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 located in areas also including:
 - (1) Wetlands, waterbodies and their buffers
 - (2) Critical wildlife habitat areas
 - (3) Slopes over 25 percent
 - (4) Trees with a circumference of 60 inches at breast height (4.5 feet above ground), or a diameter of 19 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.
 - (5) Any trees recommended for preservation or trees on adjacent properties that are moved or lost during construction shall be replaced.
 - (6) Transplanting methods that maximize plant survival shall be used.
 - (7) 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.
 - (8) Materials shall not be stored within the drip line of trees to be protected.
 - (9) Additional Best Management Practices shall be used to protect trees during construction (i.e. pruning, soil aeration, trunk wrapping, root pruning, watering, etc.).
 - (10) All protective measures shall be maintained until all construction work is completed, the site is cleaned up, and final approval is given by the Building Inspector.

10.863 Orientation of Buildings for Solar Access

- (a) The Planning Board shall review and evaluate whether the Site Development Plan is compatible with the following design guidelines, to the extent feasible based on lot configuration and size:
 - (1) Building orientation takes advantage of passive solar heat gain in the winter by orienting buildings with the longest axis running east-west. The long axis of a building should face within 10 degrees of due south if possible, and not more than 30 degrees off of due south.
 - (2) Building orientation accommodates future solar electric installations on the development project or on neighboring buildings by preserving solar access to south facing roofs of existing neighboring structures. Trees, objects, or structures

shall not be sited in locations that shade (or will shade) neighboring south facing roofs.

10.87 Green Development Standards

For all commercial, industrial and civic projects, the Planning Board shall review and evaluate whether the Site Development Plan maximizes consistency with the following Green Development Standards. The Planning Board shall have the discretion to waive standards that it deems not applicable to a given project.

10.871 Site & Context Assessment

- (a) The Planning Board shall review and evaluate whether the Site Development Plan thoroughly considers the site's context and interrelationships with 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, and 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.
 - (6) The Planning Board shall review and evaluate whether the development will "fit" within and connect to the site's larger context.

10.872 Landscaping and Water Reduction

- (a) The Planning Board shall review and evaluate whether the Site Development Plan has environmentally sensitive landscaping features, including:
 - (1) Maximum use of plants and landscaping in a natural state with low maintenance requirements, and that require little or no irrigation.
 - (2) Minimized use of potable water for landscape irrigation, including installing high-efficiency irrigation systems, using mulch to prevent water evaporation,

irrigating with captured rainwater, and reusing building grey water, where feasible.

- (3) Incorporation of Low Impact Development practices for stormwater management, including use of rain barrels and rain gardens.

10.873 Protection and Buffering of Land in Agricultural Use

Applicants shall, to the extent feasible, avoid development of land in agricultural use.

- (a) To prevent destruction of land in agricultural use, applicants shall either:
 - (1) To the extent feasible, select development sites to reduce impacts to land in active agricultural use; or
 - (2) If the development will take place on land in agricultural use, minimize impacts through cluster design or other open space preservation techniques.
 - (3) .
 - (4) If the development site is adjacent to land in agricultural use, the site plan shall:
 - Provide screening by installing landscaped buffers at property lines that abut land in agricultural use;
 - Prevent stormwater runoff from impermeable surfaces from entering adjacent land in agricultural use.

10.874 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 support walking, cycling, and use of alternative transportation:
 - (1) Parking:
 - a. The site design shall reserve some parking spaces for compact cars, low emission vehicles, and/or carpools and vanpools. To the extent feasible, set aside 10% of all parking spaces for carpools and fuel efficient vehicles (with a combined city and highway efficiency of 29 miles per gallon). Locate these spaces in preferred locations nearest to site buildings.
 - b. The site design shall not exceed the maximum applicable parking requirements in Section 10.1 of the Zoning Bylaw. Through the Site Plan Approval process, the Planning Board may reduce parking requirements, based on information that demonstrates the proposed use will have reduced parking demand. Applicants may estimate parking demand based on the type of use involved, its location, and other relevant considerations.
 - (2) Trip Reduction:
 - a. Designate and clearly mark areas for carpool and vanpool drop off/pick up and parking.

- b. Include ride boards where building users can post notices offering rides or to make carpooling arrangements, and/or develop other ride sharing measures.
- c. Encourage use of mass transit, where available, by designating areas for shuttle services to mass transit, and/or through other measures (see Community Connectivity below).
- d. Reduce on-site driving through efficient design of roads and parking areas.

10.875 Pedestrian and Bicycle Access

- (a) Applicants shall 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.
- (b) Sidewalks are required in all residential subdivisions, and for all commercial, industrial and civic uses.
- (c) Bicycle racks and other bicycle amenities are encouraged in all developments.
- (d) Linkages to town-wide or regional bicycle/pedestrian pathways are encouraged in all developments.
- (e) Bicycle and pedestrian pathways are encouraged for improved internal circulation within large developments, and should be linked to adjacent properties, pathways, sidewalks and transit stops wherever feasible.
- (f) Within commercial, civic and office developments larger than 50,000 square feet, provide secure bicycle racks or other bicycle storage, shower and changing rooms. For multifamily residential buildings, provide covered bicycle storage facilities for 15% or more of all building occupants.
- (g) When developing new roads, provide safe and convenient routes for bicyclists, pedestrians and vehicles. Refer to “complete streets” principles when designing new roads. Provide a Site Circulation Map that shows vehicle, pedestrian and bicycle routes within the site.

10.876 Handling and Storage of Hazardous Materials

- (a) 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.
- (b) Applicants shall describe and locate all hazardous materials that will be stored on site.
- (c) Use “Best Management Practices” for spill prevention and response, and for handling and storing hazardous materials so that infiltration systems, water bodies, and storm drains do not receive contaminated runoff.

10.877 Light Pollution Reduction

- (a) Applicants shall 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. 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 fixtures. Cutoffs shall shield bulbs from visibility.
 - (2) General site lighting shall focus light downwards in order to prevent light from going upwards or reaching off-site areas. The horizontal plane of the bottom of lamp fixtures shall not exceed 90 degrees. No up lighting is allowed: parking, security and aesthetic lighting shall shine downward.
 - (3) Spotlights used to illuminate buildings, signs or specific site features shall be targeted on such objects so as to prevent direct up lighting. 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. Light trespass beyond the property line and above a 90 degree horizontal plane is prohibited.
 - (6) All nonessential lighting, including display, parking and sign lighting, shall be automatically turned off after business hours, leaving only the lighting necessary for site security.
 - (7) For each interior light, the design should prevent strong intensity light from exiting through windows. Alternatively, employ automatic controls to ensure that interior lights are shut off after dark when there are no building occupants.
 - (8) The Site Development Plan shall specify the lowest lighting power densities necessary to meet the minimum requirements of each lighting task.
 - (9) No light standard shall be taller than fourteen (14) feet in height.
 - (10) Signs should be illuminated from the top. Internal illumination is not permitted.
 - a. The use of energy-efficient lamps is encouraged 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.

10.878 Collection and Storage of Recyclables

Applicants shall 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, metals and organics for recycling.

For commercial and office buildings, to calculate the storage area needed for recycling facilities, use the guidelines below:

Required Storage Area for Recyclable Materials – Commercial Uses

Building Size	Minimum Storage Space	Required Type of Container
0 - 5,000 sq. ft.	82 sq. ft.	Rear loading
5,001 - 15,000 sq. ft.	125 sq. ft.	Rear loading
15,001 - 50,000 sq. ft.	175 sq. ft.	Front loading
50,001 - 100,000 sq. ft.	225 sq. ft.	Front loading
100,001 - 200,000 sq. ft.	275 sq. ft.	Front loading
200,001 plus sq. ft.	500 sq. ft.	Front loading

For residential developments, include a refuse and recycling room, or an outdoor enclosure. Outdoor enclosures should be screened from public view.

The minimum recycling storage area guidelines for residential uses are listed below:

Required Storage Area for Recyclable Materials – Multi-family Residential Uses

Number of Residential Units	Minimum Storage Space
2-4 units	4 ft. wide x 6 ft. long x 6 ft. high
5-10 units	5 ft. wide x 9 ft. long x 8 ft. high; 6 ft. high if outdoors
11-20 units	129 sq. ft. with 8 ft. high walls or 6 ft. high if outdoors
20+ units	sq. ft. per unit

10.879 Construction Waste Management and Topsoil Recovery

Applicants shall 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, including waste cardboard, metal, brick, acoustical tile, concrete, plastic, clean wood, glass, gypsum wall-board, carpet and insulation.
- 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. Preserve and re-apply at least 6” of the site’s topsoil and at least 12” of the site’s subsoil.

10.8710 Heat Island Reduction

Applicants shall demonstrate that the development will, to the extent feasible, reduce urban heat island effects (heat pollution).

- a. Select light colored pavements and reflective roofing materials. “Cool pavements” include reflective, and light-colored paving products. “Cool roofs” include light-colored metal roofs and roof coatings.

- b. Cover at least 50% of the site hardscape with shade and/or “cool” paving materials that have a Solar Reflectance Index (SRI) of at least 29 (see table below for SRI of standard paving materials). In addition to vegetation, shade can be provided by architectural elements (i.e. awnings) or covered parking spaces with reflective roofing material.
- c. Develop a green roof. See Incentivized Green Performance *Standards* (Section 1.8).

Typical Solar Reflectance Index (SRI) for Paving Materials

Type of Paving Material	Solar Reflectance Index (SRI)
Typical New Gray Concrete*	35
Typical New White Concrete	86
New Asphalt	0

*Reflectance of surfaces can be maintained with cleaning. However, light colored surfaces will become less reflective as they weather (i.e. typical weathered gray concrete has an SRI number of 19).

10.88 Incentivized Green Performance Standards

An applicant may submit an application for a Special Permit to the Planning Board, demonstrating that the development plan incorporates any of the green development practices listed in 10.88(a) below, or other enhanced green development practices as approved by the Planning Board, in exchange for the incentives described in 10.88(b) below.

- a. Eligible green development practices include:
 - (1) Installation of a green roof;
 - (2) Installation of permeable pavement in parking areas or driveways;
 - (3) Permanent protection of additional open space, farmland and wildlife habitat area beyond applicable minimum zoning requirements;
 - (4) Restoration and permanent protection of previously destroyed or disturbed wildlife habitat;
 - (5) Creation public park and/or community garden space on lands which are permanently dedicated to the town;
- b. The applicant may select the best incentive option(s) for their project:
 - (1) Additional lot coverage or Floor Area;
 - (2) Partial waiver of parking space requirements.
 - (3) Increase in building height limits.
 - (4) Reduction in frontage requirements.

10.881 Dimensional and Density Regulations

- a. 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.

- b. 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
One acre of protected land, beyond applicable zoning requirements; or	2000 s.f. of additional floor area; or	1) The Planning Board may allow an increase in lot coverage from the 30% maximum lot coverage required in Table 6-2 of the Zoning Bylaw, up to a maximum 70% lot coverage.
One acre of permeable pavement; or	reduction of 20 parking spaces; or	2) The Planning Board may reduce the minimum parking requirements in Section 10.1 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. To obtain this waiver, the applicant shall 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.).
2000 s.f. of installed green roof; or	an increase of 5 feet in building height; or	3) The maximum increase in building height shall be ten feet.
One acre restored and protected wildlife habitat area; Or	a reduction of 20 feet in frontage requirements subject to the following (see notes):	4) The maximum reduction in frontage requirements shall be 40 feet.
One acre of public park and/or community garden space on lands which are permanently dedicated to the town equals:		

10.882 Special Permit Process for Green Performance Incentives

- a. 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 the Site Development Plan, the proposed green development practice to be employed in the proposed project, and shall describe the proposed incentive requested in exchange for the green development practice.
- b. Prior to final approval of a Special Permit, applicants proposing 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.
- c. Upon advice of the Town/City Counsel that the Conservation Restriction or Agricultural Preservation Restriction document is valid and sufficient, there shall 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.

10.883 Special Permit Criteria

- a. The Planning Board shall not grant any special permit for Green Performance Incentives unless it finds the following criteria are met:
 - (1) The proposed use is in harmony with the purposes of this bylaw/ordinance.
 - (2) The proposed use meets all of the procedural, dimensional and density requirements of this bylaw/ordinance.

MODEL HOME-BASED BUSINESS BYLAW

Prepared by Pioneer Valley Planning Commission

HOME-BASED BUSINESSES

1.1 Purposes

The purposes of this section are to:

- a. Permit the residents of the Town of _____ a broad choice in the use of their homes as places of livelihood and the production or supplementing of personal and family income;
- b. Protect residential property values;
- c. Protect residential areas from any adverse impacts associated with home-based businesses;
- d. Ensure that the rights of neighbors and other townspeople are not compromised by intrusive, hazardous, or environmentally degrading business activities;
- e. Establish performance criteria and standards for home-based businesses that will provide fair and equitable administration and enforcement of this section.

1.2 Definitions

Home-based Business: Any activity conducted by a resident within a dwelling or accessory structures for financial gain. A home-based business is an accessory use to the primary use of the parcel. Home-based businesses include home occupations and cottage industries.

Home Occupation: A home-based business which is incidental to and clearly subordinate to, the residential use of the property. A home occupation has no more than two employees who are not resident on the premises, does not use accessory structures (except for unheated storage), has no retail sales (except for goods and services produced on the premises), and occupies no more than 33% of the gross floor area of the dwelling.

Cottage Industry: A cottage industry is a more intensive form of home-based business, having more employees, more floor area used for the business, or other signs of greater use of a residential parcel for business purposes. A cottage industry, like a home occupation, remains clearly subordinate to the use of the parcel and dwelling for residential purpose

Minor cottage industry: A cottage industry with no more than five non-resident employees working on the premises at anyone time and which does not use any accessory structures for any aspect of the business aside from unheated storage.

Major cottage industry: A cottage industry with no more than ten non-resident employees working on the premises at any one time or one which uses an accessory structure for business purposes other than unheated storage.

Non-resident employees: Employees who do not live on the parcel being used for a home-based business.

1.3 Applicability

Home Occupations shall be allowed by right in the _____ District(s) subject to the following applicable regulations.

Major and Minor Cottage Industries shall be allowed in the _____ District(s) only upon issuance of a Special Permit from the Special Permit Granting Authority subject to the following regulations and, in addition, to the applicable regulations of this bylaw found at Section _____ Administration.

1.4 Standards for All Home-based Businesses

The following standards shall be used as requirements for all Home-based Businesses, whether they are Home Occupations or Cottage Industries.

a. Residency Requirements

The principal residence of the owner/operator of every home-based business shall be the dwelling unit on the premises in which the business operates.

b. Minimum Dimensional Requirements

The site must meet the density and dimensional requirements in Table _____ (Intensity Regulation) for the district in which it is located.

c. Parking Standards

Off-street parking for any home-based business must be provided on the premises and must be located at the side or rear of the principal building. While adequate off-street parking must be provided for all regular employees, visitors, and clients, the property owner is urged to minimize providing excessive parking areas.

Landscaping is required to screen parking areas from the road and from adjacent landowners. See the definition of screening materials below.

d. Storage of Heavy Equipment and Commercial Vehicles

All heavy equipment such as tractor trailers, semi-trailers, or construction equipment must be either garaged or screened with plantings or fencing to at least the height of the equipment. See the definition of screening materials below.

One commercial vehicle which is not heavy equipment and which is not more than two tons in rated capacity may be parked outdoors on the property. Additional commercial vehicles must be garaged or screened as for heavy equipment.

e. Screening Materials

Screening materials, such as plants or fencing, must provide at least 90% opacity to a height of at least six feet in all seasons. If such screening is not provided by existing or proposed vegetation, it shall be supplemented by additional plantings or fencing. All screening materials shall be aesthetically appropriate and in keeping with the character of the district.

f. Signs

See Section - (Existing Sign Bylaw) for sign standards

g. Lighting standards

Any outdoor lighting fixture newly installed or replaced shall be shielded so that it does not produce a strong, direct light beyond the property boundaries.

Lighting must be compatible with the character of the district. No light shall be taller than fifteen feet.

h. Hours of Operation

In no case shall a home-based business be open to the public, including non-resident employees, clients, visitors, and deliveries, earlier than 7:00 a.m. nor later than 10:00 p.m.

i. General Nuisances

Any activity that might result in excessive noise, electrical interference, smoke, dust, odors, heat, or glare beyond that which is common to the residential character of the district is prohibited. The Zoning Enforcement Officer may require an application to provide tests demonstrating such conformance.

j. Hazardous Materials

No highly toxic, explosive, flammable, combustible, corrosive, radioactive or similar hazardous materials shall be used, stored, or manufactured on the premises in amounts exceeding those which are typically found in normal residential use.

k. Retail Sales

There shall be no sales of services or products on the premises which are not produced on the premises, except those sales which are incidental to the business.

For example, a music teacher may sell sheet music. In addition, there shall be no designated area intended specifically for retail sales.

l. Traffic

Traffic associated with a home-based business, such as deliveries or visits by clients, shall not place an unreasonable burden on the town, the roads, or the neighborhood of the home-based business because of safety concerns, excessive noise, or aesthetics. Home-based business owners are reminded that traffic concerns will be reviewed as part of the permitting and renewal process for all cottage industries.

m. Compliance with Standards

All home-based businesses must comply with all applicable federal, state, and local regulations.

1.5. Additional Standards for Home Occupations

a. Employees

No more than two (2) employees who do not live on the premises shall be permitted to work on the premises at anyone time for a home occupation.

b. Use of Accessory Structures

A home occupation use must be conducted wholly within the residential dwelling on the parcel except that accessory structures such as sheds, detached garages, and barns, may be used for unheated storage of materials for the business.

c. Floor Area

A home occupation may not use more than 33% of the gross floor area of the dwelling for business purposes. The gross floor area is defined for this purpose as the total floor area of all heated and ventilated and, therefore, habitable rooms in the dwelling. This includes spaces such as basements and attics, if they are heated and ventilated.

1.6. Additional Standards for Minor Cottage Industries

a. Employees

No more than five (5) employees who do not live on the premises shall be permitted to work on the premises at any one time for a Minor Cottage Industry use.

b. Increased Setback Requirements

Required zoning setbacks may be increased for a minor cottage industry subject to the review of the SPGA for any activity that could potentially detract from the

agricultural-residence area but that is not deemed incompatible with the neighborhood. Potentially detracting activities include, but are not limited to: employee parking areas, loading zones, and storage sheds. Additional screening may also be required by the SPGA to shield these accessory uses from abutting residential lots.

c. Use of Accessory Structures

A minor cottage industry must be conducted wholly within the residential dwelling on the parcel except that accessory structures such as sheds, detached garages, and barns may be used for unheated storage of materials for the business.

d. Floor Area

A minor cottage industry may not use more than 49% of the gross floor area of the dwelling for business purposes. The gross floor area is defined for this purpose as the total floor area of all heated and ventilated, and, therefore, habitable rooms in the dwelling. This includes spaces such as basements and attics if they are heated and ventilated.

1.7. Additional Standards for Major Cottage Industries

a. Employees

No more than ten (10) employees who do not live on the premises shall be permitted to work on the premises at anyone time for a Major Cottage Industry use.

b. Increased Setback Requirements

Required zoning setbacks may be increased for a major cottage industry subject to the review of the SPGA for any activity that could potentially detract from the agricultural-residence area but that is not deemed incompatible with the neighborhood. Potentially detracting activities include but are not limited to: employee parking areas, loading zones, and storage sheds. Additional screening may also be required by the SPGA to shield these accessory uses from abutting residential lots.

c. Use of Accessory Structures

A major cottage industry must be conducted wholly within the primary dwelling and accessory structures on the parcel. At least 33% of the total floor area used by the cottage industry must be in the primary dwelling. For all major cottage industries the home-based business owner must ensure that the use of the parcel remains primarily residential with the business as an incidental accessory use.

d. Floor Area

A major cottage industry may not use more than 49% of the gross floor area of the dwelling and accessory structures for business purposes. The gross floor area is

defined for this purpose, as the total floor area of all heated and ventilated and therefore habitable rooms and spaces in the dwelling and any accessory structures which are used for business purposes. This includes spaces such as basements and attics, if they are heated and ventilated. If an accessory structure is not used at all for the cottage industry, its floor area should not be counted towards the gross floor area total.

1.8. Special Permit Requirements

The procedures and criteria described in Section (Special Permit section) of this bylaw shall govern the granting of Special Permits for cottage industries except that the following shall be used as additional requirements in the Special Permit process for all cottage industries. An applicant for a Cottage Industry Special Permit should read Section (Special Permits) before applying for the Permit, as that section includes requirements with direct bearing upon the legal operation of a cottage industry.

- a. The Special Permit Granting Authority for home-based business uses shall be the Planning Board.
- b. A Special Permit is required for all cottage industries and for all changes and expansions of such uses.
- c. All Special Permits from the SPGA for a cottage industry use are non-transferable and issued to a specific applicant for a specific cottage industry on a specific parcel.
- d. Special Permits for Cottage Industries must be renewed immediately following the first year of operation and then every five years after that. The renewal process shall follow the same procedures as an original Special Permit submission.
- e. Special Permits for Cottage Industries may be revoked by the SPGA for cause after reasonable notice to the holder of the permit and following a public hearing held in accordance with Section (Special Permits) of this bylaw.

Changes Needed Elsewhere in the Bylaw

If a municipality adopts a new home-based business bylaw, it should adopt at the same time changes elsewhere in its zoning bylaw so as to ensure coordination with the new bylaw. While every zoning bylaw will be different and require individual attention to effect this coordination, the following are some of the common changes which will often need to be made in a zoning bylaw.

Definitions

The definitions of home-based business, home occupation, and major and minor cottage industry which are in the model bylaw should be added to the definition section of the zoning bylaw. Any existing or conflicting definitions should be deleted. Besides older definitions for these three phrases, some possible conflicting words or phrases might be, home office, artisan/craftsman, professional office, or home professional office. Check to make sure that the

definition of Special Permit Granting Authority includes the board specified to evaluate home-based businesses.

General Use Regulations

Home-based businesses should be added to the Table of Uses for the appropriate districts. If a new SPGA is specified for home-based businesses, note in the table which town board is responsible for Special Permits for each use.

Administration - Special Permits

It is important to include in this section a clause allowing the chosen town board, whether Zoning Board of Appeals or Planning Board, to be a Special Permit Granting Authority (SPGA). Often only one such board is specified as a SPGA in an existing zoning bylaw; if that board is not the one chosen to evaluate permits for home-based businesses, the chosen board must be added. This is an example of an appropriate clause:

The Zoning Board of Appeals and the Planning Board shall have the special permit granting authority specified in Section ____ Schedule of Use Regulations.

Check the rest of the Special Permit section of the Administration component to make sure that the chosen SPGA for home-based businesses is included everywhere appropriate. For example, if the existing zoning bylaw specifies that an applicant can find Special Permit applications at the Town Hall and the Zoning Board of Appeals, and the SPGA for home-based businesses is to be the Planning Board, add the Planning Board to the clause specifying availability of application forms.

It is appropriate for a municipality to review the adequacy of its Special Permit regulations and criteria at the same time it is contemplating adding a home-based business bylaw. Compare the existing Special Permit section of the bylaw to those of other similar towns and to models available from your regional planning agency. Ask the opinion of members of the existing SPGA regarding any changes they may wish to see in the regulations. Proposing changes to the Special Permit rules at the same time as a new home-based business bylaw may prove politically inconvenient; it is probably best to unlink the two sets of changes in voters' minds and on warrants, so as to allow independent evaluation of each proposed change.

MODEL Infill Development Overlay District Bylaw

Prepared by the Pioneer Valley Planning Commission

6.2 Infill Development Overlay District

6.20 Purpose

The Infill Development Overlay District has been established to encourage infill and redevelopment in the downtown area to include parcels of land that do not meet the minimum dimensional requirements of the Zoning Bylaw as well as those that do meet the minimum requirements. It has been established to encourage development that maintains the character of existing neighborhood buildings and structures; to permit a flexible approach to providing affordable housing; to provide incentives for new and existing businesses in the downtown area; to increase property values in residential neighborhoods in the downtown area; and to foster well-planned, mixed-use, compact developments in the downtown area in keeping with the character of traditional New England villages by:

- a. Allowing a mix of uses in close proximity in the district within a limited area, including residential, retail, office, and light industrial;
- b. Preserving and restoring the overall character of the downtown area;
- c. Promoting a balance of land uses;
- d. Promoting the opportunity for people to work, meet, shop, and utilize services in the vicinity of their residences;
- e. Providing opportunities for the development of affordable housing;
- f. Providing opportunities for a mixture of uses in the same building;
- g. Promoting a positive pedestrian environment in the district;
- h. Facilitating integrated physical design;
- i. Promoting a high level of design quality;
- j. Encouraging the development of flexible space for small and emerging businesses;
- k. Facilitating development proposals responsive to current and future market conditions; and

- l. Encouraging the development of open spaces and parks within the district to accommodate workers, residents, pedestrians, and shoppers.

6.21 District Boundaries

The location and boundaries of the Infill Development Overlay District is hereby established as shown on a map entitled, "Infill Development Overlay District of the Town/City of _____, Massachusetts", dated _____, which accompanies and is hereby declared to be part of this bylaw.

6.22 Residential Infill Development

Within the boundaries of the Infill Development Overlay District, a lot with at least 5,000 square feet of area and fifty (50) feet of frontage may serve as the location for a single-family residential dwelling or two-family residential dwelling. A proposed Residential Infill Development shall demonstrate that the home shall be served by town water and sewer service upon completion of the proposed development and meet the following Performance Standards:

- a. The proposed dwelling is consistent in architectural style, scale, setbacks, and frontage with abutting structures, and those in the immediate neighborhood.
- b. Each lot will have access and utility service comparable to that serving nearby properties.
- c. No traffic congestion, health or safety limitations would be created by the development.

6.23 Infill Development/Mixed Use Infill Development

In the Districts within the boundaries of the Infill Development Overlay District, by Special Permit with Site Plan Approval from the Planning Board, a lot with at least 5,000 square feet of area and fifty (50) feet of frontage may serve as the location for an Infill Development or Mixed Use Infill Development. Any of the dimensional requirements of the Zoning Bylaw, such as lot frontage, width, building setbacks, etc. may also be reduced or eliminated by the Special Permit, provided that the Planning Board determines that the following Performance Standards have been met:

- a. The proposed building is consistent in architectural style, scale, setbacks, and frontage with abutting structures, and those in the immediate neighborhood.
- b. Each lot will have access and utility service comparable to that serving nearby properties.

- c. No traffic congestion, health or safety limitations would be created by the development.
- d. Access shall be provided to the extent feasible through an existing side street or a shared driveway; curb cuts shall be minimized.
- e. Pedestrian and vehicular traffic shall be separated; walkways shall be provided for access to adjacent properties and between businesses where feasible.

A Mixed Use Infill Development that proposes to have retail and residential uses within the same building on lots that meet the minimum dimensional requirements of the underlying zoning district shall be allowed by right if the following criteria are met:

- a. The retail use does not exceed 2,500 square feet of Gross Floor Area.
- b. No more than one residential dwelling unit is proposed.

Retail/residential Mixed Use Infill Development proposals within the same building on lots that meet the minimum dimensional requirements that exceed the above criteria shall be required to obtain a Special Permit with Site Plan Approval (see Section _____ of the Zoning Bylaw) from the Planning Board.

A proposed Infill Development/Mixed Use Infill Development shall demonstrate that the project shall be served by town water and sewer service upon completion of the proposed development.

6.24 Use Regulations

- a. All uses listed as “Y” in the underlying zoning district as shown in the Schedule of Use Regulations shall require Site Plan Approval from the Planning Board if the lot does not meet the minimum dimensional requirements of the underlying zoning district of the Zoning Bylaw.
- b. Proposed uses within the Infill Development Overlay District which require a Special Permit or Special Permit with Site Plan Approval shall continue to require all such approvals as are designated in the Schedule of Use Regulations. However, where such approval or review is also required as part of an application for a Mixed Use Infill Development, the applicant shall only be required to submit a single Special Permit or Special Permit with Site Plan Approval application for the purposes of gaining approval for all uses in such an application. See Section ____ of the Zoning Bylaw on the procedures and criteria required for the issuance of a Special Permit, and Section _____ on the procedures and criteria required for Site Plan Approval.

- c. Within a Mixed Use Infill Development, there shall be no restriction on combining different categories of use within the same building other than those restrictions imposed by the State Building Code or other federal, state, or local regulations.

6.25 Additional Standards

In Addition to the minimum standards of the underlying zoning district, the following standards shall apply to all uses allowed within the Infill Development Overlay District except single family and two-family residential development and any building used exclusively for agriculture, horticulture or floriculture. The Planning Board may waive these standards if deemed appropriate by the Board.

6.251 Landscape Standards

- a. Street trees shall be planted within the right-of-ways parallel to the street along all streets. Trees shall have a minimum height of six (6) feet and a minimum caliper of 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.
- b. Tree spacing shall be determined by species type. Large maturing trees shall be planted a minimum of 40 feet and a maximum of 50 feet on center. Small and medium maturing trees shall be planted a minimum of 10 feet and a maximum of 30 feet on center.
- c. Utilities shall be located in the street and not in the tree belt, wherever possible.

6.252 Parking Standards

The minimum off-street parking standards as specified in Section _____ of the Zoning Bylaw may be waived by the Planning Board where it can be demonstrated by the applicant that the proposed use will not have a negative traffic impact within the neighborhood. In addition to the requirements of Section _____, the following standards shall be met:

- a. Parking lots shall be located at the rear of or at the side of buildings wherever feasible.
- b. When two adjacent lots contain parking areas, it is encouraged to develop them as one parking area.
- c. 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 wherever feasible.

d. 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. Walkways must conform to requirements of the American with Disabilities Act (ADA) and the Massachusetts Architectural Access Board (MAAB).

6.26 Commonly Held Lots

Any lot that is commonly held in ownership with an adjacent lot in this district may be treated as a single lot in accordance with this bylaw, provided that the total area of such lots is at least 5,000 square feet in area, the lots have a combined contiguous frontage of at least fifty (50) feet, and vacant of structures, parking facilities, or accessory uses.

6.27 Fires and Natural Disasters

In cases of fire or natural disaster, a structure in the Infill Development Overlay District that was destroyed may be rebuilt upon the same lot in accordance with this bylaw, provided that the new structure conforms to the use regulations of this bylaw and the reconstruction is completed and the structure is occupied within two years of such damage or destruction.

6.28 Conflict with Other Laws

All development activities within the Infill Development Overlay District shall comply with applicable laws, regulations, and standards of the town, except that in the event of a conflict between this bylaw and any such laws and regulations, the provisions of this Bylaw shall control, provided that they are consistent with state and federal law.

6.29 Severability

If any section or provision of this bylaw is found by a court of competent jurisdiction to be invalid, such invalidity shall not affect the validity of any other section or provision of this Bylaw.

Zoning Bylaw Amendments also Required:

Amend Definitions to include the following new definitions:

GROSS FLOOR AREA - The sum of the horizontal areas of the several stories of a building, measured from the exterior faces of exterior walls, or in the case of a common wall separating two buildings, from the centerline of such common wall. Gross floor area shall exclude basements and attics. The surface area of tennis courts, swimming pools, driveways, parking spaces, decks, and porches is not included in the total floor area.

Infill Development - The development of new housing or other uses on scattered vacant sites in a built up area within the Infill Development Overlay District.

Mixed Use Infill Development - The development of a tract of land, building, or structure with two (2) or more different uses such as, but not limited to, residential, office, retail, institutional, entertainment, or light industrial, on scattered vacant sites in a built up area within the Infill Development Overlay District.

Residential Infill Development - The development of new single family or two-family housing on scattered vacant sites in a built up area within the Infill Development Overlay District.

SAMPLE INTERGOVERNMENTAL COMPACT or MOA

MEMORANDUM OF AGREEMENT FOR CONNECTICUT RIVER CLEAN-UP

by and among the Municipalities of Agawam, Chicopee, Holyoke, Ludlow, South Hadley, Springfield and West Springfield, the Pioneer Valley Planning Commission, and other municipalities or organizations which may approve this agreement.

WITNESSETH:

This memorandum is agreed to by and among the municipalities of Agawam, Chicopee, Holyoke, Ludlow, South Hadley, Springfield and West Springfield, the Pioneer Valley Planning Commission and other municipalities or organizations which may approve this agreement for the purpose of working cooperatively to seek federal and state financial assistance and other alternative funding sources, methods and controls for mitigating the impacts of combined sewer overflows to the Connecticut River.

WHEREAS, the Connecticut River is a natural and environmental resource of great regional and interstate importance, and is a key element in the region's quality of life and economic prosperity;

WHEREAS, water quality in the lower Connecticut River in Massachusetts is not currently meeting fishable and swimmable standards due to water pollution discharges which include combined sewer overflows and urban stormwater runoff;

WHEREAS, the significant costs of infrastructure necessary to eliminate combined sewer overflows and improve water quality in the Connecticut River exceed the current fiscal capabilities of the Connecticut River communities, unless federal and state grants or financial assistance are made available;

WHEREAS, an innovative, regional and intergovernmental approach to improving water quality on the Connecticut River is desirable and will benefit riverfront communities and the region through enhanced recreational and economic development opportunities;

NOW, THEREFORE IT IS RESOLVED that the municipalities of Agawam, Chicopee, Holyoke, Ludlow, South Hadley, Springfield, and West Springfield, the Pioneer Valley Planning Commission and other municipalities or organizations which may approve this agreement hereby agree to cooperate to seek federal and state financial assistance and other alternative funding sources, methods and controls for mitigating the impacts of combined sewer overflows to the Connecticut River as follows:

Section 1. Creation of Connecticut River Clean-Up Committee

The participants shall form a permanent organization to be known as the Connecticut River Clean-up Committee consisting of one representative from each member municipality and one representative from the Pioneer Valley Planning Commission (PVPC). The municipal representative shall be appointed by the chief elected official in each community. The PVPC

representative shall be appointed by the Executive Director of PVPC. The Committee may invite any other person or organization concerned with Connecticut River water quality issues to become an associate member, and to participate in committee deliberations, but not to vote. The purpose of the Committee shall be to increase intergovernmental cooperation to coordinate efforts for Connecticut River water quality improvement. The Committee's function shall be to help carry out the responsibilities described in Section 2-3.

The Committee may seek, receive and expend funds from municipal or other sources in order to hire a part-time or full-time coordinator to assist it in performing its functions. The Committee shall clearly identify the responsibilities of the coordinator, which shall include grantsmanship and lobbying for state and/or federal water quality funds, and the proposed sources of funding for such a position. Any proposal for municipal funding of such a position will be subject to approval by Town Meeting or City Council. An annual contribution, not to exceed two thousand dollars, will be made by each member municipality and PVPC, toward the coordinator position.

The Committee shall elect officers and shall adopt rules governing its decision-making process, quorum for meetings, frequency and location of meetings, address for purpose of correspondence, and general operations. Adoption of these rules shall require an affirmative majority vote.

Section 2. Role of the Municipalities, Agencies or Organizations Signatory to this Agreement

The municipalities of Agawam, Chicopee, Holyoke, Ludlow, South Hadley, Springfield, and West Springfield shall have the following responsibilities:

- a. To work cooperatively with other riverfront municipalities, agencies, organizations and legislators, including Hartford, Connecticut area officials, to create a partnership to lobby for state and federal wastewater grant or loan funds for Connecticut River water quality improvement;
- b. To prepare joint, intermunicipal or regional applications for wastewater grant or loan funds, working feasible and appropriate;
- c. To adopt municipal policies to correct combined sewer overflows as a standard part of road improvement projects, community development block grants or other industrial development projects;
- d. To work cooperatively on educational efforts to build public consensus for Connecticut River clean-up and revitalization efforts;
- e. To establish and agree upon a proposed priority list of combined sewer overflow mitigation projects to be addressed in each community and a schedule for implementation;
- f. To seek innovative or alternative controls to prevent or mitigate combined sewer overflow (CSO) pollution, and reduce costs and needs for expensive infrastructure construction;

- g. To investigate alternative regional funding mechanisms to assist municipalities in financing CSO controls;
- h. To establish a Municipal Waterways Improvement and Maintenance Fund, in accordance with Mass. General Laws Chapter 40, section 5g, to be used for cleaning and improvement of waterways;
- i. To research the feasibility of a proposal for a ballot referendum question to establish a regional clean water fund or bond to match state and federal water pollution control funds;
- j. To designate a voting representative to participate in the Connecticut River Clean-up Committee.

Section 3. Role of Pioneer Valley Planning Commission

The Pioneer Valley Planning Commission (PVPC) shall have the following responsibilities:

- a. To assist the municipalities in meeting their responsibilities under this memorandum;
- b. To seek from grants or other sources funding to assist municipalities in meeting the cost of hiring a part-time or full-time coordinator for the Connecticut River Clean-up Committee;
- c. To designate a voting representative to participate in the Connecticut River Clean up Committee.

Section 4. Amendments

This Memorandum of Agreement may be amended at any time by a two-thirds affirmative vote of the Committee.

Section 5. Additional Members of the Committee

The Committee may invite any other person or organization to participate in the Committee as an associate, non-voting member.

The Committee may be expanded by admitting to full membership any abutting city, municipality or organization by a two-thirds affirmative vote of the Committee; provided, however, that such expansion shall only occur at the request and initiation of such abutting city, municipality or organization, and that such city, municipality or organization shall ascribe to this Memorandum of Agreement

Section 6. Withdrawal from Membership

Any member municipality may withdraw from participation in the Committee upon two months written notice signed by the Board of Selectmen or Mayor, such notice to be given only after approval of such withdrawals as given by majority vote of the Board of Selectmen or approval of the Mayor of the withdrawing municipality.

Section 7. Authorization/Effective Date

This agreement has been authorized by approval of the Board of Selectmen or Mayor in each municipality, in accordance with Massachusetts General laws Chapter 40, Section 4a, and by vote of the Pioneer Valley Planning Commission. This Memorandum will become effective when it is signed by all participating parties.

_____ Mayor, Town of Agawam	_____ Date
_____ Mayor, City of Chicopee	_____ Date
_____ Chairman, Board of Selectmen Town of Ludlow	_____ Date
_____ Mayor, City of Holyoke	_____ Date
_____ Chairman, Board of Selectmen Town of South Hadley	_____ Date
_____ Mayor, City of Springfield	_____ Date
_____ Chairman, Board of Selectmen Town of West Springfield	_____ Date
_____ Executive Director, Pioneer Valley Planning Commission	_____ Date

Section 8. Endorsement of this Agreement by Other Non-member Municipalities, Agencies or Organizations

Any other municipalities, agencies or organizations may endorse this agreement and shall have the following responsibilities:

- a. To work cooperatively with other municipalities, agencies, organizations and legislators to create a partnership to lobby for state and federal wastewater grant or loan funds for Connecticut River water quality improvements;
- b. To work cooperatively on educational efforts to build public consensus for Connecticut River Clean-up and revitalization efforts;
- c. Optionally, to designate a non-voting advisory representative to participate in the Connecticut River Clean-up Committee.

Non-voting Advisory Endorsements

Secretary, Mass. Executive Office of Environmental Affairs	Date
Administrator, U.S. Environmental Protection Agency, Region One	Date
Chairman, Board of Selectmen Town of Longmeadow	Date
Chairman, Hartford Metropolitan District Commission	Date
Executive Director, Capitol Region Council of Governments	Date

LEED CERTIFICATION BUILDING STANDARD

Developed by the Pioneer Valley Planning Commission

SECTION 1.0 LEED CERTIFICATION BUILDING STANDARD

1.1 Purpose

The purpose of this bylaw is:

- a. To encourage the construction of environmentally sustainable municipal and privately-owned buildings;
- b. To ensure that large scale new and rehabilitated building projects are planned, designed, constructed, and operated to minimize adverse environmental impacts;
- c. To encourage the conservation of natural resources and reduction of toxins through environmentally appropriate building materials and methods;
- d. To encourage the reduction of greenhouse gas (GHG) emissions in the Building Sector to lessen the effects of climate change;
- e. To encourage a reduction in the use of energy in both the initial construction of a project, as well as its daily operation;
- f. To enhance the quality of life in the [Town/City] of _____.

1.2 Definitions

Green Building: The practice of increasing the efficiency of buildings and their use of energy, water, and materials, and reducing building impacts on human health and the environment, through better siting, design, construction, operation, maintenance, and removal.

Gross Floor Area: The sum of the gross horizontal areas of the several floors of a building measured from the exterior face of exterior walls, or from the centerline of a wall separating two buildings, but not including interior parking spaces, loading space for motor vehicles, or any space where the floor-to-ceiling height is less than six feet.

Leadership in Energy and Environmental Design (LEED) Standards: A voluntary, third-party rating system where credits are earned for satisfying specified green building criteria. Developed by the United States Green Building Council (USGBC), LEED is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. LEED, as defined in this bylaw, will refer to the most current standards as revised by the USGBC.

1.3 Applicability

Any new construction or substantial rehabilitation of privately-owned and municipally-owned, non-residential structures over 25,000 square feet in Gross Floor Area which require a Special Permit or Site Plan Review shall comply with the requirements listed in Section 1.4 of this Bylaw.

1.4 Requirements

In addition to the application requirements for a Special Permit or Site Plan Review, the applicant will submit a completed and most current LEED Registered Project Checklist reflecting the intended design details of the building(s) to the Special Permit Granting Authority. The applicant will select the most appropriate LEED rating system, based on the proposed project.

- a. For construction of non-residential structures over 25,000 square feet but less than 50,000 square feet Gross Floor Area, proposed projects shall be required to meet the Basic LEED Certification.
- b. For the construction of non-residential structures over 50,000 square feet Gross Floor Area, proposed projects shall be required to meet the Silver LEED Certification. Proposed projects are encouraged to consider meeting LEED Gold or Platinum standard.

1.5 Procedures

- a. For a Special Permit and Site Plan Application, in addition to the requirements set forth in Special Permits, Section ____ of the [TOWN/CITY] Zoning Bylaw, and Site Plan Approval, Section ____ of the [TOWN/CITY] Zoning Bylaw, the applicant will also submit to the appropriate permitting board:
 - i. The appropriate LEED Registered Project Checklist, reflecting intended design details of the proposed project;
 - ii. Identify the designated LEED Accredited Professional for the project;
 - iii. Documentation to demonstrate the anticipated methods by which compliance with the LEED standards will be achieved at the time of construction.
- b. Building Permit
 - i. Prior to the issuance of the first Building Permit for each authorized building, the applicant will submit a draft LEED certification package, prepared by a LEED Accredited Professional, to the Planning Board and Building Inspector.
 - ii. Approval shall be granted upon determination by the Planning Board that the certification package is in compliance with LEED certification level as required in Section 1.4 of this bylaw.

iii. The Planning Board shall certify to the Building Inspector that all conditions under Section 1.4 of this bylaw have been met before issuance of a Building Permit.

c. Certificate of Occupancy

i. Prior to the issuance of the first Certificate of Occupancy for each authorized building, the applicant will submit the final LEED certification package, prepared by a LEED Accredited Professional, to the Planning Board and Building Inspector.

ii. Approval shall be granted upon determination by the Planning Board that the certification package is in compliance with LEED certification level as required in Section 1.4 of this bylaw.

iii. The Planning Board shall certify to the Building Inspector that all conditions under Section 1.4 of this bylaw have been met before issuance of a Certificate of Occupancy.

iv. Within eighteen (18) months of the issuance of the final Certificate of Occupancy for each building, the applicant shall submit a report to the Planning Board which shall outline the results of the measurement and verification procedures to date for that building.

1.5 Project Review

In addition to any Administrative Fees, the Planning Board may impose a Project Review Fee on those applications which require, in the judgment of the Planning Board, review by outside consultants due to the size, scale or complexity of a proposed project, the project's potential impacts, or because the Town lacks the necessary expertise to perform the review work related to the permit or approval. In hiring outside consultants, the Board may engage engineers, planners, lawyers, designers, or other appropriate professionals able to assist the Board and to ensure compliance with this Section 1.0. Such assistance may include, but shall not be limited to, analyzing the LEED application, monitoring or inspecting a project or site for compliance with the Board's decisions or regulations, or inspecting a project during construction or implementation.

Project Review Fees shall be submitted at the time of the submittal of the application for deposit in an account established pursuant to G.L. c. 44, s. 53G (53G Account). Any application filed without this fee shall be deemed incomplete and no review work shall commence until the fee has been paid in full.

1.6 Performance Bond

The permit granting authority shall require an irrevocable performance bond or other security to insure large scale new and rehabilitated building projects are functioning at the required LEED certification level, unless, in a particular case it specifically finds that such security is not warranted and so states its decision giving the reasons for its finding. The bond shall not be released until the applicant has certified in writing and the permit granting authority has determined that the building projects have been completed in compliance with the permit and LEED certification.

1.7 Conflict with Other Laws

The provisions of this bylaw shall be considered supplemental of existing zoning bylaws. To the extent that a conflict exists between this bylaw and others, the more restrictive bylaw, or provisions therein, shall apply.

1.8 Severability

If any provision of this bylaw is held invalid by a court of competent jurisdiction, the remainder of the bylaw shall not be affected thereby. The invalidity of any section or parts of any section or sections of this bylaw shall not affect the validity of the remainder of the town's zoning bylaw.

Model Mixed Use Development Bylaw/Ordinance

Prepared by PVPC, updated 9-2-14

6.6 MIXED USE DEVELOPMENT

6.61 Scope

To regulate Mixed Use Development in appropriate areas of the Town and to protect the public health, safety, and general welfare in the Town of _____ by establishing controls that will facilitate flexible development while protecting the public interest.

6.62 Purposes

- A.** The purpose of this bylaw/ordinance is to foster a greater opportunity for creative development by providing guidelines which encourage a mix of uses compatible with existing and neighboring properties; to provide housing and business uses in locations where a variety of town services are available; to promote utilization of existing buildings and property, and to encourage the provision of open areas. The intent, furthermore, is to encourage interaction among activities located within a Mixed Use Development, to enhance business vitality, reduce vehicular traffic, provide employment opportunities for residents close to home, ensure the compatibility with each other of the commercial, and residential uses, ensure that the appearance and effects of buildings and uses are harmonious with the character of the area in which they are located by:
1. Allowing a diversity of uses in close proximity in the district within a limited area, including residential, retail, and office;
 2. Accommodating mixed-use buildings with neighborhood-serving retail, service and other uses on the ground floor and residential units above;
 3. Encouraging development that exhibits the physical design characteristics of pedestrian-oriented storefront-style shopping streets;
 4. Promoting the opportunity for people to work, meet, shop and utilize services in the vicinity of their residences,
 5. Providing opportunities for the development of affordable housing,
 6. Providing opportunities for a mixture of uses in the same building,
 7. Promoting a positive pedestrian environment in the district,
 8. Facilitating integrated physical design,
 9. Promoting a high level of design quality,
 10. Encouraging the development of flexible space for small and emerging businesses,
 11. Facilitating development proposals responsive to current and future market conditions, and
 12. Encouraging the development of open spaces and parks within the district to accommodate workers, residents, pedestrians, and shoppers.

6.63 Establishment and Administration

- A. The Mixed Use Overlay District is an overlay district that is superimposed over the underlying zoning districts and is shown on the Zoning Map as set forth on the map entitled "Mixed Use Overlay District", dated _____ 2014, prepared by Pioneer Valley Planning Commission. This map is hereby made a part of the Zoning Bylaw/Ordinance and is on file in the Office of the Town/City Clerk.
- B. The regulations for use, dimension, and all other provisions of the Zoning Bylaw/Ordinance governing the underlying zoning district(s) shall remain in full force, except for those Mixed Use projects undergoing development pursuant to this Section 6.6. Within the boundaries of the Mixed Use Overlay District, a developer may elect either to develop a Project in accordance with the requirements of the Mixed Use Zoning, or to develop a project in accordance with requirements of the regulations for use, dimension, and all other provisions of the Zoning Bylaw/Ordinance governing the underlying zoning district(s).
- C. An applicant may seek development of a Project located within the Mixed Use Overlay District in accordance with the provisions of this Section 6.6, including a request for a Special Permit with Site Plan Approval.
- D. The provisions of this Section 6.6 shall be administered by the Planning Board, except as otherwise provided herein.
- E. The Planning Board may waive any information requirements it judges to be unnecessary to the review of a particular plan. Such waiver decisions must be documented in writing by the Planning Board.

6.64 Definitions

- A. The following definitions shall apply to all mixed use applications under these zoning Bylaws/Ordinances:
 - 1. **Assisted Living:** Housing for adults, with services provided, such as meals, laundry, and housekeeping.
 - 2. **Business Services:** Services used in the conducting of business and commerce, including only:
 - a. Consumer and mercantile credit reporting;
 - b. News services;
 - c. Research, development and testing;
 - d. Business management and consulting;
 - e. Insurance company service offices;
 - f. Real estate offices.
 - 3. **Café:** A coffee house or small restaurant, often with an enclosed or outdoor section extending onto the sidewalk.
 - 4. **Cocktail Lounge:** Is the use of a site for retail sale of alcoholic beverages for consumption on the premises, including taverns, bars, and similar uses, other than a restaurant use as that term is described in this section.

5. **Driveway:** A space, located on a lot, built for access to a garage or off-street parking or loading space.
6. **Fast Food Restaurant:** An establishment whose principal business is the sale of prepared or rapidly prepared food directly to the customer in a ready-to-consume state for consumption either within the restaurant building or off the premises. Orders are not generally taken at the customers table, and food is generally served in disposable wrapping or containers.
7. **Live-work Units:** A live/work unit is defined as a single unit (e.g., studio, loft, or one bedroom) consisting of both a commercial/office and a residential component that is occupied by the same resident. The live/work unit shall be the primary dwelling of the occupant.
8. **Lot Coverage:** The area of a lot covered by the footprint of all structures, as well as decks, balconies, porches, and similar architectural features, driveway areas, expressed as a percentage of the total lot area.
9. **Mixed Use Development:** The development of a tract of land, building, or structure with two (2) or more different uses such as, but not limited to, residential, office, retail, institutional, or entertainment, in a compact village form, with vehicular access to an accepted public way. A proposed Mixed Use Development shall demonstrate that the project shall be served by town water and sewer service upon completion of the proposed development.
10. **Municipal Facilities:** Facilities utilized in the provision of services normally provided by municipalities such as schools, parks, playgrounds, municipal office buildings, and maintenance buildings.
11. **Odor:** A strong and unpleasant smell, for example, a garbage or chemical smell.
12. **Personal Services:** Establishments primarily engaged in providing services involving the care of a person or his/her apparel, including but not limited to:
 - a. Laundering, dry cleaning and garments services not exceeding 5,000 square feet of floor area per establishment;
 - b. Coin operated laundries;
 - c. Shoe repair;
 - d. Photographic services;
 - e. Beauty and barber shops;
 - f. Apparel repair and alteration;
 - g. Funeral services;
 - h. Steam baths;
 - i. Reducing salons and health clubs;
 - j. Clothing rental.
13. **Professional Services:** Services performed by professional persons for business and personal use, including, but not limited to:
 - a. Medical and health offices and clinics not exceeding 5,000 feet of floor area per office or group of offices;
 - b. Planning;
 - c. Engineering and architectural;
 - d. Accounting;
 - e. Auditing and bookkeeping;
 - f. Educational and scientific.

14. **Senior and/or Handicapped Housing or Senior Apartments:** Age-restricted multi-unit housing for 55 and older adults, or handicapped persons, with self-contained living units for older adults who are able to care for themselves. Usually no additional services such as meals or transportation are provided.
15. **Sit Down Restaurant:** An eating establishment of high quality and with turnover rates generally of at least one hour or longer, serving food and beverages for retail sale, intended for consumption on the premises, and may include the sale and on-premises consumption of alcoholic beverages as an accessory use provided all necessary licenses are secured.
16. **Treebelt:** Can consist of tree planters, brick pavers, and benches with a minimum width of five feet.

6.65 Use Regulations

A. Special Permit Uses in a Mixed Use Development

1. Mixed use developments may be constructed in the Mixed Use Development Overlay District with the approval of a Special Permit with Site Plan Approval granted by the Planning Board. The following uses may be included within a mixed use development:
 - a. Retail Uses;
 - b. Sit Down Restaurants;
 - c. Cafes and outdoor dining areas;
 - d. Multi-family Residential uses;
 - e. Home Occupations;
 - f. Professional Service Offices;
 - g. Personal Service Establishments;
 - h. Municipal Uses;
 - i. Banks or financial institutions;
 - j. Health club;
 - k. Hotel/Motel not exceeding 10 guest rooms per establishment;
 - l. Bed-and-breakfast establishments;
 - m. Townhouses (single family dwellings connected by one or more walls);
 - n. Cinema, theatre, or auditorium;
 - o. Park, recreation or playground;
 - p. Artist studio/residence;
 - q. Assisted living residential uses, senior apartments and senior housing;
 - r. Artisan manufacturing or production (hand tools only, e.g. jewelry or ceramics);
 - s. Civic uses;
 - t. Live/work units;
 - u. Multiple Uses in the same structure.
2. Within a mixed use development, the following uses shall not be allowed as free standing buildings, and shall not provide drive through service windows:
 - a. Fast food restaurants;
 - b. High turnover sit-down restaurants;
 - c. Banks.

B. Prohibited Uses in a Mixed Use Development

1. The following uses shall not be included within a Mixed Use Development:
 - a. Industrial uses;
 - b. Motor vehicle sales, maintenance and repair facilities;
 - c. Gasoline filling stations;

- d. Dry cleaning, linen cleaning, or diaper services which clean clothing articles on site.
- e. Adult entertainment uses;
- f. Animal hospitals, animal sales;
- g. Automobile or truck sales;
- h. Bars and cocktail lounges;
- i. Drive-up services associated with any commercial use;
- j. Junkyards.

C. Same-structure/On-site Mixed Use

Within an approved Mixed Use Development or Mixed Use Infill development, there shall be no restriction on combining different categories of use within the same building except any imposed by the State Building Code or other federal, state, or local regulations.

D. Special Permit Criteria for All Mixed Use Developments

1. All Mixed Use Developments must meet the Special Permit with Site Plan Approval requirements in Section 5.4.
2. All Mixed Use Developments must meet the following additional Special Permit criteria:
 - a. The project complies with the additional performance standards specific to Mixed Use Developments in Section 6.66 below.
 - b. The project is consistent with the purposes of this Bylaws/Ordinance, as stated in Section 6.62.

E. Dimensional Requirements

The dimensional requirements applicable to the Mixed Use Overlay District are shown in the Table of Dimensional and Density Regulations in Section 4.3.

6.66 Performance Standards for Mixed Use Developments

To the extent feasible, all Mixed Use Developments must meet the Performance Standards in noted below.

No use shall be permitted that causes or results in dissemination of dust, smoke, gas or fumes odor, noise, vibration or excessive light under standards set forth in the performance criteria in this chapter.

Any other performance standards of the town shall also apply to uses conducted under this Section 6.6 of the Zoning Bylaws/Ordinances.

A. Access and Traffic Impacts:

1. Traffic and safety impacts to the existing and proposed roads shall be minimized.
2. Access shall be provided to the extent feasible through an existing side street or a shared driveway. Curb cuts shall be limited, and shall be as narrow as is feasible without resulting in traffic safety issues.
3. Pedestrian and vehicular traffic shall be separated; walkways shall be provided for access to adjacent properties and between businesses.

4. Plans must illustrate provisions for automobile, pedestrian and bicycle circulation. Provisions must be made for motor vehicle, bicycle, and pedestrian circulation connections to adjacent lots.
5. The Planning Board shall require a detailed traffic study for high volume traffic generating uses with a trip generation rate over 700 vehicles/day (based on Institute of Transportation Engineers rates found in Trip Generation); for the construction of new Mixed Use Development structure of more than 25,000 square feet in gross floor area; and for any external enlargement that brings the Mixed Use Development total to 25,000 square feet gross floor area for all structures. The Planning Board may waive any or all requirements for a traffic study for external enlargements of less than 2,000 square feet of gross floor area in excess of the 25,000 gross floor area threshold. The traffic impact statement shall contain:
 - a. The projected number of motor vehicle trips to enter or leave the site, estimated for daily and peak hour traffic levels;
 - b. The proposed traffic flow pattern for both vehicles and pedestrian access shall be described and related to the site plan, including vehicular movements at all major intersections likely to be affected by the proposed use of the site;
 - c. Traffic flow patterns at the site including entrances and egresses, loading and unloading areas, and curb cuts on site and within one hundred (100) feet of the site;
 - d. A detailed assessment of the traffic safety impacts of the proposed project or use on the carrying capacity of any adjacent highway or road, including the projected number of motor vehicle trips to enter or depart from the site estimated for daily hour and peak hour traffic levels, road capacities and impacts on intersection. Existing daily and peak hour traffic levels and road capacities shall also be given;
 - e. A parking lot vehicle traffic and pedestrian circulation plan shall be designed to minimize conflicts and safety problems.

B. Noise:

1. In order to protect, preserve, and promote the health, safety, welfare, peace, and quiet of the inhabitants of the town/city through the reduction, control, and prevention of such loud or raucous noise that unreasonably disturbs, injures, or endangers the comfort, privacy, repose, health, peace or safety of reasonable persons, all noise levels, measured at a height of four feet (4') above the ground surface at all property lines, using a sound meter which meets the most current American National Standards Institute's Specification for Type II Sound Level Meters, must not exceed the following standards:

Time of Day	Max. Sound Level (dBA)
7:00 a.m. to 7:00 p.m.	65*
7:00 p.m. to 11:00 p.m.	50
11:00 p.m. to 7:00 a.m.	45

*Note: 65 dba = normal conversation; 50 dba = noise level of a normal working refrigerator; 45dba = a quiet library

2. These standards shall not apply to power tools and equipment (i.e. lawn mowers, leaf blowers, sweepers, snowblowers or snow removal, etc.) used in the normal maintenance of the site's outdoor areas (i.e. lawn, garden, parking, etc.). Such outdoor maintenance shall be limited to between the hours of 8:00 am 7:00 pm.

C. Emissions and Odors:

1. Emissions and odors shall be completely and effectively confined within the building, or so regulated as to prevent any nuisance, hazard, or other disturbance from being perceptible (without the use of instruments) at any lot line of the premises on which the use is located. No emissions are permitted which can:
 - cause any damage to health of humans, animals or vegetation
 - cause excessive soiling
 - result in odorous gases or odoriferous matter in such quantities as to be offensive
2. The determination of what emissions are in violation of this provision shall be made by the Zoning Enforcement Officer or his/her designee taking into consideration all of the following:
 - the level of the odor;
 - the nature of the odor is usual or unusual;
 - the origin of the odor is natural or unnatural;
 - the level of the ambient odor;
 - the proximity of the odor to living/sleeping facilities;
 - the nature and zoning of the area from which the odor emanates and the area where it is received;
 - the duration of the odor; and whether the odor is recurrent, intermittent, or constant.

D. Lighting:

1. Lighting systems should be designed, constructed, and installed in a manner that controls glare and light trespass, minimizes obtrusive light, conserves energy and resources while maintaining safety, visibility, security of individuals and property and curtailing the degradation of the nighttime visual environment. Evenly distributed lighting throughout a site will minimize impacts on surrounding neighborhoods and increase efficiency. By directing light where it is needed and only the intensity necessary to serve the intended purpose, these standards will prevent glare and its harsh shadows and blind spots. All lighting shall comply with the following:
 - Except for approved exterior lighting, operations producing glare shall be conducted entirely within an enclosed building. No direct or sky-reflected glare, whether from floodlights or from high temperature processes such as welding shall be permitted beyond its lot lines onto neighboring properties, or onto any street.
 - Exterior lighting, including but not necessarily limited to lighting of exterior walls of buildings from an external light source, lighting of parking areas, and lighting of walks and drives shall be done in such a manner to direct light away from adjacent lots and public ways.
 - All outdoor light fixtures and illuminated signs shall be designed, located, installed and directed in such a manner as to prevent light trespass beyond the property line, and light above a ninety-degree horizontal plane. If necessary, an applicant may need to provide photometric plans and/or manufacturing specification sheets to show conformance with these standards
 - All nonessential lighting, including display, parking, and sign lighting, shall be turned off after business hours, leaving only the lighting necessary for site and pedestrian security, crime prevention and streetlighting.
 - All lighting shall be recessed and shielded to prevent off-site glare.

- Site lighting shall conform to the following output standards:

Maximum (footcandle)	Site Average (footcandle)	Footcandle at Property Line
5	2.5	0

E. Storage:

1. All materials, supplies and equipment shall be stored in accordance with Fire Prevention Standards of the National Board of Fire underwriters and shall be screened from view from public ways and abutting properties.

F. Waste Disposal:

1. Waste disposal shall follow State and Town Board of Health regulations.
2. Storage of waste and waste facilities shall be screened from view from public ways and neighboring properties.
3. Appropriate provisions shall be made for the disposal of trash, which may include, but shall not be limited to, the provision of trash compactors within the building or on site, as well as a signed annual contract for rubbish removal.

G. Loading/Unloading:

1. The Planning Board, when acting upon an application under Section 6.6 of these Zoning Bylaws/Ordinances, may require that operations, including loading and unloading shall be limited to weekdays between the hours of 8AM and 7PM only.
2. Loading and unloading platforms and doorways specially designed for loading/unloading are prohibited on the front side of any building.

H. Walkways

1. For public convenience a pedestrian and/or bicycle way shall connect all uses on the site and otherwise provide appropriate circulation or continuity to an existing pedestrian or bicycle circulation system. These uses include, but are not limited to residential, parking, transit, bicycling, industrial, recreation, and commercial.
2. Walkways must conform to requirements of the American with Disabilities Act (ADA) and the Massachusetts Architectural Access Board (MAAB).
3. Sidewalks are required along all town streets. A treebelt is required adjacent to sidewalk areas. The Planning Board can waive treebelt requirements in situations where they determine that local conditions warrant.
4. The development should provide internal and/or public pedestrian connections that are direct, convenient and pleasant with appropriate amenities (e.g. attractive sidewalks and benches).

I. Vehicular Access, Parking and Loading, and Shared Parking Requirements

1. The project shall meet all parking requirements of Section 5.7 of the Zoning Bylaws/Ordinance.
2. Parking shall be located to the side or rear of buildings. In no case shall parking be allowed in the planting strip adjacent to the sidewalk or within the front setback of any lot.
3. Parking spaces may be located either on or off the lot. Applicant must show proof of space, its location relative to the dwelling unit, and must indicate if the space is owned or leased.
4. Buildings that do not have frontage on a street must provide access for emergency and service vehicles through the layout and design of driveways, interior service roads, or pedestrian and bicycle circulation corridors.
5. Where there is more than one category of use, then the number of spaces required shall be 70% of the sum of required spaces for each category of use.
6. The Planning Board may reduce the number of required parking spaces for the commercial portion of the building by 50%.
7. Off-street loading requirements are: Multi-Family Residential, Office, Retail, Consumer Service, and Public Assembly uses require one bay per every 50,000 square feet of floor area.
8. The Planning Board may allow shared parking in a mixed use development as part of the Special Permit approval. The minimum number of parking spaces for a mixed use development or where shared parking strategies are proposed shall be determined by a study prepared by the applicant following the procedures of the Urban Land Institute Shared Parking Report, ITE Shared Parking Guidelines, or other approved procedures. A formal parking study may be waived for small developments where there is established experience with the land use mix and its impact is expected to be minimal. The actual number of parking spaces required shall be based well-recognized sources of parking data such as the ULI or ITE reports. If standard rates are not available or limited, the applicant may collect data at similar sites to establish local parking demand rates.

J. Development Standards

1. Existing buildings shall be re-used for mixed use developments, where feasible, as a priority over new construction.
2. New construction design shall be in harmony with the existing neighborhood or district.
3. Buildings or structures that are listed or eligible for inclusion on the National Register of Historic Places and/or the Massachusetts Register of Historic Places or within a local historic district as established by M.G.L. Chapter 40C, shall be converted, constructed, reconstructed, restored or altered to maintain or promote the status of the building or structure on, or eligibility for inclusion on the State or National Register of Historic Places.
4. Applicants shall consult the _____ Design Guidelines Handbook for guidance regarding design issues for mixed used development. Applicants shall indicate how the proposed development addresses the design issues referenced in the _____ Design Guidelines Handbook.

K. Signs:

1. Signs shall conform to the existing Bylaws/Ordinances of the Town/City of _____ (Section 5.9), except that the following additional standards apply to all mixed uses:
 - a. Permitted signs include: signs located within the sign band on building facades; awning signs; hanging signs projecting from building facades; window signs and un-moveable free-standing signs.
 - b. Temporary signs permitted include: political signs; special events signs; and for sale or for lease signs.
 - c. Prohibited signs include: flashing signs; roof signs; moveable signs; internally lit plastic signs.
 - d. Each business may display not more than two permanent signs.
 - e. Sign materials should be durable and easy to maintain. Signs may be constructed of wood, metal, stone, gold leaf, glass, canvas, stained glass or encased in a wooden frame.
 - f. Sign illumination may include external white light illumination, provided it is shaded from view off the premises, and neon.
 - g. Sign size: Signs may not exceed sixteen square feet in area.
 - h. Sign height: Free-standing pole signs shall have a maximum height of ten feet; other free-standing signs shall have a maximum height of four feet.

L. Landscaping Requirements:

1. Screening of mechanical equipment, trash, and loading areas shall be provided through the use of walls, fences, and/or dense, evergreen plant materials.
2. Parking areas shall be screened from adjacent residential uses, streets, and walkways using trees and shrubs adapted to the region, of specimen quality conforming to the American Standard for Nursery Stock, (American Standards Institute, Inc.), and shall be planted according to accepted horticultural standards. Berms may be used for screening along the street in conjunction with plant materials.
3. The landscaped perimeter area shall be at least five feet wide, and can consist of trees, tree planters, brick pavers and benches.
4. Landscaping shall be provided for driveways and other interior vehicular use areas to provide visual and climatic relief from broad expanses of pavement and to channelize and define logical areas for pedestrian and vehicular traffic.
5. The interior parking area shall be landscaped with sufficient shade trees to provide 50% shade within fifteen (15) years of installation.
6. The use of porous pavement and/or perforated brick or block shall be used to the extent feasible to increase on-site water retention for plant material, groundwater supplies, and to reduce problems associated with runoff.
7. Completion of the landscaping requirements may be postponed due to seasonal weather conditions for a period not to exceed six (6) months from the time of project completion.
8. Applicants shall reference the landscaping recommendations of the _____ Design Guidelines Handbook when preparing a proposed landscape plan.

M. Maintenance of Landscaping and Screening:

1. All landscaping and screening shall be maintained by the property owner.
2. Landscaping and screening plant materials shall not encroach on the public walkways or roadways in a way that impedes pedestrian or vehicular traffic.
3. Shrubs or trees that die shall be replaced within one growing season.
4. If the property owner fails to do so, the town reserves the right to maintain the landscaping and screening after notifying the owners, agents, renters, or lessees by certified mail at their last known address or at the subject property address, that it shall be removed or trimmed within seven days of the notice by the Director of Public Works.
5. The town shall assess the owners, agents, renters, or lessees for the cost of trimming or removal plus an additional amount of up to 20% of the charges for administrative costs, to the owner and to the lessee, agent, occupant, or other person in possession and control of the property.
6. If any property owner fails or refuses to pay when due any charge imposed under this section, the Director of Public Works may, in addition to taking other collection remedies, certify due and unpaid charges, including interest, to the Town Treasurer to be levied against the person's property for collection by the county in the same manner as delinquent general taxes upon such property are collected as provided by the Town/City of _____.

N. Appearance/Architectural Design

1. Architectural design shall be compatible with the historic character and scale of building in the neighborhood and the Town/City of _____ through the use of appropriate building materials, screening, breaks in roof and wall lines and other architectural techniques. Applicants should consult the _____ Design Guidelines Handbook for specific guidance on design issues.
2. Variations in architectural detail, form and siting shall be used to provide visual interest and avoid monotony.
3. Existing buildings subject to reconstruction or rehabilitation and proposed buildings shall be compatible with the historic character and scale of contiguous buildings within the immediate neighborhood vicinity.
4. Proposed buildings should relate harmoniously to each other with adequate light, air, circulation, and separation between buildings.
5. Buildings shall be designed so that only retail, restaurant, and personal service establishments shall be located on the ground or below grade building levels.
6. The entire building façade must be oriented to front and side street property lines and must be located within ten feet of such property lines, with sidewalks in front of buildings.
7. Public open spaces, such as plazas and pocket parks, are encouraged within the development;
8. In making its decision, the Planning Board may consider whether the building design is compatible with the following design guidelines:
 - 1) exterior facades are faced with wood, metal, or vinyl clapboards, or stone or brick;
 - 2) exterior facade treatment is compatible on all four sides;
 - 3) rooflines are peaked;

4) facades facing town streets have windows facing the street.

O. Multi-family Housing Limits

9. Within a mixed use development, multi-family housing units may only be constructed on the second floor of a mixed use structure which has a business, personal or professional services use on the first floor. Senior and/or Handicapped Housing or Senior Apartments are allowed on the first floor to meet accessibility needs.

P. Green Infrastructure and Stormwater Runoff

- i. To the extent feasible, Mixed Use Development projects shall recharge all stormwater on site. The use of green infrastructure strategies for stormwater recharge, such as permeable pavements, tree box filters, green streets, rain gardens, stormwater infiltration basins and green roofs, are strongly encouraged. Applicants' site plans shall indicate how the proposed development addresses green infrastructure and stormwater recharge.

Q. Outdoor Dining

- i. Outdoor dining shall be permitted by right, as an accessory use for any restaurant use, and must comply with the following standards:
1. Alcohol may be served to and consumed by patrons in outdoor dining areas, provided that all necessary licenses are acquired. These licenses are to be gathered through the Board of Selectmen, the Building Department and the Board of Health.
 2. The hours of operation of outdoor dining areas may be equal to or less than the hours of operation of the main restaurant. Dining areas which abut residential areas must end outdoor dining and seating by 11pm.
 3. Litter must be cleaned up regularly.

6.67 Optional Affordable Housing Bonus

- A. At least ten (10%) percent of the total dwelling units in a mixed use development may be designated as affordable housing. Affordable housing will be defined as those residential units affordable to a household earning up to eighty percent (80%) of the median income in the town/city of _____ statistical area.
- B. The affordable housing units shall include resale, lease or rental controls that will ensure continued affordability by future low and moderate income households. Deed restrictions or similar devices shall be used to limit future sale or rental prices for these purposes.
- C. The affordable units may be located in an existing structure if their construction constitutes a net increase in the number of dwelling units in the development.
- D. A bonus of twenty-five percent (25%) additional dwelling units – over and above the allowable density - may be awarded if the above criteria are met.
- E. Mixed Use Infill developments shall not qualify for this Affordable Housing Bonus.

ADDITIONAL AMENDMENTS NEEDED

Amendment to Table of Dimensional and Density Regulations in Section 4.3:

Zoning District	Minimum Lot Area	Minimum Frontage	Minimum Front Yard	Minimum Side Yard	Minimum Rear Yard	Maximum Height	Maximum Lot Coverage
Mixed Use Overlay (with Town Water and Sewer)	45,000 s.f.	200 feet	10 feet	20 feet	20 feet	35 feet/ 2.5 stories	60%

MODEL MIXED USE VILLAGE CENTER BYLAW
Prepared by Pioneer Valley Planning Commission 2-05

MIXED USE VILLAGE CENTER DISTRICT (MUV)

A. INTENT

The intent of the Mixed Use Village Center District is to foster well-planned, mixed-use, compact developments in the village center in _____, in keeping with the character of traditional New England villages, in order to create a place with a unique and positive local identity, and provide opportunities for development to expand the town's economic diversity and vitality.

B. GOALS

Development within this district should provide commercial, civic, residential uses and public open space within easy, safe walking distance of each other. Vehicular circulation should be safe and well organized, with the use and visual impact of cars minimized. There should be tree lined streets, sidewalks, well-designed architecture, and common interconnected open public spaces. Property developers are encouraged to provide amenities such as protected open space, increased landscaping, street furniture, public spaces, and greater integration of mixed uses.

C. PURPOSES

The purposes of this bylaw are to encourage vital, innovative, development projects and uses in the village center that:

- (1) Provide a compact and diverse mix of housing, office, retail, service and civic uses, including a mixture of uses in the same building;
- (2) Exhibit the design features of traditional villages and small towns in New England;
- (3) Facilitate more efficient provision and maintenance of public services and infrastructure;
- (4) Blend well with the existing landscape and help preserve sensitive environmental features;
- (5) Provide the opportunity for people to work, shop and utilize services in the vicinity of their residences;
- (6) Preserve and restore the overall character of the village center;
- (7) Promote a pedestrian-friendly environment in the village center,
- (8) Encourage the growth of the local economy and jobs, including development of flexible space for small and emerging businesses,
- (9) Encourage the development of open spaces and parks within the village center to accommodate workers, residents, pedestrians and shoppers.

D. use regulations

(1) Permitted Uses

- a) Single family residential dwellings are permitted by right in the Mixed Use Village Center District.
- b) The uses noted in Table One are permitted with Site Plan Review from the Planning Board in the Mixed Use Village Center District:

Table One. Uses Permitted with Site Plan Review in Mixed Use Village Center District

- a) RESIDENTIAL USES
- b) COMMERCIAL USES
- c) CIVIC USES

- 1) Townhouses;
- 2) Elderly congregate housing;
- 3) Accessory apartments, within single family residences;
- 4) Apartments on the second floor of commercial uses;
- 5) Semi detached dwellings;
- 1) Professional offices, including law or medical offices;
- 2) Business offices and support services;
- 3) Banks or financial services;
- 4) General retail sales;
- 5) Personal services (laundry, dry cleaning or similar);
- 6) Health club, indoor sports and recreation;
- 7) Grocery or convenience store;
- 8) Restaurant or delicatessen (but not including drive-in service);
- 9) Consumer repair services;
- 10) Theater or indoor entertainment;
- 11) Agriculture, horticulture, floriculture and viticulture;
- 12) Farmstands;
- 13) Mixed uses, wherein a combination of permitted uses are permitted in the same building;
- 14) Bed and breakfast inn;
- 15) Artist studio or gallery;
- 1) Municipal or governmental facilities, such as post office or administrative offices;
- 2) School or educational institution;
- 3) Church or religious uses;
- 4) Library or museum;
- 5) Utility services;
- 6) Community park or recreation facilities;
- 7) Public transit facilities;
- 8) Pedestrian or bicycle facilities;
- 9) Day care services for children or elderly;
- 10) Lodge or club;

(2) Prohibited Uses

The following uses are prohibited within the Mixed Use Village Center District:

- a) Drive-in or drive-through restaurant;
- b) Establishment selling or repairing new or used motor vehicles;
- c) Lodging house;
- d) Communications or television tower;
- e) Self-service storage facility;
- f) Commercial fuel oil storage;
- g) Commercial earth removal operation;
- h) Industrial or manufacturing use;
- i) Freight or trucking terminal;
- j) Warehousing;
- k) Residential apartment building;
- l) Commercial kennel;
- m) Lumber mill;
- n) Miniature golf courses;
- o) Adult entertainment uses;
- p) Junkyards;
- p) Other uses not specifically permitted in Table One above.

F. Dimensional Requirements

(1) Dimensional Requirements

(a) The following dimensional and density requirements shall apply to developments in the Mixed Use Village Center District (MUV), except as otherwise noted:

Table Two. Dimensional Requirements in the Mixed Use Village Center District

<u>Requirement</u>	
<u>Minimum Lot Size</u>	
<u>Minimum Lot Frontage/ Width</u>	
<u>Minimum Lot Depth</u>	
<u>Minimum Front & Side Yard Setback</u>	
<u>Maximum Front Yard Setback</u>	
<u>Minimum Rear Yard Setback</u>	
Single family detached residential dwelling	
15,000 square feet	
50 feet	
100 feet	
10 feet, except 25 feet from collector streets and from the edge of the MUV zone	
35 feet	
20 feet, except 25 feet from collector streets and from the edge of the MUV zone	
Semi detached dwelling	
10,000 square feet	
35 feet	
100 feet	
10 feet, except 25 feet from collector streets and from the edge of the MUV zone	
35 feet	
20 feet, except 25 feet from collector streets and from the edge of the MUV zone	
Townhouse	
10,000 square feet per structure, plus 2,000 square feet per unit in structure	
20 feet	
100 feet	
10 feet, except 25 feet from collector streets and from the edge of the MUV zone	
35 feet	
20 feet, except 25 feet from collector streets and from the edge of the MUV zone	
Commercial or civic or mixed use building	
30,000 square feet	
60 feet	
140 feet	
10 feet, except 25 feet from collector streets and from the edge of the MUV zone	
25 feet	
20 feet, except 25 feet from collector streets and from the edge of the MUV zone	

Table Three. Additional Dimensional Regulations for All Uses in the Mixed Use Village Center District

Requirement	Maximum or Minimum Standard
Building Height	
48 feet maximum	
Impervious Coverage, including buildings, parking lots, roads	
50% maximum	
Open Space Percentage	
25% minimum	

(b) The Planning Board may, as part of Site Plan Review, allow frontage requirements to be met on private internal access roadways if they find that adequate and permanent access is provided to the lot and that the access roadways are designed to serve as many parcels as possible, to function efficiently to link other internal and external roadways or future roadways, and to minimize curb cuts onto town and state streets to the minimum required for safe access.

E. SITE PLAN REVIEW

(1) Site Plan Review Process

(a) Procedures

An applicant proposing to develop a property under the requirements of this bylaw shall submit a Site Plan Review application to the Planning Board, and shall comply with all applicable provisions of the _____ Zoning Bylaw.

(b) Applicability

No building permit for construction within the Mixed Use Village Center District shall be granted until the provisions of this section have been fulfilled, and Site Plan Review has been completed for the specific use proposed.

(c) Approval Process

All applicants must submit 8 copies of a Site Plan to the Planning Board for review. The Planning Board shall undertake comprehensive review of these plans in accordance with the Site Plan Review regulations in Section ____ of the _____ Zoning Bylaw, including timetables and public hearing requirements therein. Within 7 days after the submission of a final plan, the Planning Board shall refer copies of the Site Plan to the Board of Health, Conservation Commission, Building Inspector, Public Works Department, Historical Commission, Police Department and Fire Department, who shall review the application and submit their recommendations and comments to the Planning Board within 30 days. Before a decision on a Site Plan is given, the Planning Board shall hold a public hearing on the plan, in accordance with Site Plan Review regulations. The Planning Board shall take final action within 90 days after submission of a Site Plan.

(2) Site Plan Contents and Fees

(a) Each Site Plan must contain the following information:

- [1] locations, layouts and sizes of all proposed uses;
- [2] layout of the transportation network for vehicles, transit, pedestrians and bicyclists;
- [3] location, layout and size of private and public open space and open space improvements;
- [4] location of major utility facilities;
- [5] landscaping plans for streetscapes, parks and recreation areas;
- [6] all information required for Special Permit applications in Section _____ of the _____ Zoning Bylaw;
- [7] locations and types of environmentally sensitive areas, including floodplains, wetlands, water supply protection areas, steep slopes, river protection areas, and agricultural lands, and plans to protect or mitigate impacts to these areas;
- [8] Building designs for all commercial or civic buildings prepared by a licensed architect, and landscaping plans prepared by a licensed landscape designer;
- [9] Locations and types of drainage and water quality controls.

(b) Site plans should be prepared at a scale sufficient for the Board to make its decision, but a minimum of 1"=40 feet, and should include topography at two foot contour intervals. A page size reduction is also required. The required fee for submittal of Site Plans is \$_____.

(c) The exact form and contents of the application, fees, plans and information shall be as required by the Rules and Regulations of the Planning Board. The Board shall adopt, and may periodically amend, after a public hearing, such Rules and Regulations relating to the procedures and administration of this section and such Rules and Regulations shall be on file at the Planning Department and Town Clerk's office.

(4) Design Standards

In order to receive Planning Board approval, the Planning Board must find that the Site Plan meets the following design criteria:

- (a) commercial uses should be pedestrian-friendly, either clustered together or laid out as small-scale "Main Street" style shops, with buildings brought up to the street and sidewalk, and common, shared parking in the rear;
- (b) all uses should be linked by a network of sidewalks or bicycle paths, which should also connect to the townwide paths or walkways where feasible;
- (c) streets and roads should be lined with street trees, sidewalks and decorative, pedestrian scale lighting;
- (d) commercial and civic uses should be architect-designed, consistent with the _____ Design Guidelines Handbook, recreating the character of a traditional New England village;
- (e) utilities should be underground.

(5) Development Standards

In order to receive Planning Board approval, the Planning Board must find that the Site Plan meets the following Development Standards:

(a) General Standards

Public water and sewer service is required for all development. All utility lines such as telephone, cable television, and electric are to be located underground.

(b) Pedestrian Circulation and Amenities

Provision for safe and convenient pedestrian access shall be incorporated into all Plans. Concrete or brick walkways shall be provided throughout the site. Pedestrian amenities are encouraged, such as: public art; fountain; tables, chairs, or benches; bike racks or lockers;

(c) Parking

(i) Off-street parking for commercial uses shall be sufficient to provide parking for the employees of all proposed uses as well as long-term customer parking. Parking lots shall be discouraged from front yard setback areas, and instead shall be located at the rear of buildings on the interior of lots, whenever possible, and shall be accessed by means of common driveways, preferably from side streets or lanes. Such lots shall be small in size (less than 25 parking spaces), where possible, and interconnected with commercial parking lots on adjacent properties. Shared parking facilities are encouraged.

(ii) In addition to the off-street parking requirements specified above, on-street parking shall be provided to serve customers of commercial uses. The minimum requirement for on-street parking shall be one curbside space for each 500 square feet of gross floor area of commercial uses. Where the minimum on-street parking requirement cannot be completely complied with, the deficient number of spaces shall be provided in off-street parking lots.

(d) Service, Loading, and Refuse Areas

Each commercial, civic or mixed use building shall be provided with an adequate service and/or loading area and:

- (i) shall be designed so that they may be used without blocking or otherwise interfering with the use of through streets, parking facilities, or pedestrian circulation;
- (ii) shall not be located on the sides of buildings that face external streets or internal collector streets;
- (iii) shall be screened from streets, parking areas, and residential lot lines by architectural elements or landscaped buffers.

(e) Landscaping

- (i) Street trees shall be planted within the right-of-ways parallel to the street along all streets. Trees shall have a minimum caliper of 2.5" at the time of planting.
- (ii) Tree spacing shall be determined by species type. Large maturing trees shall be planted a minimum of 40 feet and a maximum of 50 feet on center. Small and medium maturing trees shall be planted a minimum of 10 feet and a maximum of 30 feet on center.
- (iii) All parking areas with 5 or more spaces shall provide effective screening of the parking area from adjacent streets or properties.
- (iv) Parking areas of 10 or more spaces shall provide a minimum of 10 percent of the total parking area as landscaped open space.
- (v) Parking areas of 25 or more spaces shall provide landscaped islands of a minimum width of four feet for the purposes of :

- [1] defining parking lot entrances,
- [2] defining the ends of a portion of the parking aisles,
- [3] defining the location and pattern of primary internal access drives,
- [4] separating parking spaces within long rows of spaces, and
- [5] separating some of the rows of parking spaces from other rows.

(f) Lighting

- (i) Any outdoor lighting fixture newly installed or replaced shall be designed so that it does not produce a strong, direct light beyond the property boundaries
- (ii) All lighting shall follow a uniform lighting system.
- (iii) Lighting fixtures shall be decorative, pedestrian-scaled fixtures.

(g) Appearance/Architectural Design

(i) Architectural design shall be compatible with the 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 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. Development shall comply with the standards set forth in the _____ Design Guidelines Manual.

(ii) In making its decision, the Planning Board may consider whether the building design is compatible with the following design guidelines: 1) exterior facades are faced with wood, metal or vinyl clapboards, or stone, or brick; 2) exterior façade treatment is compatible on all four sides; 3) rooflines are peaked.

(h) Stormwater Management

- (i) To the extent practicable, the site shall be designed to manage stormwater on-site through the use of natural and structural methods which conform with MA DEP Stormwater Policy.
- (ii) An erosion control plan which is designed to prevent erosion and sedimentation of waterbodies during construction shall be developed and submitted to the Planning Board.
- (iii) The development shall, at a minimum, be designed to meet the Stormwater Management Policy of the Massachusetts Department of Environmental Protection.

(i) Other Applicable Standards

(i) The proposed use shall meet all standards for noise, dust, off-street loading, vehicular access, signage, parking and other applicable zoning standards in the Town of _____ Zoning Bylaw.

F. DEFINITIONS

ACCESSORY APARTMENT - An independent self-contained dwelling unit consisting of one or more rooms, with private bath and kitchen facilities on a lot containing a single-family dwelling. Only one accessory apartment may be created within a single-family house, and it shall be clearly subordinate to the main unit. In no case shall it be more than twenty-five percent (25%) of the building's total floor area, nor greater than eight hundred (800) square feet, nor have more than one bedroom. The accessory apartment shall be designed so that, to the degree reasonably feasible, the exterior appearance of the entire home remains that of a one-family residence. If a second external entrance is provided for the accessory unit, it cannot be located on the side of the building facing the street, but rather must be located to the side or rear of the structure. Either the principal residence or the apartment must be owner-occupied.

APARTMENT ON SECOND FLOOR OF COMMERCIAL USE - One or more rooms with private bath and kitchen facilities comprising an independent self-contained dwelling on the second floor of a building with commercial use or uses on the ground level.

ELDERLY CONGREGATE HOUSING - A dwelling providing shelter and services for the elderly which may include meals, housekeeping and personal care assistance.

LODGE OR CLUB - A facility to house a group of people organized for a common purpose to pursue common goals, interests or activities and usually characterized by certain membership qualifications, payment of dues and fees, regular meetings, and a constitution and bylaws.

LODGING HOUSE - A facility in which temporary rental sleeping accommodations are provided to transient individuals or families, and in which meals also may be provided as part of the fee.

PERSONAL SERVICES - Establishments engaged in providing services involving the care of a person or their apparel. Personal services includes the following: laundries and dry cleaning, beauty shops, barber shops, shoe repair, funeral services, health clubs, clothing rental, and similar services.

SEMI DETACHED DWELLING - A one-family dwelling attached to one other one-family dwelling by a common vertical wall, each dwelling located on a separate lot, with front facades offset.

TOWNHOUSE - A one-family dwelling in a row of at least three such units in which each unit has its own front and rear access to the outside, no unit is located over another unit, and each unit is separated from any other unit by one or more common fire resistant walls.

UTILITY SERVICES - Establishments engaged in the transmission or distribution of electricity, gas, or steam, or as part of water, sewer and sanitary systems.

G. Miscellaneous Provisions

(1) Conflict with other laws.

All development activities within the Mixed Use Village Center District shall comply with applicable laws, regulations, and standards of the town, except that in the event of a conflict between this bylaw and any such laws and regulations, the provisions of this Bylaw shall control, provided that they are consistent with state and federal law.

(2) Severability.

If any section or provision of this bylaw is found by a court of competent jurisdiction to be invalid, such invalidity shall not affect the validity of any other section or provision of this Bylaw.

MODEL OPEN SPACE RESIDENTIAL DEVELOPMENT (OSRD) BYLAW WITH MAJOR RESIDENTIAL DEVELOPMENT CONTROLS

Prepared by Pioneer Valley Planning Commission

1.0 OPEN SPACE RESIDENTIAL DEVELOPMENT

1.1 Intent

Open Space Residential Development (OSRD) in accordance with this bylaw shall be required for all Major Residential Developments in the [*input town specific zoning districts here*], except not in the Floodplain District. Open Space Residential Development shall mean a residential development in which a variety of housing types are clustered together, adjacent to permanently preserved open space. Open Space Residential Development shall be encouraged within the town, and shall be the preferred method of subdivision development wherever the following purposes would be served.

1.2 Purposes

The purposes of Open Space Residential Development are:

1.21 To allow for greater flexibility and creativity in the design of residential developments, provided that the overall density of the development is no greater than what is normally allowed in the district;

1.22 To encourage the permanent preservation of open space, agricultural lands, forest lands and other natural resources including aquifers, water bodies and wetlands, and historical and archaeological resources;

1.23 To encourage a less sprawling and more efficient form of development that consumes less open land and conforms to existing topography and natural features;

1.24 To maintain the traditional New England rural character and land use pattern in which small villages contrast with open space and farmlands;

1.25 To facilitate the construction of streets, utilities and public services in a more economical and efficient manner;

1.26 To ensure that residential developments are designed to minimize impacts to the natural features of the land, including wetlands, watercourses, forests, prime agricultural land, steep slopes, plants, wildlife, historic sites, scenic views, and rural character;

1.27 To encourage development out of view from the road, and promote alternatives to strip residential development lining roadsides in the town;

1.28 To provide wildlife corridors connecting open spaces, needed by wildlife to ensure their survival.

1.3 Definitions

Basic Maximum Number: The number of units that would be allowed on a site using the standard Zoning Bylaw Provisions and/or Subdivision Rules and Regulations as determined by a Yield Plan.

Common Area: Any land area, other than Open Space, set aside for common ownership as a result of an OSRD, including areas for Common Facilities.

Common Driveway: Vehicular access, which is not a street, but extending from a street, serving as a common vehicular access to more than one (1) but not more than six (6) residential lots built in accordance with the standards set forth in this bylaw. The driveway will lie entirely within the lots being served.

Common Facilities: Built facilities which are commonly owned by the property owners within an OSRD. Common Facilities may be proposed but are not required. They may include streets, rights of way, common buildings, wells, water and waste treatment systems, and recreation facilities.

Conventional Lot: A lot in a standard subdivision based upon the minimum dimensional requirements of the underlying zoning district in which the subject property lies, and the minimum requirements of the Subdivision Regulations.

Conventional Plan: A plan showing the division of property into lots based upon the minimum requirements of the underlying zoning district in which the subject property lies, and the minimum requirements of the Subdivision Regulations.

Existing Resources / Site Analysis Map: A map which identifies, locates, and describes noteworthy features to be designed around through sensitive subdivision layouts, such as vegetation, wetlands, steep slopes, farmland soils, historic or cultural features, threatened or endangered species, unusual geological formations, and scenic views or viewsheds.

Homeowners' Association: A private non-profit organization (corporation, association, or other legal entity) established by the developer to manage, maintain, support, and finance the common facilities and common open space of an OSRD, and to enforce certain covenants and restrictions.

Minor Residential Development: A subdivision which requires approval under M.G.L., Ch. 41 creating 3 or fewer lots or a residential development creating 3 or fewer dwelling units.

Major Residential Development: A subdivision which requires approval under M.G.L., Ch. 41 creating 4 or more lots or a residential development creating 4 or more dwelling units.

[The scale of a Major Residential Development can be changed depending on the typical scale of subdivision design in a given community.]

Open Space: Undeveloped land set aside for common or individual ownership as a result of an OSRD, with conservation easements and other deeded restrictions to ensure that the land will

remain permanently open and undeveloped. A condition of OSRD approval is that open space may not be further subdivided.

Open Space Residential Development (OSRD): A form of residential development where the density of the dwelling units is no greater than would be permitted in the district in where the OSRD is located, but where the lot size and other dimensional standards may be reduced in exchange for the preservation of permanently protected open space, recreational land, forests, or other farmland.

Prime Agricultural Soils: Agricultural land with soils designated as prime or of statewide significance by the U.S. Natural Resources Soil Service soil surveys.

Title V Regulations: 310 CMR 15.000

Wetlands: Areas characterized by vegetation described in Massachusetts General Laws, Chapter 131, Section 40.

Yield Plan: A conceptual plan showing how the parcel could be subdivided in a conventional manner. Determination of the possible number of conventional lots shall be determined by Title V regulations, 310 CMR 15.000, as well as the [Insert Town Name] Board of Health regulations. For purposes of determining the number of OSRD dwelling units, each conceptual conventional lot must meet the requirements of a buildable lot for a single family dwelling unit as defined in the zoning district in which the OSRD is located and meet all other applicable requirements of the Zoning Bylaw and Subdivision Regulations. In no case shall the number of OSRD dwelling units exceed the number of units that would be allowed under a conventional subdivision.

1.4 Applicability

1.41 Any applicant applying for a Major Residential Development in the Town of [Insert Town Name] shall apply for an OSRD under this bylaw. Applicants applying for a Minor Residential Development may apply for an OSRD under this bylaw.

[This model bylaw mandates the use of OSRD for all Major Residential Developments. Each community should assess whether to make this type of development mandatory, encourage its use through incentives, or allow it by right on an equal footing to conventional subdivision. If a community determines that this type of development should be encouraged, incentive language should be added to encourage its use.]

1.42 Segmentation: In determining whether a project is a major residential development, the developer and the Planning Board shall consider the entirety of the development, including (a) any likely future expansion of the project on the subject property or on any property which is contiguous to the subject property or under related ownership or (b) any past, related development on any property which is contiguous to the subject property or any property that was under related ownership with the subject property at the time that this bylaw was adopted. A developer may not phase or segment a project or transfer ownership of contiguous properties to evade, defer or curtail the requirements set forth in this bylaw.

1.43 Uses Permitted in the Developed Area of an OSRD.

- 1) Single Family Detached Dwelling Units;
- 2) Duplex or Two-Family Dwelling Units;
- 3) Multi-Family Dwelling Units provided that no building shall contain greater than four (4) dwelling units, and the percentage of multi-family dwelling units shall not exceed twenty (20) percent of the total number of units in the development;

[This model bylaw allows for a variety of housing types within the OSRD. Each community should assess its housing needs and amend this section based on those needs]

1.44 Uses Permitted in the Open Space of an OSRD.

- 1) Agricultural uses including horticultural, raising of crops, livestock, poultry, nurseries, orchards, hay, and building related to the same;
- 2) Public park or recreation area;
- 3) Woodlots, arboreta, and other similar silvicultural uses;
- 4) Woodland preserve, game preserve, wildlife sanctuary, or other similar conservation use;
- 5) Accessory uses customarily incidental to any permitted use.

1.45 Special Land Features. The Planning Board may request an applicant to use an OSRD subdivision design if the property possesses one or more of the following special features:

- 1) Unfragmented open land as identified as a priority for protection in the town's Open Space and Recreation Plan, Master Plan or the Community Development Plan;
- 2) Agricultural land with soils designated as prime or of statewide significance by the U.S. Natural Resource Conservation Service soil surveys;
- 3) Rare, threatened, or endangered species or exemplary natural communities according to the Massachusetts BioMap Project developed by the Massachusetts Natural Heritage & Endangered Species Program;
- 4) Unique natural, cultural, and/or historical features as identified in the Master Plan or Community Development Plan.

[The language under Section 1.45 above should only be added to the bylaw if the community is not going to mandate OSRD for all Major Residential Developments, but allow the Planning board to decide which form of development to use when the subject property possesses one or more of the specials features highlighted above.]

1.5 Application Requirements

1.51 Pre-application Review

The applicant is very strongly encouraged to request a pre-application review at a regular business meeting of the Planning Board. If one is requested, the Planning Board shall invite the Conservation Commission, Board of Health, Historical Commission, and [INSERT THE NAMES OF ANY OTHER APPROPRIATE BOARDS]. The purpose of a pre-application review is to minimize the applicant's costs of engineering and other technical experts, and to commence discussions with the Planning

Board at the earliest possible stage in the development. At the pre-application review, the applicant may outline the proposed development including both conventional and OSRD models, seek preliminary feedback from the Planning Board and/or its technical experts, and set a timetable for submittal of a formal application.

1.52 Site Visit

Applicants are encouraged to request a site visit by the Planning Board and/or its agents in order to facilitate pre-application review of the proposed development. If one is requested, the Planning Board shall invite the Conservation Commission, Board of Health, Historical Commission, and [INSERT THE NAMES OF ANY OTHER APPROPRIATE BOARDS]

1.53 Site Context Map

A Site Context Map shall be submitted / presented to the Planning board during the pre-application review. This map shall illustrate the parcel in connection to its surrounding neighborhood. Based upon existing data sources and field inspections, it shall show various kinds of major natural resource areas or features that cross parcel lines or that are located on adjoining lands. This map enables the Planning Board to understand the site in relation to what is occurring on adjacent properties.

1.54 Existing Resources / Site Analysis Map

The following shall be submitted / presented to the Planning Board during the pre-application review at a regularly scheduled meeting for the purpose of assessing the impact or implications of the development and shall be used in the preparation of a preliminary design plan.

- 1) Boundaries of wetlands defined by Massachusetts Wetlands Law CMR-140 and certified by a licensed wetlands professional engineer;
- 2) Location and limits of soils types, particularly Prime Agricultural Soils, consistent with the soils classification maps prepared by the US Department of Agriculture Natural Resource Conservation Service;
- 3) Areas where the depth of natural soil to bedrock is four (4) feet or less;
- 4) The extent of any Interim Wellhead Protection Areas and Recharge Areas;
- 5) Topographic contours at intervals of ten (10) feet or less;
- 6) Delineation of slopes of twenty-five percent (25%) or greater;
- 7) The location of cultural and historic features including, but not limited to, stone walls, archaeological and historic sites and structures, and significant and rare vegetation;
- 9) Areas delineated as "BioMap Core Habitat" or "Supporting Natural Landscape" on the Massachusetts BioMap Project developed by the Massachusetts Natural Heritage & Endangered Species Program;

1.55 Preliminary Subdivision Plan Submission

- 1) A Preliminary Subdivision Plan shall be submitted in conformance with the Town of [Insert Town Name] Subdivision Regulations. Applicants shall submit the preliminary design to the Planning Board for review prior to development of a

Definitive Plan. Approval of the Preliminary Plan by the Planning Board will be based on the review criteria standards set forth in Section 1.55(2).

[For those communities that want to encourage this form of development and give the Planning Board the discretion to choose between OSRD and conventional development, applicants should submit both a conventional plan and an OSRD plan in order for the Planning Board to make a determination on a case by case basis on the type of development to be used.]

2) Review of Preliminary Plan. The Planning Board shall review the Preliminary Subdivision Plan in accordance with the criteria contained in this Bylaw and with other applicable regulations of the Town of [Insert Town Name]. The review shall informally advise the applicant to the extent to which the proposed subdivision or land development conforms to the relevant standards of this Bylaw and may suggest possible plan modifications that would increase its degree of conformance. The review shall include, but is not limited to:

- (a) The location of all areas proposed for land disturbance (streets, foundations, yards, septic disposal systems, storm water management areas, etc.) with respect to notable features of natural or culturally significance as identified on the applicants Existing Resources / Site Analysis Map;
- (b) The potential for street connections with existing streets, other proposed streets, or potential developments of adjoining parcels;
- (c) The location of proposed access points along existing road networks;
- (d) The proposed building density and areas of impervious surface.

1.56 Definitive Subdivision Plan Submission

A final Definitive Development Plan shall be submitted in conformance with this section and the Town of [Insert Town Name] Subdivision Regulations as applicable. Such Plans shall adequately address standards delineated in this bylaw. In addition, the Definitive Development Plan shall address issues that have been previously discussed in the Existing Resources / Site Analysis Map.

1.6 **Subdivision Approval Procedures**

1.61 Applicants for Open Space development projects shall follow all procedures specified in the Town of [Insert Town Name] Subdivision Regulations.

1.62 The Planning Board shall submit copies of the preliminary and final subdivision plans to the Board of Health, Conservation Commission, Highway Department, Chief of Police, Fire Chief [INSERT THE NAMES OF ANY OTHER APPROPRIATE BOARDS] who shall review the application and submit their recommendations and comments to the Planning Board concerning :

- 1) The completeness and adequacy of the data and methodology used by the applicant to determine the impacts of the proposed development;
- 2) The effects of the projected impacts of the proposed development; and
- 3) Recommended conditions or remedial measures to accommodate or mitigate the expected impacts of the proposed development.

Failure of Boards to make recommendations within 30 days of the referral of the application shall be deemed to be lack of opposition.

1.7 Criteria for Evaluation

No approval for an OSRD shall be given unless the application complies with the following criteria:

1.71 The proposed development shall be compatible with respect to the objectives and policy recommendations of the Open Space and Recreation Plan and Community Development Plan or Master Plan;

1.72 The proposed development shall be consistent with the intent and purposes of this bylaw;

1.73 All dwellings shall, to the greatest extent possible, be located out of view from any road unless valuable natural resources or farmland located to the rear of the property render building in view of the road more desirable;

1.74 The portion of a parcel placed in open space shall, to the greatest extent possible, be that which is most valuable or productive as a natural resource, wildlife habitat, farmland, or forestry land;

1.75 The OSRD shall result in the creation of less curb cuts or vehicular access points to a public way than would reasonably be expected to occur under Standard ANR or Subdivision Development.

1.76 Streets shall be designed and located in such a manner as to maintain and preserve natural topography, significant landmarks, and trees; to minimize cut and fill; and to preserve and enhance views and vistas on or off the subject parcel.

1.77 The preferred location for the required protected open space in an OSRD shall be, to the extent feasible, in view of town roads and linked to any existing protected lands on adjacent parcels.

1.8 Dimensional Standards

1.81 Allowed Density

1) The maximum number of dwelling units for an OSRD shall be determined by use of a yield plan, which is a conceptual plan showing how the parcel could be subdivided in a conventional manner. Determination of the possible number of conventional lots shall be determined by Title V regulations, 310 CMR 15.000, as well as the [Insert Town Name] Board of Health regulations. For purposes of determining the number of OSRD dwelling units, each conceptual conventional lot must meet the requirements of a buildable lot for a single family dwelling unit as

defined in the zoning district in which the OSRD is located and meet all other applicable requirements of the Zoning Bylaw and Subdivision Regulations. In no case shall the number of OSRD dwelling units exceed the number of units that would be allowed under a conventional subdivision.

2) There shall be no further subdivision of an approved OSRD.

1.82 Flexible Dimensional Controls

1) Frontage

(a) The minimum frontage for a tract on which an OSRD is proposed (whether or not by subdivision) shall equal or exceed 60 feet for each lot created in the OSRD, as shown in the Table of OSRD Dimensional Requirements (Table 1). [For example, to create a six-lot OSRD in a typical Residential District, the original parcel must have a minimum of 360 foot contiguous frontage along a public way.]

(b) In the interest of flexibility and creative site designs, there shall be no minimum frontage requirement for individual lots on new subdivision streets within an OSRD, with the exception described in Section 1.9.2(c) below.

(c) For each lot developed along a public street existing at the time of the application, the minimum frontage, minimum lot size and all other dimensional controls shall be those which are required in the underlying zoning district in which the OSRD is located.

2) Lot Size

(a) The minimum lot size for individual lots without town water and sewer within an OSRD shall be 25,000 square feet.

(b) The minimum lot size for individual lots with town water and sewer within an OSRD shall be 10,000 square feet.

[Minimum lot sizes for individual lots within an OSRD without public water and sewer should be based on whether the community will allow community systems to be built within the Open Space of an OSRD. Minimum lot sizes for individual lots within an OSRD with public water and sewer should be based upon existing lots sizes in the underlying zoning districts in which OSRD is mandated or allowed.]

3) Setbacks

(a) There shall be a minimum setback of fifty (50) feet along all property boundaries of the overall tract for all structures, including accessory structures, parking areas, driveways and internal streets. Entrance streets connecting the OSRD to the external street system may cross the setback area.

(b) There shall be no minimum front yard, side yard, or rear yard setback requirements for individual lots within an OSRD.

(c) There shall be a minimum of twenty (20) feet between buildings in an OSRD.

[Input town specific data]

Residential-Neighborhood

40,000

N/A

None

None

[Input town specific data]

[Input town specific data]

[Input town specific data]

[Input town specific data]

[Input town specific data]

[Input town specific data]

[Input town specific data]

Residential-Village

30,000

N/A

None

None

[Input town specific data]

[Input town specific data]

[Input town specific data]

[Input town specific data]

[Input town specific data]

[Input town specific data]

[Input town specific data]

OSRD Development

Rural-Residential

- Town Water/Sewer
- Individual Systems

15,000

25,000

20,000

30,000

50%

None

40,000 sf per lot, including lot

None

60 per lot

None

None

None

25%

35

Residential-Neighborhood

- Town Water/Sewer
- Individual Systems

10,000

15,000

15,000

20,000

50%

None

40,000 sf per lot, including lot

None

60 per lot

None

None

None

25%

35

Residential-Village
- Town Water/Sewer
Individual Systems

8,000

10,000

10,000

15,000

50%

None

40,000 sf per lot, including lot

None

60 per lot

None

None

None

25%

35

¹ Calculations for average lot areas shall be computed by adding the lot sizes for all lots in the OSRD, plus common open space, as described in Section 1.12, and dividing by the total number of lots.

² The frontage of the total tract from which an OSRD is created shall equal or exceed at least 60 feet per developable lot created.

1.83 Landscaped Buffers

- 1) A landscaped buffer no less than fifty (50) feet deep shall be provided where appropriate to screen the development from public streets and adjacent properties. Entrance streets connecting the OSRD to the external street system may cross the buffer area. The natural vegetation shall be retained whenever possible. If the natural vegetation is not sufficient to serve as an effective visual screen, landscaping shall be required to provide such a screen. Landscaping may include berms and/or decorative fencing of an appropriate height.
- 2) This buffer area shall be part of the common area, and shall be subject to the same restrictions that apply to that area.
- 3) Frontage lands on streets existing at the time of application shall be preserved as buffers to the maximum extent possible in addition to all required setbacks

1.84 Common Driveways

The Planning Board may authorize the use of common driveways to provide access to no more than six (6) individual lots of land provided that the following conditions are met:

- 1) A common driveway shall have a minimum roadway width of sixteen (16) feet to a maximum of twenty (20) feet, in addition to an easement of sufficient width to assure proper drainage and maintenance.
- 2) A common driveway shall not exceed 400 feet in length.
- 3) The slope or grade of a common drive shall in no place exceed 10% if unpaved or 12% if paved.
- 4) The common drive shall intersect a public way at an angle of not less than 80 degrees.
- 5) Alignment and sight distances should be sufficient to support a design speed of 15 mph.
- 6) The common driveway shall be capable of providing access for emergency vehicles with either a "hammer head", "T" or "Y" configuration in lieu of a cul-de-sac for reverse direction in a single movement.
- 7) The common driveway shall lie entirely within the lots being served.

- 8) The common driveway, at its intersection with the street, must provide a leveling-off area with a slope no greater than 1% for the first 20 feet and a slope no greater than 5% for the next 30 feet.
- 9) There shall be a minimum of 500 feet between the entrances of any two common driveways onto any road.
- 10) The common driveway shall be constructed of a minimum 15" gravel base, with an oil and stone top layer of 1½" consisting of three successive layers of ¾" crushed traprock stone, ½" crushed traprock stone and ¼" crushed traprock stone, with a crown sufficient for drainage. Drainage shall be by sheet runoff to drainage swales adequate to dispose of surface runoff. Culverts will be installed if deemed necessary by the Planning Board.
- 11) A common driveway shall have adequate sight distance at its intersection with a public or private road, and shall not create traffic safety hazards to its users or the public.
- 12) The common driveway shall access the property over the frontage of at least one of the lots being served by the driveway.
- 13) The common driveway shall provide the only vehicular egress/access to the lots being serviced by it, and this shall be so stated in the deeds to the subject lots.
- 14) Permanent signs, sufficiently readable from the road to serve the purpose of emergency identification, indicating the street number address assigned to each lot served by the common driveway shall be installed within ten (10) feet of the intersection of the common driveway with the street, as well as within ten (10) feet of the intersection of an individual lot driveway with the common driveway. This requirement is in addition to those for individual homes.
- 15) Common driveway design shall to the greatest extent possible minimize adverse impact to wetlands, farmland, or other natural resources; allow reasonable, safe, and less environmentally damaging access to lots characterized by slopes or ledges; and result in the preservation of rural character through reduction of number of access ways; and retention of existing vegetation and topography.
- 16) Frontage along the length of a common driveway shall in no way be used to satisfy frontage requirements as specified in the Zoning Bylaw.
- 17) No common driveway, approved under this bylaw, shall accepted by the town as a public road, nor shall the town under any circumstances be held liable for construction, reconstruction, maintenance or snow removal on any common driveway.

These standards may be waived when, in the opinion of the Planning Board, such action is in the public interest and not inconsistent with the purpose and intent of the Zoning Bylaw.

[This model bylaw encourages the use of common driveways to allow greater flexibility in the design of an OSRD. Communities that have existing common driveway regulations should reference the appropriate bylaw in place of these specific provisions. Communities should consider whether to allow common driveways for all developments as opposed to only OSRD, in which case such regulations should be put forth as a zoning amendment to apply to all development in the community.]

1.9 Utility Requirements

1.91 On-site Sewage Disposal

The following standards shall apply to developments requiring on-site sewage disposal:

- 1) The applicant shall submit a septic system design prepared by a certified engineer and approved by the Board of Health and a plan illustrating the location of water supply wells with the application.
- 2) All Open Space Residential Developments must meet the minimum state Environmental Code (Title V) requirements for minimum setbacks between private water supply wells and septic tanks or soil absorption systems (310 CMR 15.211).
- 3) All Open Space Residential Developments must meet the minimum state Environmental Code (Title V) requirements for nitrogen loading limitations (310 CMR 15.214-15.217). For OSRDs with individual lot sizes less than 40,000 square feet, applicants must meet the following standards:

(a) Applicants must designate, on a plan, specific areas of common open space as "nitrogen credit land", based on the following equation:

$$(40,000 \text{ square feet} \times \text{number of OSRD lots}) - (\text{total square feet in proposed OSRD lots}) = \text{square feet of required nitrogen credit land in common open space}$$

(b) Nitrogen credit land must meet DEP qualifications contained in "Guidelines for Title 5 Aggregation of Flows and Nitrogen Loading 310CMR15.216" including, but not limited, to the following qualifications:

- Must be restricted to prohibit man-made sources of nitrogen, including sewage discharge, nitrogen-based fertilizer or raising and grazing of livestock;
- Must be restricted to prohibit artificially rendered imperviousness (i.e. paved streets, paved parking lots, buildings, structures, etc.);
- Not within a Velocity Zone or Regulatory Floodway identified by FEMA;
- Not under surface water;
- Not already being used as nitrogen credit land.

(c) All designated nitrogen credit land must be permanently restricted from further development under a "Grant of Title 5 Nitrogen Loading Restriction and Easement on Nitrogen Credit Land".

After approval of the Flexible Residential Open Space Final Subdivision Plan, applicants must apply to the Board of Health and the Mass. Department of Environmental Protection (DEP) for an aggregate determination of nitrogen loading under 310 CMR 15.216.

- 4) It is required that septic tanks be installed on individually-owned lots. Nitrogen Credit Land must be at least 100 feet from all private wells.

1.92 Water Supply

In order to meet state Title V requirements for separation distances between drinking water wells and septic systems, private drinking water supply wells may be located in

the common open space for an Open Space Residential Development, provided that the provisions of Section 1.13 for a homeowners' association are met.

1.93 Stormwater Management

The Planning Board shall encourage the use of non-structural stormwater management techniques and other drainage systems that reduce impervious surfaces and enable infiltration where appropriate.

Stormwater management systems serving the OSRD subdivision may be located within the required common open space. Surface systems, such as retention and detention ponds, shall not qualify towards the minimum open space requirement.

1.10 Common Open Space

1.101 Common Open Space Requirements

- 1) A minimum of 50% of the total development parcel must be permanently protected as common open space. At least 70% of the common open space shall be retained in contiguous areas, unless approved by the Planning Board.
- 2) Watercourses, lakes, ponds, wetlands, floodplains, and steep slopes over 25% may be included in common open space calculations not to exceed twenty-five (25) percent.
- 3) The Planning Board may permit up to three (3) percent of the open space area to be paved or built upon for structures accessory to the dedicated use of open space (i.e. pedestrian walks, bicycle paths, playgrounds, farm-related structures).
- 4) All recreational facilities, common areas, and common open space shall be reasonably accessible to all residents of the development.

1.102 Land Protection Methods for Common Open Space

- 1) All land not devoted to buildings, lots, roads and other development shall be permanently protected as common open space for recreation, conservation, forestry or agricultural uses which preserve the land in its natural condition.
- 2) The land shall be owned by a non-profit land trust or conservation organization, homeowners' association, or individual, and a permanent conservation easement or deed restriction must be conveyed to the Town, with Town approval, or to a non-profit trust or conservation organization whose principal purpose is to conserve farmland or open space.
- 3) Further subdivision of common open land or its use other than recreation, conservation, forest or agriculture, except for easements for underground utilities or drinking water supply wells, shall be prohibited.

1.11 **Additional Requirements**

1.111 Trails. Where there is an existing local or regional trail network on land adjacent to a proposed OSRD, the developer of the OSRD may be required to connect to the existing trail network with trail corridors through the site, and shall grant the general public access to these trails in perpetuity. The minimum nature of public access required is pedestrian traffic. The instrument granting access, acceptable to the planning board, shall restrict the use of motorized vehicles where appropriate.

1.112 Open Space. Where there is an existing network of open space or large tracts of unfragmented open space on land adjacent to a proposed OSRD, the developer of the OSRD may be required to connect to the existing open space where feasible with the required open space set-aside, and shall grant the general public access to this open space in perpetuity. The minimum nature of public access required is pedestrian traffic. The instrument granting access, acceptable to the planning board, shall restrict the use of motorized vehicles where appropriate.

1.113 Forest Management. On sites where the open space to be preserved is mostly mature forest (70% or greater), the developer of a OSRD may be required to submit a Forest Management Plan developed by a MA Licensed Forester and approved by the Planning Board.

1.114 View Shed and Viewpoints. The Planning Board may require the development to protect in perpetuity view sheds and associated viewpoints, which are lands or corridors of land that contribute to the visual landscape of the Town, including items such as open fields containing stone walls. View sheds and viewpoints include, but are not limited to, those identified in the most current version of the [Insert Town Name] Community Development Plan. The Planning Board may make use of a site visit to determine potential view sheds and viewpoints to be preserved.

1.12 Homeowners' Association

1.121 In the event that ownership of the land will remain with the homeowners in the Open Space Residential Development, a non-profit, homeowners' association shall be established, requiring membership of each lot owner in the Open Space Residential Development.

1.122 The association shall be responsible for the permanent maintenance of all common lands, common open space, recreational and thoroughfare facilities (not including drinking water wells), except where such responsibility is assumed by another owner of the common land (land trust or conservation organization). If any drinking water well is located on common open space, the homeowner/s shall own the well and be responsible for any maintenance or related costs associated with their well.

1.123 A homeowners' association agreement or covenant will guarantee continuing maintenance of such common utilities, land and facilities, and assessing each lot a share of maintenance expenses shall be submitted with the final subdivision application. Where no homeowners' association is proposed, an alternative plan shall be submitted with the final subdivision application.

1.124 Such agreement shall be subject to the review and approval of Town Counsel and the Planning Board, and shall be recorded in the Hampden County Registry of Deeds. Such agreements or covenants shall provide that in the event that the association fails to maintain the common open land in reasonable order and condition in accordance with the agreement, the town may, after notice to the association and public hearing, enter upon such land and maintain it in order to preserve taxable values of the properties within the development and to prevent the common land from becoming a public nuisance. The covenants shall also provide that the cost of such maintenance by the town shall be assessed equally against each of the properties within the development.

1.13 Conflict with Other Laws

The provisions of this bylaw shall be considered supplemental of existing zoning bylaws. To the extent that a conflict exists between this bylaw and others, the more restrictive bylaw, or provisions therein, shall apply.

1.14 Severability

If any provision of this bylaw is held invalid by a court of competent jurisdiction, the remainder of the bylaw shall not be affected thereby. The invalidity of any section or sections or parts of any section or sections of this bylaw shall not affect the validity of the remainder of the Town's Zoning Bylaw.

Optional Sections of an OSRD Bylaw

1.X Increases in Permissible Density.

The Planning Board may award a density bonus to increase the number of dwelling units beyond the Basic Maximum Number for an OSRD Plan. The density bonus for the OSRD shall not, in the aggregate, exceed twenty percent (20%) of the Basic Maximum Number. Computations shall be rounded down to the next whole number. A density bonus may be awarded in the following circumstances:

- A. For each additional ten percent (10%) of the site (over and above the required 50%) set aside as open space, a bonus of five percent (5%) of the Basic Maximum Number may be awarded. Calculations shall be rounded down to the nearest integer when determining this bonus.
- B. For every two (2) dwelling units restricted in perpetuity to occupancy by Moderate-Income Households, or for every one (1) dwelling unit restricted in perpetuity to occupancy by Low-Income Households, one (1) market rate dwelling unit may be added to the Basic Maximum Number. Affordable housing units may be used toward density bonuses only if they can be counted toward the Town's affordable housing inventory as determined by the Massachusetts Department of Housing and Community Development. The applicant shall provide documentation demonstrating that the unit(s) shall count toward the community's affordable housing inventory to the satisfaction of the Planning Board.
- C. For every historic structure preserved and subject to a historic preservation restriction, one (1) dwelling unit may be added to the Basic Maximum Number.

1.X Affordable Housing

1.X1 Definitions

Affordable Housing Unit: A dwelling unit with an Affordability Deed Restriction available at a cost of no more than 30% of gross household income of households at or below 80% of the Area Median Income as reported by the U.S. Department of Housing and Urban Development, including units listed under M.G.L. Chapter 40B Sections 20-24.

Affordable Deed Restriction: A covenant agreement, deed restriction, or other legal instrument, acceptable in form and substance to the Town of [Insert Town Name], that effectively restricts occupancy of an affordable housing unit to a qualified purchaser or qualified renter, and which provides for administration, monitoring and enforcement of the restriction during the term of affordability. An affordable housing restriction shall run with the land in perpetuity or for the maximum period of time allowed by law, so as to be binding on and enforceable against any person claiming an interest in the property. An affordable housing restriction shall be enforceable under the provisions of M.G.L. Chapter 184, Section 32, and be approved by the Department of Housing and Community Development.

Low- or Moderate-Income Household: A household with income at or below 80% of area median income, adjusted for household size, for the metropolitan or non-metropolitan area that includes the Town of [Insert Town Name] as determined annually by the United States Department of Housing and Urban Development (HUD).

Maximum Affordable Purchase Price or Rent: A selling price or monthly rent, exclusive of utilities, that meets the maximum purchase price or rent guidelines of the Massachusetts Department of Housing and Community Development for inclusion on the Subsidized Housing Inventory.

Median Income: The household income determined annually by the US Department of Housing and Urban Development for [Insert town name] or the region that includes [Insert town name].

Qualified Purchaser - A low- or moderate-income household that purchases and occupies an affordable housing unit as its principal residence.

Qualified Renter: A low or moderate-income household that rents and occupies an affordable housing unit as its principal residence.

Subsidized Housing Inventory: The Department of Housing and Community Development Chapter 40B Subsidized Housing Inventory as provided in 760 CMR 31.04.

1.X2 Number of Units to be Provided - All developments of 10 units or more which are subject to this Bylaw shall be required to set aside a minimum of ten percent (10%) of the total number of dwelling units provided as affordable housing.

1.X3 The affordable units to be provided shall be equivalent in size, quality, and characteristics to the other units in the development. The units shall not be grouped together; they shall be distributed among all units.

1.X4 Preservation of Affordability; Restrictions on Resale

(1) An affordable housing unit created in accordance with this Bylaw shall be subject to an affordable housing restriction or regulatory agreement that contains limitations on use, resale and rents. The affordable housing restriction or regulatory agreement shall meet the requirements of the Town and the Local Initiative Program or other programs qualifying dwelling units for inclusion on the Subsidized Housing Inventory, and shall be in force for the maximum period allowed by law.

(2) The affordable housing restriction or regulatory agreement shall be enforceable under the provisions of M.G.L. c.184.

(3) The Planning Board shall require that the applicant comply with the mandatory provision of affordable housing units and accompanying restrictions on affordability, including the execution of the affordable housing restriction or regulatory agreement.

All documents necessary to ensure compliance with this Bylaw shall be subject to the review and approval of the Planning Board and review as to form by Town Counsel. Such documents shall be executed and recorded prior to and as a condition of the issuance of any Certificate of Occupancy unless later recording is permitted by the Planning Board for good reason.

Proposed Addition to the Subdivision Regulations

Fire Suppression

The Fire Chief shall determine on a case by case basis whether the developer of a proposed subdivision shall be required to install:

- A. Fire Suppression Cistern(s) for fire suppression within the proposed subdivision. The appropriate size and location of the fire cistern(s) shall be determined by the Fire Chief; or
- B. Residential Fire Suppression Systems for all residential units within the proposed subdivision; or
- C. Both Fire Suppression Cistern(s) for fire suppression within the proposed subdivision and Residential Fire Suppression Systems for all residential units within the proposed subdivision.

The final determination on the type of fire suppression system(s) to be utilized within a proposed subdivision shall be determined by the Fire Chief.

MODEL SHARED PARKING BYLAW

Section ____: Location of Parking

All required parking shall be provided on the same lot with the principal use it is to serve or, in Commercial, Business and Industrial Districts, on a lot that is in the same ownership as, and located within, three hundred (300) feet of the principal use, except as provided in ____ and ____ of this Section.

Parking required for two or more buildings or uses may be provided on the same lot as the principal use or, in Business and Industrial Districts, on a lot under the same ownership in combined facilities where it is evident that such facilities will continue to be available for the several buildings or uses, except as provided in ____ and ____ of this Section.

Section ____: Shared Parking

In Commercial, Business and Industrial Districts; and in Residential Districts except for residential and multi-family uses, Home Occupations and Home Based Businesses; the Planning Board may issue a Special Permit permitting the use of parking spaces for more than one use when they find that the applicant has submitted an adequate Parking Management Plan (including supportive documentation) showing that:

- a. the peak parking demand generated by the uses occur at different times, and
- b. there will be adequate parking for the combined uses at all times

Section ____: Off-Site Parking.

In Commercial, Business and Industrial Districts; and in Residential Districts except for residential and multi-family uses, Home Occupations and Home Based Businesses; The Planning Board may issue a Special Permit permitting the providing of required parking for a use on a lot that is not under the same ownership when they find that the applicant has submitted an adequate Parking Management Plan (including supportive documentation) showing that:

- a. for uses in a Commercial, Business and Industrial District that the parking spaces are also located in a Commercial, Business and Industrial District, and for uses in a Residential District that the parking spaces are also located in a Residential District, unless the parking involves a municipal facility or property.
- b. the parking is suitably located in the neighborhood in which it is proposed
- c. the parking has adequate paving, landscaping, screening, lighting, curbing or wheel stops, and provides for safe vehicular and pedestrian circulation on the site and at all curb-cuts with abutting streets

- d. the applicant has submitted sufficient legal documentation ensuring the provision of the parking on the parcel.

It should be noted that said Special Permit is contingent upon the continued ability to legally use the off-site facility and that said Special Permit, and any uses dependent on it, shall terminate upon the termination of any legal agreements permitting the use of said off-site parking. The use for which the parking was being provided at the off-site facility shall cease upon the termination of said Special permit until such time as adequate parking is provided in accordance with the requirements of the Zoning Ordinance.

Section ____: Downtown Parking Fund

The Planning Board may issue a Special Permit requiring a payment of \$_____ per required parking space into a municipal fund dedicated to addressing the parking demand in the _____ District where they find that:

1. the parking required cannot be physically provided to serve the use, and;
2. the payment into the fund would ultimately lead towards addressing the parking demand generated by the use.

These funds are to be used solely for expenses (land acquisition, design engineering services and construction costs, but not maintenance costs) related to adding parking spaces, improving the utilization of existing parking spaces, or reducing the need for new parking to serve the _____ District.

In an effort to encourage the restoration of building heights in the downtown district which are more uniform and consistent with the scale of development which has historically existed, the addition of a second story to a single story building existing on the date of adoption of this bylaw shall not require the provision of additional parking or a payment into the dedicated municipal parking fund as required by this section.

Model Planned BUSINESS AND INDUSTRIAL DEVELOPMENT Bylaw

Prepared by the Pioneer Valley Planning Commission

1.0 Purposes

1.1 The purposes of the Planned Industrial Development regulations in this Section shall include the following:

- a. To attract environmentally acceptable light industries;
- b. To encourage diversity in the community tax base through appropriate industrial development;
- c. To minimize potential adverse environmental conditions, such as pollution and noise, associated with industrial development.

1.2 The purposes of the Planned Business Development regulations in this Section shall include the following:

- a. To encourage business development which is clustered to reduce adverse traffic, aesthetic, and environmental impacts on the community;
- b. to encourage diversity in the community tax base and clustered commercial development which is consistent with (town's/city's) character.

2.0 Applicability

2.1 Planned Industrial Developments shall be permitted in the Industrial District only upon issuance of a Special Permit with Site Plan Approval from the Planning Board.

2.2 Planned Business Development shall be permitted in the Commercial or Industrial Districts only upon issuance of a Special Permit with Site Plan Approval from the Planning Board.

3.0 Definitions

Planned Industrial Development shall mean a development constructed on a lot or lots under single ownership at the time of application, planned and developed as an integral unit, and consisting primarily of light industrial uses.

Planned Business Development shall mean a development constructed on a lot or lots under single ownership at the time of application, planned and developed as an integral unit, consisting primarily of retail or service uses.

4.0 Uses Permitted by Special Permit With Site Plan Approval

4.1 A Planned Industrial Development shall encourage a wide range of manufacturing, research and other uses which can be built and operated with a minimum of noise, smoke, odor and other nuisances and which do not create adverse impacts upon adjacent uses.

4.2 Uses permitted by Special Permit with Site Plan Approval in a Planned Industrial Development shall be limited only to the following:

a. Industry, Utility, and Communication:

- i. Telegraph, telephone, and express offices, radio, television, and film broadcasting firms.
- ii. Warehouse for storage, production, assembly and marketing of wholesale goods.
- iii. Wholesale trade and distribution.
- iv. Open storage of raw materials, finished goods or construction equipment and structures for storing such equipment, provided outside storage areas shall be screened from outside view. Not to include junkyards or open storage of abandoned automobiles or other vehicles.
- v. Enclosed manufacturing, processing, fabrication, packaging, assembly storage.
- vi. Construction industry and suppliers.
- vii. Research offices or establishments for research and development activities.
- viii. Distributorships dealing with commercial and industrial supplies.
- ix. The processing of grain, vegetables, or dairy products for human consumption.
- x. Repair service establishments.
- xi. Accessory structures and uses customarily incidental to the above permitted uses.

b. Offices and Services to Serve the Convenience Needs of Persons Working in the District:

- i. Miscellaneous professional and business offices and services including medical, legal, finance, and other professional services.
- ii. Restaurants or other places servicing food or beverages, except those having the character of a drive-in eating establishment. A drive-in eating establishment is a

business establishment where food is usually served to or consumed by patrons while they are seated in parked cars.

iii. Automobile service stations.

c. Other Permitted Uses:

i. Agricultural uses including but not limited to nurseries, greenhouses, woodlots, truck gardens and similar uses.

ii. Recreational uses, parks, marinas, picnic areas, and similar uses.

iii. Emergency services, including but not limited to, police stations, fire stations, rescue squad, and ambulance service.

iv. Public and private non-profit educational institutions.

v. Structures used for religious purposes.

vi. Town equipment garage.

vii. Medical center including accessory medical research and associated facilities.

viii. Trade or industrial schools.

4.3 Permitted uses within a Planned Business Development may include any retail or service uses which are allowed by Special Permit with Site Plan Approval as noted in Table of Use Regulations.

5.0 Dimensional Regulations

5.1 All uses shall be in conformity with the dimensional and density regulations set forth in Table of Area Regulations.

5.2 Additional Planned Industrial Development Dimensional Regulations: 75-foot buffer is required along side and rear lots abutting any residential or commercial property.

6.0 General Regulations

6.1 The tract shall be in single or consolidated ownership at the time of application.

6.2 A site plan shall be presented for the entire tract, consistent with the requirements in this section, and Section _____ Special Permits. In addition, subdivision approval by the Planning Board shall be required where a development constitutes a subdivision as per the Subdivision Control Law.

6.3 Uses shall be contained in one continuous building except that groupings of buildings may be allowed by the Board where such groupings are consistent with the safety of the users of the development and are further consistent with the overall intent of this section.

6.4 The development shall be adequately served by a water system adequate in terms of fire protection and domestic use and the designated leaching area for on-lot septic systems meets with the minimum requirements of the State Sanitary Code Article XI and an additional area can be served for expansion which can also meet the same requirements.

6.5 All industrial uses must be completely contained within buildings.

7.0 Incentives for Planned Business or Industrial Development

7.1 Business uses may be clustered or grouped together. If this option is selected the following standards are required:

- a. Individual lot sizes shall not be reduced more than ten (10) percent below lot sizes normally required in Table 2, Area Regulations in the Industrial District.
- b. The total number of establishments in the development shall not exceed the number of establishments which could be developed under normal application requirements of the Planned Industrial District.

7.2 The maximum building coverage may be increased above the maximum permitted in the Table of Height and Bulk Regulations, but shall not exceed 40%.

7.3 Parking requirements may be reduced below the requirements contained in the Table of Off-Street Parking Standards, however, any reduction in parking space requirements shall not exceed more than 10% of those required under normal application of requirements for the particular uses proposed. The development shall be served by one common parking area and by common exit and entrance areas.

8.0 Performance Standards

8.1 All planned industrial or business developments must demonstrate compliance with the following performance standards:

All uses must comply with the Commercial Development Performance Standards in Section 9.0.

8.2 In addition, all planned industrial developments must demonstrate compliance with the following additional performance standards:

a. Noise

- i. Excessive noise at unreasonable hours shall be muffled so as not to be objectionable due to volume, frequency, shrillness, or intermittence.
- ii. The maximum permissible sound pressure level of any continuous, regular, or frequent source of sound produced by any use or activity shall not exceed the following limits at the property line of the sound source:

Table 3 - Sound Pressure Level Limits Measured in dB (A's)

<i>District</i>	<i>7 A.M. - 10 P.M.</i>	<i>10 P.M. - 7 A.M.</i>
General Business	65	60
Industrial	70	65
Residential	55	45

Sound pressure level shall be measured at all major lot lines, at a height of at least four (4) feet above the ground surface. Noise shall be measured with a sound level meter meeting the standards of the American Standards Institute, ANSI S1.4-1961 "American Standard Meter for the Physical Measurements of Sound."

- iii. Sound levels specified shall not exceed for more than 15 minutes in any one day, except for temporary construction or maintenance work, agricultural activity, timber harvesting, traffic, church bells, emergency warning devices, parades, or other similar special circumstances.
- iv. No person shall engage in or cause very loud construction activities on a site abutting residential use between the hours of 9 P.M. of one day and 7 A.M. of the following day.

b. Vibration

- i. No vibration shall be produced which is transmitted through the ground and is discernible without the aid of instruments at or at any point beyond the lot line.

c. Air pollution

- i. Atmospheric emissions of gaseous or particulate matter generated by land use shall conform to the then current regulations of the Massachusetts Division of Environmental Protection DEP. If the proposed land use shall be of a nature to arouse the concern of the Building Inspector and/or Special Permit Granting Authority, the applicant may be required to produce plans and specifications of detail sufficient for

review by DEP. Determination by DEP that potential exists for emissions in excess of allowable limits shall be grounds for permit refusal.

d. Nuisance Odors

i. There shall be no emissions of toxic or noxious matter or objectionable odors of any kind in such quantity as to be readily detectable at the property line of the lot on which the use emitting the toxic or noxious material or odor is located. For the purposes of this Section, toxic or noxious matter is any solid, liquid, or gaseous matter including, but not limited to, gases, vapors, dusts, fumes, and mists, containing properties which by chemical or other means are inherently harmful to destroy life or impair health, or capable of causing injury to the well being of persons or damage to property.

e. Explosive Materials

i. All activities and storage of flammable and explosive materials shall be provided with adequate fire-fighting and fire-suppression devices and equipment.

f. Radioactivity

i. There shall be no activities that emit dangerous levels of radioactivity.

g. Water Pollution

i. No discharge, at any point, into a private sewer system, stream, or the ground of any material in such a way, or of nature or temperature as can contaminate any running stream, water supply or otherwise cause the emission of dangerous or objectionable elements and accumulation of wastes conducive to the breeding of rodents or insects shall be permitted.

ii. The use and discharge of substances into lakes, streams, or similar waterbodies shall not violate the rules and regulations of the (Town) Conservation Commission or the standards of the Massachusetts Division of Quality Engineering.

h. Wastes and Refuse

i. No waste material or refuse shall be dumped upon, or permitted to remain upon, any part of the lot or tract outside of buildings constructed thereon. Waste material or refuse stored outside buildings shall be placed in completely enclosed containers.

9.0 Application for Planned Industrial Development

In addition to the requirements of M.G.L. Chapter 40A, Section 9 and the requirements, contained in (the Special Permit and Site Plan Approval sections) of this bylaw/ordinance, applicants for planned industrial development shall comply with the following:

9.1 Applicants for planned industrial development shall submit a development plan on standard twenty-four (24) inch by thirty-six (36) inch sheets, for the entire tract at a scale of one inch equals one hundred (100) feet. The plan shall be submitted to the Planning Board and shall show at least the following:

- a. Two (2) foot finished contours on the tract.
- b. The location and acreage of areas to be devoted to specific uses.
- c. Existing and proposed streets, parking areas, drainage and utility systems, including water and sewer, street lighting, landscaping, easements, and natural features.
- d. The proposed location of parks, open spaces and other recreational uses.
- e. Such other information as may be required by the Planning Board.

9.2 The Planning Board shall obtain with each submission, a deposit sufficient to cover any expenses connected with a public hearing and review of plans.

MODEL PLANNED UNIT RESIDENTIAL DEVELOPMENT (PURD)

Developed by the Pioneer Valley Planning Commission

Section 1.0: Planned Unit Residential Development

1.1 General Description

A “Planned Unit Residential Development” shall mean a development on a plot of land, containing a mixture of uses and building types, including single family and multi-family dwellings, business uses and open space. A Planned Unit Residential Development (PURD) may be permitted by Special Permit to exceed the normal density requirements for the district, to the extent authorized by this bylaw, provided that the standards specified herein are met.

1.2 Purpose

The purpose of this Planned Unit Residential Development are to:

1. Allow for greater variety and flexibility in development forms;
2. Encourage more compact and efficient developments;
3. Facilitate the construction and maintenance of streets, utilities, and public services in a more economical and efficient manner;
4. Promote the permanent protection of open space
5. Maintain and replicate the traditional New England rural character and land use pattern in which small villages are adjacent to common open space.

1.3 Applicability

Planned Unit Residential Developments shall be permitted in the _____ Districts only by issuance of a Special Permit, as specified by Section ___ of the {TOWN} Zoning Bylaw.

1.4 Uses allowed

In a PURD, the following uses shall be permitted:

1. Single family dwellings
2. Two-family or semi-detached dwellings

3. Town houses
4. Multi-family units
5. Recreational uses and open space, including a Community Building
6. Business uses that are allowed in the underlying district

1.5 Density and Dimensional Requirements

In a PURD, the following requirements relating to density and intensity of land shall be met:

1.5.1 The minimum lot size for all dwelling units may be reduced by no less than 20% below the lot size required for the applicable zoning district.

1.5.2 There shall be no frontage requirements within the PURD

1.5.3 Minimum setback, rear, and side yard requirements specified in the Table of Dimensional Requirements in the {Town Name} Zoning Bylaw shall pertain only to the periphery of the PURD.

1.5.4 The maximum height of structures shall be the same as the standards for the applicable zoning district.

1.5.5 The maximum number of dwelling units per structure shall be six (6) units.

1.6 Additional Requirements

1.6.1 Parking and Circulation

1.6.1.1 There shall be an adequate, safe, and convenient arrangement of pedestrian circulation, facilities, roadways, driveways, and parking.

1.6.1.2 Vehicular access to the PURD shall be provided from an existing public way, which in the opinion of the Special Permit Granting Authority, is adequate to service the proposed development.

1.6.1.3 Roads within the PURD shall be privately owned and maintained and shall be designed with sufficient width, suitable grade, and adequate construction to safely provide for the needs of

pedestrian and vehicular traffic generated by the development. Access roads shall be designed and constructed according to the requirements of the {TOWN NAME} Subdivision Regulations.

1.6.1.4 Garages or off street parking spaces, or a combination thereof, shall be provided for all occupants, employees, and visitors, and shall follow the parking standards set forth in Section ____ of this Bylaw.

1.6.2 Landscape and Vegetative Buffers

1.6.2.1 A coordinated landscape design for the entire project area, including landscaping of structures, parking areas, driveways, and walkways, shall be submitted for approval by the Special Permit Granting Authority.

1.6.2.2 Whenever possible, existing trees and vegetative cover shall be conserved and integrated into the landscape design.

1.6.2.3 All residential structures and accessory uses within the PURD shall be set back from the boundaries of adjacent lots by a buffer strip of at least fifty (50') feet in width, which shall include trees and shrubbery.

1.6.2.4 Proper maintenance of the landscaping, including the buffer strip, shall be the responsibility of the owner.

1.6.3 Utility Requirements

1.6.3.1 Each dwelling in a PURD shall be provided with access, drainage, and utilities that are functionally equivalent to the requirements set under the {TOWN NAME} Subdivision Regulations.

1.6.3.2 All structures which require plumbing shall be connected to a private well or public water supply, if available, and where units are to be served with an on site sewerage disposal facility, shall meet the requirements of Title V and the Subdivision Regulations, and have Board of Health approval.

1.6.4 Common Open Space

1.6.4.1 All land not devoted dwellings, accessory uses, roads, or other development shall be set aside as common land for recreation, conservation, or agricultural uses

1.6.4.2 Within the open space area provided in the PURD, at least 2,000 square feet per dwelling unit must be usable open space for active a passive recreation. Such space shall not include parking space, laundry drying area, required yards, or land within the Floodplain District or Wetlands, as determined by the Conservation Commission. Usable open space shall be defined to include such facilities as contiguous open space available for play, tot lots, gardens, hiking/jogging trails, tennis courts, or similar facilities.

1.6.4.3 Further subdivision of common open land or its use for other than recreation, conservation, or agricultural, except for easements for underground utilities, shall be prohibited.

1.6.4.4 Structures or buildings accessory to recreation, conservation, or agricultural use may be erected but shall not exceed 10% coverage of such common land.

1.6.5 Community Association

1.6.5.1 An owners association shall be established, requiring membership of each lot or unit owner in the planned unit development. The association shall be responsible for the permanent maintenance of all communal water and sewerage systems, common open space, recreational, and thoroughfare facilities.

1.6.5.2 An association agreement or covenant shall be submitted with the Special Permit application guaranteeing continued maintenance of such common utilities, land, and facilities and assessing each unit a share of maintenance expenses. Such agreement shall be subject to the review and approval of Town Counsel and the Permit Granting Authority.

1.6.5.3 Such agreements or covenants shall provide that in the event that the association fails to maintain the common facilities in a reasonable order

1.7 Procedures and Application Review

In addition to the requirements specified in Section _____, Special Permit, of this Bylaw and MGL Chapter 40A Section 9, the following procedures shall be required for the presentation of a PURD

1.7.1 The proposed development shall be in harmony with the Master Plan, if any, as prepared and amended by the Town.

1.7.2 The development plans shall specify reasonable periods within which development of each section of the PURD may be started. Deviation from the required amount of usable open space per housing unit may be allowed, provided such deviation shall be adjusted for in other sections of the PURD.

1.7.3 Subsequent approval by the Special Permit Granting Authority of such portions of the development as constitute a subdivision will be required as set forth in the Subdivision Control Law, including approval of the street and utility systems. A favorable recommendation by the Special Permit Granting Authority that the Special Permit be issued shall not, therefore, be deemed to either constitute subdivision approval under the Subdivision Control Law or the Subdivision rules and Regulations of the Planning Board, nor imply that such approval will be given.

1.7 Conflict with Other Laws

The provisions of this bylaw shall be considered supplemental of existing zoning bylaws. To the extent that a conflict exists between this bylaw and others, the more restrictive bylaw, or provisions therein, shall apply.

1.8 Severability

If any provision of this bylaw is held invalid by a court of competent jurisdiction, the remainder of the bylaw shall not be affected thereby. The invalidity of any section or parts of any section or sections of this bylaw shall not affect the validity of the remainder of the town's zoning bylaw.

MODEL RIDGELINE AND HILLSIDE PROTECTION DISTRICT BYLAW

Prepared by the Pioneer Valley Planning Commission

1.0 RIDGELINE AND HILLSIDE PROTECTION OVERLAY DISTRICT

1.1 Purpose

The purpose of this bylaw is to promote the health, safety and general welfare of the Town of _____ by:

1. Insuring that any development that takes place within the Ridgeline and Hillside Protection Overlay District preserves and protects critical natural resource areas, minimizes visual impact of man-made features and enhances the economic values of the properties located therein;
2. Minimizing the removal of native vegetation, especially large timber, and regulating the excavation and alteration of land in order to minimize any danger of erosion, flooding or pollution of the ground or surface water supply (public or private) within the district or any adjacent low lying areas;
3. Insuring that all proposed development activities do not reduce property values within the district or adjacent to by unnecessarily detracting from the visual setting or obstructing significant views; and
4. Protecting existing historical physical features and the preservation and development of linkages from one open space area to another.

1.2 Scope of Authority

The Ridgeline and Hillside Protection District is an overlay district and shall be superimposed on the other districts established by this Bylaw. All regulations of the (Town) Zoning Bylaw applicable to such underlying districts shall remain in effect, except that where the Scenic District imposes additional regulations, such regulations shall prevail.

1. Designated Area: The Scenic Upland District Bylaw shall include all areas designated on the overlay map entitled Ridgeline and Hillside Protection District District, Town/City of _____, on file with the Town Clerk.
2. The Ridgeline and Hillside Protection District is intended to include those mountain or upland areas which have one or more of the following characteristics:
 - a. Steep slopes averaging 15% or greater for 200 feet.

- b. Unique landforms, including bedrock outcrops, till-covered hills, geological rarities, cliffs, or other unusual topographic features.
- c. Any land at an elevation of 600 or more feet above sea level.

1.3 Definitions

Clear Cutting: The cutting of all trees on a site.

Hillside: Land having an average grade of 15% or greater for 200 feet.

Ridgeline: The long, narrow crest or horizontal line of hills or mountains, usually at the highest elevation.

Selective Cutting: No more than 50% of the mature trees on a site cut under a selective cutting plan.

Significant Alteration: Any alteration which increases the assessed value by 15%, or which adds to the height of a structure, or which substantially alters the visual profile of the property or structures thereon

1.4 Uses

1. Permitted Uses

- a. Agricultural production, including but not limited to the raising of crops, livestock, poultry, nurseries, orchards, and hay;
- b. Recreational uses, provided there is minimal disruption of wildlife habitat;
- c. Maintenance and repair usual and necessary for continuance of an existing use;
- d. Conservation of water, plants, and wildlife, including the raising and management of wildlife;
- e. Non-commercial cutting of trees for fuel (refer to the MA Forest Stewardship Program);
- f. Uses permitted under M.G.L. Chapter 40a, Section 3 (agricultural, religious, or educational purposes; child care facilities; etc.); and

g. Selective timber cutting shall be permitted within the area of a designated building envelope wherein principal and accessory structures have been approved. Timber cutting for the purpose of clearing land for legitimate agricultural purposes shall be permitted subject to satisfactory evidence of such intended use. Selective commercial timber cutting may be permitted, in accordance with the Massachusetts Forest Cutting Practices Act, M.G.L. Chapter 132.

2. Prohibited Uses

a. All uses not permitted in Section 1.4.1 (Permitted Uses) or Section 1.4.3 (Uses Permitted with Ridgeline and Hillside District Review) shall be deemed prohibited.

b. Clear cutting of trees and vegetation shall be prohibited.

3. Uses Permitted with Ridgeline and Hillside District Review

The following uses shall be permitted, subject to Ridgeline and Hillside Protection District Review of project site plans prior to the issuance of a building permit or Special Permit or approval of a definitive plan under the [Town] Subdivision Regulations:

a. The construction of a new dwelling or principal structure;

b. Any construction or significant alteration of any dwelling or other structure, if any such action affects the exterior appearance. A significant alteration is defined as any alteration which increases the assessed value by 15%, or which adds to the height of a structure, or which substantially alters the visual profile of the property or structures thereon;

c. Any commercial or industrial use allowed by Special Permit in the underlying district;

d. Any subdivision which requires approval under the [Town] Subdivision Regulations;

e. The Board may waive any or all requirements of the Ridgeline and Hillside Protection District Review for dwelling additions, and or accessory buildings of 400 square feet or less.

4. Exempt Uses

a. Agricultural activities;

b. Work incidental to construction on the premises under a currently valid Building Permit;

c. Selective cutting of trees or vegetation for normal maintenance purposes on less than one half acre of land, provided that no additional cutting shall be done on the parcel, or on adjoining parcels in common ownership, for a period of two years, except for selective cutting specified in a Forest Cutting Plan approved in accordance with the Mass. Forest Cutting Practices Act (M.G.L. Chapter 132, sections 40-46);

d. Any addition, enlargement, extension, restoration of single family residences or construction of accessory buildings to any single family residences which have been actually and completely constructed prior to the adoption of this By-law.

1.5 Ridgeline and Hillside Development Standards

Buildings and landscaping are to be designed and located on the site to blend with the natural terrain and vegetation, and to preserve the scenic character of the site, conforming to the following standards:

1. Building Characteristics

a. Building height shall not exceed thirty-five (35) feet.

b. Exposed foundation walls shall not exceed two (2) feet above the proposed finished grade.

c. Building, alterations, additions, or structures should be placed downgrade of the ridgeline where possible.

d. Building materials shall blend with the natural landscape.

2. Landscaping

a. Removal of native vegetation, especially large timber, shall be minimized and the replacement of vegetation and landscaping shall be generally compatible with the vegetation of the designated area.

b. Trees may only be removed for location and construction of streets, driveways or structures. Selective clearing for views is permitted where the viewshed is obstructed by dense vegetation.

c. Retaining walls, of natural materials only, may be used to create usable yard space in the side and rear yard.

d. Landscaping and plantings shall be utilized to screen major buildings in open or prominent areas from significant views, both when installed and when mature.

3. Grading

Any grading or earth moving operation is to be planned and executed in such a manner that final contours appear to be consistent with the existing terrain, both on and adjacent to the site.

4. Prevention of Water Pollution and Flooding

a. Storage and/or transmission of petroleum or other refined petroleum products is prohibited except within buildings which will be heated or in quantities of 50 gallons or less. Petroleum products stored within a building shall be placed on a diked or impermeable surface to prevent spills or leaks from reaching groundwater.

b. All run-off from impervious surfaces shall be recharged on the site by being diverted to storm water infiltration basins covered with natural vegetation. Storm water infiltration basins must be designed to handle a 25-year storm. Dry wells shall be used only where other methods are infeasible, and shall be preceded by oil, grease, and sediment traps to facilitate removal of contamination. Any and all recharge areas shall be permanently maintained in full working order by the owner.

5. Prevention of Erosion and Sedimentation

a. No area or areas totaling two (2) acres or more on any parcel or contiguous parcels in the same ownership shall have existing vegetation clear-stripped or be filled six (6) inches or more so as to destroy existing vegetation unless in conjunction with agricultural activity or unless necessarily incidental to construction on the premises under a currently valid building permit or unless within streets which are either public or designated on an approved subdivision plan or unless a special permit is approved by the Zoning Board of Appeals on the condition that run-off will be controlled, erosion avoided and either a constructed surface or cover vegetation will be provided not later than the first full spring season immediately following completion of the stripping operation. No stripped area or areas which are allowed by special permit shall remain through the winter without a temporary cover or winter rye or similar plant materials being provided for soil control, except in the case of agricultural activity where such temporary cover would be infeasible.

b. Sediment and erosion control measures shall be employed to minimize such impacts during and after construction, in accordance with guidelines established by the U.S. Natural Resources Conservation Service "Guidelines for Soil and Water Conservation in Urbanizing Areas of Massachusetts."

6. Utilities

a. Utilities shall be constructed and routed underground except in those situations where natural features prevent the underground siting or where safety considerations necessitate above ground construction and routing. The Review Board may waive this requirement.

b. Above ground utilities shall be constructed and routed to minimize detrimental effects on the visual setting.

7. Site Planning

In the building of more than one structure, variable setbacks, multiple orientations, and other site planning techniques shall be incorporated in order to avoid the appearance of a solid line of development.

8. Accessory Structures

Construction of a tower, satellite dish, windmill, any type of antenna, or other installation shall not obstruct the view of a public way, or from a public way, or from an abutter's dwelling.

1.6. Ridgeline and Hillside Protection District Review Board

The Ridgeline and Hillside Protection District Review Board shall be a sub-committee of the Planning Board, appointed by the Planning Board, and shall consist of no more than five (5) members. In the absence of such a board, the Planning Board shall administer this Bylaw.

1.7 Procedures for Review

1. Prior to undertaking any work in the Ridgeline and Hillside Protection District, including clearing and removal of vegetation, grading or construction, and prior to applying for a Building Permit, landowners must submit an application for Ridgeline and Hillside Protection Review to the Ridgeline and Hillside Protection Review Board. The Building Inspector shall not accept an application for a Building Permit without an attached Ridgeline and Hillside Protection Review application, which has been reviewed by the Ridgeline and Hillside Protection Review Board.
2. The Ridgeline and Hillside Protection District Review Board shall review the application and return its recommendations in writing to the Building Inspector within thirty-five (35) days of the receipt of the application. If the application for Ridgeline and Hillside District Protection Review is associated with an application for a variance, special permit, or subdivision review, the Ridgeline and Hillside Protection District Review Board shall immediately transmit their recommendations to the Planning Board or Zoning Board of Appeals as appropriate.
3. If the Ridgeline and Hillside Protection District Review Board does not submit its recommendations to the Building Inspector within thirty-five (35) days, such failure to act shall constitute approval of the application.
4. The Ridgeline and Hillside District Review Board's action shall be advisory to the Planning Board and shall consist of either:
 - a. A determination that the proposed project will constitute a suitable development and is in compliance with the criteria set forth in the Bylaw;
 - b. Approval subject to conditions, modifications, and restrictions as the Ridgeline and Hillside Protection District Review Board may deem necessary.
5. The Building Inspector, Planning Board, and Zoning Board of Appeals shall, in making their permit granting decision, give due consideration to the Ridgeline and Hillside Protection District Review Board's recommendations, and shall communicate all subsequent decisions to said Board.

1.8 Ridgeline and Hillside District Review Applications

To facilitate siting and design of building sensitively related to the natural setting, applications for the Ridgeline and Hillside Protection District Review of proposed development in the district must be accompanied by the following:

1. Plot Plan;
2. View Points - Photographs of the development site taken from points along the street, together with a map indicating the distance between these points and the site;
3. Placement, height and physical characteristics of all existing and proposed buildings and structures located on the development site.

1.9 Conflict with Other Laws

The provisions of this bylaw shall be considered supplemental of existing zoning bylaws. To the extent that a conflict exists between this bylaw and others, the more restrictive bylaw, or provisions therein, shall apply.

1.10 Severability

If any provision of this bylaw is held invalid by a court of competent jurisdiction, the remainder of the bylaw shall not be affected thereby. The invalidity of any section or parts of any section or sections of this bylaw shall not affect the validity of the remainder of the town's zoning bylaw.

MODEL RIGHT TO FARM BY-LAW

*Developed by the Department of Agricultural Resources,
Notes prepared by the Pioneer Valley Planning Commission*

1.0 Legislative Purpose and Intent

The purpose and intent of this By-law is to state with emphasis the Right to Farm accorded to all citizens of the Commonwealth under Article 97, of the Constitution, and all state statutes and regulations there under including but not limited to Massachusetts General Laws Chapter 40A, Section 3, Paragraph 1; Chapter 90, Section 9, Chapter III, Section 125A and Chapter 128 Section IA. We the citizens of [Farm-Town] restate and republish these rights pursuant to the Town's authority conferred by Article 89 of the Articles of Amendment of the Massachusetts Constitution, ("Home Rule Amendment").

This General By-law encourages the pursuit of agriculture, promotes agriculture- based economic opportunities, and protects farmlands within the Town of [Farm- Town] by allowing agricultural uses and related activities to function with minimal conflict with abutters and Town agencies. This By-law shall apply to all jurisdictional areas within the Town.

2.0 Definitions

The word "farm" shall include any parcel or contiguous parcels of land, or water bodies used for the primary purpose of commercial agriculture, or accessory thereto.

The words "farming" or "agriculture" or their derivatives shall include, but not be limited to the following:

- farming in all its branches and the cultivation and tillage of the soil;
- dairying;
- production, cultivation, growing, and harvesting of any agricultural, aquacultural, floricultural, viticultural, or horticultural commodities;
- growing and harvesting of forest products upon forest land, and any other forestry or lumbering operations;
- raising of livestock including horses;
- keeping of horses as a commercial enterprise; and
- keeping and raising of poultry, swine, cattle, ratites (such as emus, ostriches and rheas) and camelids (such as llamas and camels), and other domesticated animals for food and other agricultural purposes, including bees and fur-bearing animals.

"Farming" shall encompass activities including, but not limited to, the following:

- operation and transportation of slow-moving farm equipment over roads within the Town;

control of pests, including, but not limited to, insects, weeds, predators and disease organism of plants and animals;

application of manure, fertilizers and pesticides;

conducting agriculture-related educational and farm-based recreational activities, including agri-tourism, provided that the activities are related to marketing the agricultural output or services of the farm;

processing and packaging of the agricultural output of the farm and the operation of a farmer's market or farm stand including signage thereto;

maintenance, repair, or storage of seasonal equipment, or apparatus owned or leased by the farm owner or manager used expressly for the purpose of propagation, processing, management, or sale of the agricultural products; and

on-farm relocation of earth and the clearing of ground for farming operations.

3.0 Right To Farm Declaration

The Right to Farm is hereby recognized to exist within the Town of [Farm-Town]. The above-described agricultural activities may occur on holidays, weekdays, and weekends by night or day and shall include the attendant incidental noise, odors, dust, and fumes associated with normally accepted agricultural practices. It is hereby determined that whatever impact may be caused to others through the normal practice of agriculture is more than offset by the benefits of farming to the neighborhood, community, and society in general. The benefits and protections of this By-law are intended to apply exclusively to those commercial agricultural and farming operations and activities conducted in accordance with generally accepted agricultural practices. Moreover, nothing in this Right To Farm By-law shall be deemed as acquiring any interest in land, or as imposing any land use regulation, which is properly the subject of state statute, regulation, or local zoning law.

4.0 Disclosure Notification

Not later than 21 days after the purchase and sale contract is entered into, or prior to the sale or exchange of real property if no purchase and sale agreement exists, for the purchase or exchange of real property, or prior to the acquisition of a leasehold interest or other possessory interest in real property, located in the Town of [Farm-Town], the landowner shall present the buyer or occupant with a disclosure notification which states the following:

"It is the policy of this community to conserve, protect and encourage the maintenance and improvement of agricultural land for the production of food, and other agricultural products, and also for its natural and ecological value. This disclosure notification is to inform buyers or occupants that the property they are about to acquire or occupy lies within a town where farming activities occur. Such farming activities may

include, but are not limited to, activities that cause noise, dust and odors. Buyers or occupants are also informed that the location of property within the Town may be impacted by commercial agricultural operations including the ability to access water services for such property under certain circumstances.”

A copy of the disclosure notification shall be given on a form prepared by the Town and shall be signed by the landowner prior to the sale, purchase, exchange or occupancy of such real property. A copy of the disclosure notification must be filed with the Board of Selectmen or its designee prior to the sale, purchase, exchange or occupancy of such real property. In addition to the above, a copy of this disclosure notification shall be provided by the Town to landowners each fiscal year by mail.

A violation of Section 4 shall be subject to a fine of \$300 and shall be enforced by the Board of Selectmen or its designee. The Town is authorized to enforce Section 4 under the non-criminal disposition provision of G.L. c. 40, § 21D.

5.0 Resolution of Disputes

[Applicable only in communities that have Agricultural Commissions]

Any person who seeks to complain about the operation of a farm may, notwithstanding pursuing any other available remedy, file a grievance with the Select Board, the Zoning Enforcement Officer, or the Board of Health, depending upon the nature of the grievance. The filing of the grievance does not suspend the time within which to pursue any other available remedies that the aggrieved may have. The Zoning Enforcement Officer or Select Board may forward a copy of the grievance to the Agricultural Commission or its agent, which shall review and facilitate the resolution of the grievance, and report its recommendations to the referring Town authority within an agreed upon time frame.

The Board of Health, except in cases of imminent danger or public health risk, may forward a copy of the grievance to the Agricultural Commission or its agent, which shall review and facilitate the resolution of the grievance, and report its recommendations to the Board of Health within an agreed upon time frame.

6.0 Severability Clause

If any part of this By-law is for any reason held to be unconstitutional or invalid, such decision shall not affect the remainder of this By-law. The Town of [Farm- Town] hereby declares the provisions of this By-law to be severable.

Model Bylaw/Ordinance For RIVER PROTECTION AND FLOODPLAIN ZONING

Prepared by Pioneer Valley Planning Commission, Revised 10-9-07

1. River Protection and Floodplain District

A. Purposes.

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

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

B. District Delineation

1. The River Protection and Floodplain 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 _____ Flood Insurance Rate Maps (FIRM) for the _____ River, dated _____, on file with the Town/City 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/ordinance, 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 _____ River within the Town/City of _____, and along the entire length of the following _____ River tributaries, _____.

2. The boundaries of the 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. Use Regulations

All development within the 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).

1. Permitted Uses

The following uses in the 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:

- 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.
- ##### **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.
 - d. Parking or storage of vehicles 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. 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 shall require the filing of a Forest Cutting Plan in accordance with the Massachusetts Forest Cutting Practices Act (MGL Ch 132s 40-46).
 - 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; removal of woody or flood debris; or riverbank restoration activities permitted by the Conservation Commission.
 - 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. No structure or building in the 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 bylaw/ordinance, 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. Animal feedlots, in conformance with Best Management Practices established by the Natural Resource Conservation Service (NRCS).
5. Special Permit Procedures
- a. The following Special Permit requirements apply in the River Protection and Floodplain District:
 - i. With 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.
- b. The following Special Permit requirements apply in the River Protection and Floodplain District, in addition to those requirements specified in Sections 3d.:
- i. A buffer strip extending at least two hundred (200) feet in depth, to be measured landward from each bank of the _____ River shall be required for all lots within the River Protection and Floodplain District. 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 or scenic condition.
 - ii. No buildings or structures shall be erected, enlarged, or altered or moved within the buffer strip.
 - iii. On-site wastewater disposal systems shall be located as far from the _____ River as is feasible.
- c. In addition to the provisions of Section 3c, in order to issue a Special Permit, the Planning Board must find that the proposed use is compliant with the following provisions:
- i. In the River Protection and Floodplain District, proposed uses must:

- 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 most likely conserve shoreland vegetation and the integrity of the buffer strip.
- e) Be integrated into the existing landscape through features such as vegetative buffers and through retention of the natural shorelines.
- f) Not result in erosion or sedimentation.
- g) Not result in water pollution.

6. Nonconforming Uses

- a. Any lawful use, building, structures, premises, land or parts thereof existing at the effective date of this Bylaw/Ordinance or amendments thereof and not in conformance with the provisions of this bylaw/ordinance 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.

7. Enforcement and Penalties

a. Violations

Any development activity that has commenced or is conducted contrary to this bylaw/ordinance 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/ordinance, 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/ordinance 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 bylaw/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 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/City in any court of competent jurisdiction.

e. Non-Criminal Disposition

As an alternative to criminal prosecution or civil action, the Town/City of _____ may elect to utilize the non-criminal disposition procedure set forth in the town/city bylaw/ordinances. 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/ordinance shall not invalidate any other section or provision thereof.

ORDINANCE NO. _____

CITY OF WESTFIELD

IN CITY COUNCIL

AN ORDINANCE AMENDING THE CODE OF ORDINANCES, CITY OF WESTFIELD, MASSACHUSETTS, ADOPTED JUNE 17, 1993.

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF WESTFIELD, AS FOLLOWS:

That Chapter 18 of the Code of Ordinances be and is hereby amended by adding Division 3, Sewer Expansion, Sections 18-225 through 18-229 as follows:

Division 3. SEWER EXTENSION PLAN

Sec. 18-225 Permitted Extension Areas

The Plan entitled Sewer Extension Plan, City of Westfield, dated February 3, 2005 is hereby adopted by the City and incorporated by reference in this ordinance. Sanitary sewer system extensions shall only be permitted within the areas so designated on this plan. All uses and properties located within the area so designated for extension on the above referenced plan are eligible to connect into the city's sanitary sewer system without an Infiltration & Inflow Waiver (as stated below) provided:

- a) for multi-family and commercial/industrial uses, that the cumulative total (beginning on the date of adoption of this Ordinance) of waste flows generated from such uses does not exceed .23 mgd, (as determined by the state Department of Environmental Protection, or such entity as shall succeed, replace or supercede the state Department of Environmental Protection).
- b) for residential uses, that:
 1. the street that they are fronting on was constructed and in existence prior to the adoption date of this ordinance, and
 2. the cumulative total (beginning on the date of adoption of this Ordinance) of waste flows generated from such uses does not exceed .53 mgd (as determined by the state Department of Environmental Protection, or such entity as shall succeed, replace or supercede the state Department of Environmental Protection)

c) all extensions must be approved by a 2/3 majority vote of the entire membership the City Council at a Public Meeting (no Public Hearing is required) when, in their opinion, they find all of the following:

1) for residential extensions:

- i. that such extension will not promote additional development in the area of a nature or at a density which the City Council feels is unsuitable or undesirable, and;
- ii. that once the extension is completed, there will be available capacity at the Water Pollution Control Plant to accommodate the sewerage generated by the anticipated uses serviced by said extension, and;
- iii. that the granting of such extension is in the best interests of the health safety and welfare of the city and its residents in that the resulting loss of treatment capacity at the wastewater treatment plant (due to the amount of wastewater being generated by the anticipated uses to be serviced by said extension) will be compensated by providing needed services to an area deemed by the City Council as a high priority.

2) for multi-family and non-residential extensions:

- i. that such extension will not promote additional development in the area of a nature or at a density which the City Council feels is unsuitable or undesirable, and;
- ii. that once the extension is completed, there will be available capacity at the Water Pollution Control Plant to accommodate the sewerage generated by the anticipated uses serviced by said extension, and;
- iii. that the granting of such extension is in the best interests of the health safety and welfare of the city and its residents in that the resulting loss of treatment capacity at the wastewater treatment plant (due to the amount of wastewater being generated by the anticipated uses to be serviced by said extension) will be compensated by a suitably sufficient increase in the job and tax base of the community generated by those same anticipated uses.

Once the city's wastewater treatment facility's design flow capacity has been reached (as determined by the state Department of Environmental Protection, or such entity as shall succeed, replace or supercede the state Department of Environmental Protection) for these uses, additional projects of such uses within the extension area must apply for and receive an Infiltration & Inflow Waiver.

Sec. 18-226 INFILTRATION & INFLOW WAIVER OPTION

a) **PURPOSE** - In adopting the Westfield Sewer System Expansion Plan, the city recognizes that some projects which benefit the over-riding public interest may warrant a waiver from strict compliance with the requirements set forth in Section 18-225. The Infiltration & Inflow (I&I) Waiver Option has been adopted to guide and direct the City Council, on a case

by case basis, in the process and criteria for evaluating and rendering a decision on any applications for a waiver.

- b) CRITERIA -An I&I Waiver may be granted to eligible projects as are set forth in Section 18-227 when treatment capacity at the Water Pollution Control Plant is capable of being created through the elimination of points of infiltration and inflows of groundwater and stormwater in the city's sanitary sewer system.
- c) FEE- In the event of the approval of a waiver request, the applicant shall be required to pay a fee, to be determined by the City Engineer, equal to the city's expense to eliminate 5 gallons of groundwater/stormwater infiltration/inflows for every 1 gallon of sewerage projected to be generated (based on average flows) by the project. Said fee shall be paid to the city prior to the beginning of construction for work authorized in approving the application. All such fees shall be kept in a separate dedicated account to be used specifically for the purpose of eliminating infiltration and inflows of groundwater and stormwater in the city's sanitary sewer system.

All I&I Option applications and approvals are reviewed independently and shall not set a precedent for future applications and approvals, with each petition is evaluated on its own merits.

Sec. 18-227 ELIGIBLE PROJECTS – Only the following are eligible to apply for an Infiltration & Inflow Waiver:

- a) all properties shown on the above referenced Sewer Extension Plan as being within the extension area (at such time as the city's wastewater treatment facility's design flow capacity has been reached)
- b) all properties not shown on the above referenced Sewer Extension Plan as being within the extension area, for the following specific uses:
 - i. for Residential uses which cannot be serviced by an on-site sanitary sewage system and which comply with at least one of the following criteria:
 - such use provides affordable housing (must be Chapter 40B qualified/eligible)
 - such use is located on the Water Resource Protection Area as identified in the Westfield Zoning Ordinance and Zoning Map (such use must still have the required 2 acre minimum lot sizes),
 - such use is to serve an area of multiple septic systems failures and certified by the Board of Health as requiring public sanitary sewerage as the only viable alternative.
 - ii. for Industrial/Commercial uses which comply with both of the following:
 - such uses increases the job and tax base of the community, and
 - such extension does not create residential access

Sec. 18-228 APPLICATION PROCEDURE - Applications for the Infiltration & Inflow Waiver shall:

- a) be made in writing to the City Council and filed with the City Clerk
- b) include:
 - i. detailed engineering plans and cost estimates of all required improvements, prepared and stamped by an insured professional engineer licensed by the state of Massachusetts,
 - ii. detailed calculations determining the amount of sewerage anticipated to be generated by the proposed use prepared and stamped by an insured professional engineer licensed by the state of Massachusetts,
 - iii. a study, prepared by a qualified professional, of the anticipated impacts of such extension on the future growth and development patterns of land in the area,
- c) be referred by the City Council to the City Engineer, Board of Public Works, Board of Health, Waste Water Treatment Plant and Planning Board for their review, comment and recommendation.

SEC. 18-229 APPROVAL - The City Council, by a 2/3 majority vote of its entire membership, may, at a Public Meeting (no Public Hearing is required), approve a petition for an extension, not in accordance and/or compliance with the approved Extension Plan when, in their opinion, they find all of the following:

- a) that such petition complies with the requirements of Section 18-227 and 18-228, and;
- b) that such petition will not promote additional development in the area of a nature or at a density which the City Council feels is unsuitable or undesirable, and;
- c) that, once the I&I improvements are completed, there will be available capacity at the Water Pollution Control Plant to accommodate the sewerage generated by the proposed use (the commencement of the proposed use may begin prior to the actual I&I improvements being made), and;
- d) that the cumulative total of all I&I options approved does not exceed the total treatment capacity (i.e. that capacity associated with I&I in excess of that required to be removed under the permit) of the Water Pollution Control Plant, and;
- e) that the granting of such petition is in the best interests of the health safety and welfare of the city and its residents.

Presented to the Mayor

For approval _____, 2006

Karen M. Fanion, City Clerk
Mayor

Approved by the Mayor

_____, 2006

Richard K. Sullivan, Jr.,

MODEL SIDEWALK REGULATIONS – ZONING & SUBDIVISION

Prepared by the Pioneer Valley Planning Commission

ZONING BYLAWS

1.0 – SIDEWALK REGULATIONS

1.1 – PURPOSE

The purpose of this bylaw is to promote the health, safety and general welfare of the Town, and to ensure compliance with the following goals:

1. Promoting the safety of pedestrian access, movement, and protection for the physically able, physically challenged, children or seniors (or variously-abled) within the community;
2. Insuring that the ADA guidelines are met for all sidewalk or pathway installations, existing and proposed;
3. Promoting attractive and well-constructed sidewalks or pathways that correspond to the character, aesthetic qualities, natural, environmental, and historical features of developing or existing neighborhoods;
4. Connecting to existing and projected sidewalks or pathways whenever the opportunity arises to ensure an interconnected pedestrian system;
5. Ensuring that all development—including new construction, reconstruction or rehabilitation—provides adequate sidewalks.

1.2 – DEFINITIONS

Bi-walk: A sidewalk or pathway designated shared use for bicycles, other non-motorized transportation, and pedestrians.

Crosswalk: Any portion of a roadway at an intersection or elsewhere that is distinctly indicated for pedestrian crossing. If there is no marking, a sidewalk crossing is implied at each leg of every intersection by the extension of the lateral lines of the sidewalk on each side, or where the sidewalk would be if there is none.

Driveway: A private roadway providing access for vehicles to a parking space, garage, dwelling, or other structure.

Infrastructure: Any public facility, system, or improvement including, without limitation, water and sewer mains and appurtenances, storm drains and structures, streets and sidewalks, trees and landscaping in public right-of-way, City/Town-owned and non-City/Town-owned utilities, and public safety equipment.

Pedestrian Friendly: The presence of facilities and design features that make an environment safe and attractive to pedestrians. These include: walkable distances between uses, (i.e. under ¼ mile); sidewalks, paths and walkways; continuous visual interest (i.e. uninterrupted line of buildings, attractive barrier in front of parking lots, murals on blank walls, infill development, pocket parks, etc.); consumer uses (i.e. restaurants, shops, cinemas, housing); trees for shade; awnings for shelter; buildings and landscaping elements sited to avoid wind tunnel effect, and to provide sheltered areas; visual texture in the streetscape (i.e. interesting storefronts, public art, plantings, pavement patterns, etc.); people presence (i.e. sidewalk cafes, street vendors, late business hours, residents using front porches and yards); good maintenance and inclusion of site amenities; buffers between cars and pedestrians (i.e. planted medians, on-street parking, grade separation); paths connecting adjacent uses; crosswalks and ramps; traffic calming devices; traffic lights; over- and underpasses.

Sidewalk: The area between the curb or edge of the street and the property line, whether or not it is improved. Sidewalks typically include three parts: the street transition zone (sometimes called the planter/furniture zone), the pedestrian clearway (called the sidewalk in common usage), and the building transition zone. The **street transition zone** lies between the curb and the pedestrian clearway. It provides buffering for pedestrians from the street and may include street trees, planted areas, benches, lighting, signs, public art, etc. The **pedestrian clearway** is typically paved. It is intended for pedestrian movement and should remain clear of obstacles. The **building transition zone** provides a transition from the pedestrian clearway to buildings. It provides space for planting, street furniture including café tables, art, door swings and movement in and out of buildings, etc. The term sidewalk may also include such parts of any streets or highway as shall be established or used and determined as foot-walks or sidewalks.

1.3 - REGULATIONS

1.31 Sidewalks. Sidewalks shall be constructed in any area of the community where:

- a. Sidewalks are necessary to provide adequate and safe routes for school children to and from their dwellings and to and from educational facilities;
- b. Pedestrian traffic is not adequately accommodated by existing sidewalks;
- c. No sidewalks are in existence;
- d. There is an opportunity to make connections between existing or proposed sidewalks;
- e. The health, welfare, and safety of the public require that adequate sidewalks be provided for the public convenience; and
- f. All new development or redevelopment, construction or reconstruction.

1.32 Pedestrian Circulation Plan. The Planning Board requires inclusion of a pedestrian circulation plan and sidewalk profiles for all proposed subdivisions, site plan reviews and special permits. It shall include:

- a. The location of streets and roads adjacent to the site and proposed roads within the site;

- b. The location of existing walkways and paths on and off the site; the location of bus stops, parking lots, parking spaces, and driveways; the location of recreation facilities, religious structures, schools, industries, retail establishments, offices, and any other destination facilities; the location of residences; and any other structures or uses that may be requested by the Planning Board, DPW, Selectboard or other government body;
- c. Links between sidewalks and pathways within the development, and to neighborhood destinations and existing or anticipated sidewalks or pathways in the surrounding area.
- d. A description of estimated daily and peak-hour pedestrian trips to be generated by the site and flow patterns for pedestrians showing adequate access to and from the site and adequate circulation within the site; and
- e. An interior traffic and pedestrian circulation plan designed to minimize conflicts and safety problems.

1.33 Standards for Pedestrian Clearways

- a. Pedestrian clearways shall be at least 3 feet in width and shall meet the requirements set forth in the Americans with Disabilities Act of 1990.
- b. Whenever possible, cross slope on pedestrian clearways shall not exceed 1:50
- c. Changes in level up to 1/4 in (6 mm) may be vertical and without edge treatment. Changes in level between 1/4 in and 1/2 in (6 mm and 13 mm) shall be beveled with a slope no greater than 1:2. Changes in level greater than 1/2 in (13 mm) shall be accomplished by means of a ramp that complies with these regulations.
- d. Gratings. If gratings are located within the pedestrian clearway, then they shall have spaces no greater than 1/2 in (13 mm) wide in one direction. If gratings have elongated openings, then they shall be placed so that the long dimension is perpendicular to the dominant direction of travel.

1.34 Curb and Intersection Corner Ramps

- a. Plans shall include, either within the corner or within the curb area immediately adjacent thereto, ramps allowing access to sidewalks and streets by variously-abled persons.
- b. The ramps referred to in Subsection 1.34 (a) shall be designed and constructed in a good and substantial manner in accordance with plans and/or specifications provided in an appropriate professional design standards manual. The particular plan to be used at a given intersection corner shall be appropriate to the location as determined in a review by the City/Town Engineer.

1.35 Driveways. A driveway shall be considered part of the sidewalk:

- a. After a driveway has been constructed, it shall be deemed a part of the sidewalk whether or not there is a sidewalk improvement extending along the balance of the frontage of the property,

for all purposes of repair or reconstruction. Requirements relating to construction or reconstruction of a sidewalk as provided in this Chapter shall be applicable to reconstruction of a driveway which portion is in the sidewalk area of the right-of-way.

- b. Wherever possible driveway aprons should not intrude into the pedestrian clearway. The pedestrian clearway shall maintain a cross slope of 1:50 across the entire driveway. The driveway apron should be located in the street transition zone between the pedestrian clearway and the roadway.
- c. Where the street transition zone does not provide adequate space to transition from the grade of the pedestrian clearway to the grade of the roadway, a “dropped driveway” may be used. In a “dropped driveway,” the pedestrian clearway on either side of the driveway is sloped downward to the driveway which is at street grade. Whenever possible, the slope from the pedestrian clearway to the dropped driveway shall not exceed ADA guidelines.

1.36 Locations for Curb Extensions:

- a. Curb extensions may be used at any corner location, or at any mid-block location where there is a marked crosswalk, provided there is a parking lane into which the curb may be extended. They may include transit stops.
- b. Curb extensions are not generally used where there is no parking lane because of the potential hazard to bicycle travel.
- c. Curbs may be extended into one or both streets at a corner. No obstructions or private use should occur in the curb extension.

1.37 Crosswalks

- a. Crosswalks are a critical element of the pedestrian network to enable sidewalk transportation users to safely and conveniently cross intervening streets. Safe crosswalks support other transportation modes as well; transit riders, motorists, and bicyclists all may need to cross the street as pedestrians at some point in their trip.
- b. Parking is prohibited within a crosswalk.

1.38 Bi-walks

- a. Sidewalks shall be constructed to form connections to and from public schools. These sidewalks or pathways shall be designated for bicycle and other non-motorized transportation use for students in all school grades.

1.39 Connectivity

- a. When desirable for public convenience, a pedestrian or bicycle way may be required to connect to a cul-de-sac or to pass through an unusually long or oddly shaped block or otherwise provide appropriate circulation or continuity to a pedestrian or bicycle circulation system.

2.0 SUBDIVISION RULES AND REGULATIONS

(Under Rules and Regulations for Subdivision of Land, a paragraph inserted in the *Design Standards* section provides a direct way for the community to benefit.)

2.1 - SIDEWALKS

2.11 Sidewalk requirements:

- a. Sidewalks shall be required on both sides of all new public streets.
- b. Exceptions will be considered under the following conditions:
 - i. Sidewalks shall be required on one side of the street if the right-of-way has severe topographic or natural resource constraints, or the street is a cul-de sac with four or fewer dwelling units.
 - ii. In such exceptions, the developer shall install an equal number of feet of sidewalk in another area of the community as deemed by the DPW Director, Municipal Engineer, and Planning Board. The developer may as an alternative devote that amount of work to the repair of sidewalk as deemed by the DPW Director, Municipal Engineer, and the Planning Board.
- c. Sidewalks shall be required for all ANR lots that are part of a new subdivision.
- d. Sidewalks shall be required for all new construction on ANR lots on all ways.
- e. A buffer strip of four feet width between the pedestrian way and the road shall be required for all sidewalks to further provide a safe pedestrian environment. Shade trees shall be planted at thirty-foot intervals in a tree belt established in the buffer strip.
- f. Pedestrian and bicycle ways: When desirable for public convenience, a pedestrian or bicycle way may be required to connect to a cul-de-sac or to pass through an unusually long or oddly shaped block or otherwise provide appropriate circulation or continuity to a pedestrian or bicycle circulation system.
- g. Additional Right-of-Way Improvements: The Planning Board may require right-of-way improvements in excess of the right-of-way improvement requirements set forth in this section, if public right-of-way improvements that directly benefit and are necessary to serve the subject property or development require additional right-of-way improvements.

This model sign bylaw is intended to show what is typically included in a sign bylaw. Because each community is different, sign bylaws should be developed to reflect the unique challenges and opportunities of each individual community. The model can be used as a menu which can be tailored to address the needs and character of each individual community and district.

MODEL SIGN BYLAW

SECTION ____ . SIGNS

Any exterior sign or advertising device, or any permanent interior sign or advertising device situated, designed or intended to be viewed from the out of doors, which is hereafter erected or maintained shall, except as expressly provided, conform to the following requirements.

1. SIGN PERMIT

- a. No sign or advertising display shall be erected, altered or enlarged until a Sign Permit has been issued by the Building Inspector. Such permit shall only be issued if the sign complies or will comply with all applicable provisions of these bylaws. The permit and/or permit number shall be affixed to the sign in the manner prescribed by the Building Inspector.
- b. Exemptions - The following signs shall be permitted without a sign permit:
 - i. Signs posted by governmental agencies or pursuant to governmental statute, order or regulation.
 - ii. Temporary and permanent traffic signs and signals installed by the town, county or state for the purpose of directing and regulating the flow of traffic.
 - iii. Temporary traffic signs installed by a utility for the purpose of directing and regulating the flow of traffic while performing work in the right of way.
 - iv. Signs indicating public transportation stops when installed by the township or a public transportation utility.
 - v. Historical tablets, cornerstones, memorial plaques which are installed by government agencies or civil or religious organizations.
 - vi. Flags or emblems of religious, educational, civic or governmental organizations.
 - vii. Directional signs necessary for the safety and direction of residents, employees, customers, and visitors (whether in a vehicle or on foot) identifying parking areas, loading zones, entrances, exits and similar locations.
 - viii. Warning and no-trespassing signs.
 - ix. The name and number plates identifying residents and affixed to a house, apartment or mailbox and lawn signs identifying residents.
 - x. Signs which are an integral part of vending machines, including gasoline pumps, soda machines and ATM machines.
 - xi. Real estate signs, announcing the sale, rental or lease of the premises on which the sign is located.
 - xii. Temporary sale signs attached to a window.
 - xiii. Temporary signs for advertising public functions or fundraising events for charitable or religious organizations.
 - xiv. Temporary signs pertaining to campaigns, sales, promotions, drives or events of political, civic, philanthropic, educational or religious organizations.

xv. Signs of builders, electrical contractors, painters and other artisans erected at project sites.

2. PROHIBITED SIGNS

- a. Signs which intend to imitate or otherwise cause confusion with existing signs erected by any governmental board, body or agency.
- b. Sign, or its illumination, of any type which by reason of its location, shape, size, text or color interferes with traffic or presents a hazard as determined by the Zoning Enforcement Officer, after consultation with the town Engineer and Chief of Police.
- c. Roof signs.
- d. Off-premised advertising signs (signs advertising a business, service or product not regularly produced or available on the parcel upon which the sign is located), fixed or portable, unless otherwise specifically permitted in this bylaw.
- e. Signs causing interference with television or radio reception.
- f. Any commercial sign or banner spanning a public street, except for banners spanning a public street publicizing town sponsored or supported events.
- g. Signs placed or attached or supported on awnings, trees, fences, utility poles or light poles, or signs attached to other signs. Nothing herein contained is intended to prohibit the placement of signs directing traffic or identifying various locations within a lot or parcel on light poles and utility poles erected therein.
- h. Signs placed upon motor vehicles which are continuously or repeatedly parked in conspicuous location to serve as a sign. Specifically exempted from this section are those signs, nameplates or letters affixed to or printed on commercial vehicles regularly used in the course of business for regular deliveries, pickups or other such purposes and/or in compliance with the provisions of the Massachusetts Commercial Drivers License Laws. Specifically included are signs on vehicles, trailers and the like which have as their prime purpose the advertising of goods, wares and services of a business which are maintained in a stationary manner at one (1) or more locations for extended periods of time.
- i. Any series of two (2) or more signs placed along a street or highway carrying an advertising message, part of which is contained on each sign except for where publicizing a town sponsored or supported event.
- j. Banners, except for commercial and institutional activities supported or sponsored by the township, located on corner buildings two (2) or more stories in height. Banners may be twice the size of projecting signs and may project three (3) feet from a wall which includes a space of one (1) foot between the wall and the banner.

3. GENERAL REQUIREMENTS THAT APPLY TO ALL DISTRICTS (unless otherwise specified)

- a. Any signs not specifically permitted are hereby prohibited.
- b. Pre-existing Nonconforming Signs may not be changed, extended or altered unless:
 - i. the change brings the sign into conformity with the provisions of this chapter, or
 - ii. said change is limited to changing the sign letters or symbols and/or changing panels and does not alter the structure of the sign itself.
- c. No signs, except special events signs, shall be placed on private or public property except for the purpose of identifying the use or uses actually conducted upon the premises upon which such sign are erected and for no other purpose.
- d. No permitted signs may be placed on town property without the approval of the Select Board/city Council and Department of Public Works.
- e. No sign shall be located in such a manner as to materially impede the view of any street or intersection.

Model Stormwater Management Ordinance

Prepared by Pioneer Valley Planning Commission

1.0 Erosion and Sediment Control For Stormwater Management

1.1 PURPOSE AND AUTHORITY

1.11 Purpose

a. The purpose of this ordinance is to better manage land development in order to protect, maintain, and enhance the public health, safety, and general welfare of the citizens of [Name of Town] by establishing minimum requirements and procedures to control the adverse impacts associated with stormwater runoff.

b. The proper management of stormwater runoff will meet the following objectives:

Reduce the adverse water quality impacts of stormwater discharges to rivers, lakes, reservoirs and streams in order to attain federal water quality standards;

Prevent the discharge of pollutants, including hazardous chemicals, into stormwater runoff;

Minimize the volume and rate of stormwater which is discharged, to rivers, streams, reservoirs, lakes and combined sewers that flows from any site during and following development;

Prevent erosion and sedimentation from land development, and reduce stream channel erosion caused by increased runoff;

Provide for the recharge of groundwater aquifers and maintain the base flow of streams;

Provide stormwater facilities that are attractive, maintain the natural integrity of the environment, and are designed to protect public safety;

Maintain or reduce pre-development runoff characteristics after development to the extent feasible;

Minimize damage to public and private property from flooding;

Ensure that these management controls are properly maintained.

1.12 Authority

The [Name of Town] Department of Public Works [or other entity to be determined] shall administer, implement and enforce this ordinance. Any powers granted to or duties imposed upon the Department of Public Works may be delegated in writing by the Board of Public Works to employees or agents of the Department of Public Works.

1.2 DEFINITIONS

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

Authorized Enforcement Agency: The Department of Public Works [or other entity to be determined], its employees or agents designated to enforce this ordinance.

"Adverse impact" means 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.

"Best management practices (BMP)" are structural or biological devices that temporarily store or treat urban stormwater runoff to reduce flooding, remove pollutants, and provide other amenities. They can also be non-structural practices that reduce pollutants at their source. BMPs are described in a stormwater design manual, Stormwater Management, Volume Two: Stormwater Technical Handbook (March, 1997, Mass. Department of Environmental Protection, as updated or amended).

"Construction activity" is disturbance of the ground by removal of vegetative surface cover or topsoil, grading, excavation, clearing or filling.

"Design storm" is 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" is 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.
extended detention

"Disturbance" is any land clearing, grading, bulldozing, digging or similar activities.

"Drainage area" means that area contributing runoff to a single point measured in a horizontal plane, which is enclosed by a ridgeline.

"Drywell" is 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" means a grant or reservation by the owner of land for the use of such land by others for a specific purpose or purposes, and which must be included in the conveyance of land affected by such easement.

"Flow attenuation" means prolonging the flow time of runoff to reduce the peak discharge.

"Hydrology model" may include 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;

Hydrocad.

"Impervious surfaces" are areas, such as pavement or rooftops, which prevent the infiltration of water into the soil.

"Infiltration" is the downward movement of water from the surface to the subsoil.

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

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

"Peak discharge" is the maximum instantaneous rate of flow during a storm, usually in reference to a specific design storm event

"Permeable soils" are 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" is any individual, group of individuals, association, partnership, corporation, company, business, organization, trust, estate, administrative agency, public or quasi-public corporation or body, the Commonwealth or political subdivision thereof.

"Retention" is the holding of runoff in a basin without release except by means of evaporation, infiltration, or emergency bypass.

"Start of construction" is the first land-disturbing activity associated with a development, including land preparation such as: clearing, 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.

"Swale" is a natural depression or wide shallow ditch used to temporarily store, route, or filter runoff.

1.3 APPLICABILITY

1.31 Applicability

Prior to the issuance of any site plan approval or development permit 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 Special Permit Granting Authority. No person shall, on or after the effective date of the ordinance, initiate any land clearing, 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 ordinance:

- a. Subdivisions and construction activities of any kind disturbing greater than one (1) acre.
- b. Multi-family residential developments involving four or more units;
- c. 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 10 or more parking spaces.

- d. 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 10 or more parking spaces.
- e. 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 all together disturbs one or more acres.

[NOTE: B-E above are recommended but not required under NPDES Phase II]

1.32 Exemptions

To prevent the adverse impacts of stormwater runoff, the stormwater performance standards in this bylaw must be met at new development sites. These standards apply to construction activities as described under Applicability above. The following activities are exempt from the requirements for submittal and approval of a stormwater management plan under this bylaw, but must comply with the stormwater performance standards in this bylaw:

- a. Any agricultural activity which is consistent with an approved soil conservation plan prepared or approved by the Natural Resource Conservation Service;
- b. Any logging which is consistent with a timber management plan approved under the Forest Cutting Practices Act by Massachusetts Department of Environmental Management;
- c. Additions or modifications to existing single family structures;
- d. Developments that do not disturb one (1) acre or more of land, provided that they are not part of a larger common development plan;
- e. Repairs to any stormwater treatment system deemed necessary by the [town/city] Department of Public Works;
- f. Any emergency activity that is immediately necessary for the protection of life, property or the environment, as determined by the Department of Public Works; and
- g. Single family residential uses disturbing less than one (1) acre.

1.33 Stormwater Design Manual

A stormwater design manual, Stormwater Management, Volume Two: Stormwater Technical Handbook (March, 1997, Mass. Department of Environmental Protection, as updated or amended) is hereby incorporated by reference as part of this ordinance, and shall furnish additional policy, criteria and information including specifications and standards, for the proper implementation of the requirements of this ordinance.

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 [Name of Town] Department of Public Works or 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.

1.4 Permit Procedures and Requirements

1.41 Permit Required

No land owner or land operator shall receive any of the building, grading, or other land development permits required for land disturbance activities, and no land owner shall commence land disturbance activities, without approval of a Stormwater Management Permit from the *[Administrative Entity]* and meeting the requirements of this ordinance.

1.42 Application Requirements

Application for approval of a Stormwater Management Permit shall include the following:

- a. A stormwater management plan or an application for waiver shall be submitted to the *[Name of Town Administrative Entity]* for review and approval for any proposed development specified in Section 3.1. Three copies of the stormwater management plan shall be submitted, and clearly labeled, along with other documents required in this zoning ordinance for site plan review. The plan shall contain supporting computations, drawings, and sufficient information describing the manner, location, and type of measures in which stormwater runoff will be managed from the entire development. The plan shall serve as the basis for all subsequent construction.
- b. An erosion and sediment control plan, which shall contain sufficient information to describe the nature and purpose of the proposed development.
- c. ongoing maintenance agreement
- d. non-refundable permit review fee

The applicant may request, and the *[Name of Town Administrative Entity]* may grant, a waiver from any information requirements it judges to be unnecessary to the review of a particular plan.

1.43 Procedures for Review and Approval of Stormwater Permits

- a. The procedures for review and approval of stormwater management permits shall be consistent with *(review procedures of Administrative Entity)*, as appropriate to the use.
- b. The *[Name of Town Administrative Entity]* shall refer copies to the stormwater management permits to the City Engineer for review, and shall consider any comments submitted by the City Engineer during the review period.
- c. The *[Name of Town Administrative Entity]* shall hold a public hearing within twenty-one (21) days of the receipt of a complete application and shall take final action within twenty-one (21) days from the close of the hearing unless such time is extended by agreement between the applicant and *[insert appropriate board or department]*. 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 (7) days prior to the hearing.

1.44 Criteria for Review of Stormwater Permits

In addition to other criteria used by the [Name of Town Administrative Entity] in making permit decisions, for the uses specified in this ordinance, the [Name of Town Administrative Entity] must also find that the Stormwater Management Plan submitted with the permit application meets the following criteria:

- a. the Stormwater Management Plan and the Erosion and Sediment Control Plan are consistent with the Purposes and Objectives of this Bylaw;
- b. the Stormwater Management Plan meets the Performance Standards described in this bylaw;
- c. the Erosion and Sediment Control plan must meet the Design Requirements in this bylaw.

1.45 [Name of Town Administrative Entity] Action

The [Name of Town Administrative Entity] action, rendered in writing, shall consist of either:

- a. Approval of the Stormwater Management Permit Application based upon determination that the proposed plan meets the purposes in this bylaw and the standards in this bylaw and will adequately protect the water resources of the community and is in compliance with the requirements set forth in this bylaw;
- b. 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 this bylaw and the standards in this bylaw and adequately protects water resources, set forth in this bylaw;
- c. Disapproval of the Stormwater Management Permit Application based upon a determination that the proposed plan, as submitted, does not meet the purposes in this bylaw and the standards in this bylaw or adequately protect water resources, as set forth in this bylaw.

Failure of the Board 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 Board action, the Board must issue a Stormwater Management Permit.

1.46 Inspections

No Plan will be approved without adequate provision for inspection of the property before development activity commences. The applicant shall arrange with the [Name of Town Administrative Entity] for scheduling the following inspections:

- a. Initial inspection: prior to approval of any plan
- b. Erosion Control Inspections: after site clearing, rough grading and final grading to ensure erosion control practices are in accord with the plan.
- c. Bury inspection: prior to backfilling of any underground drainage or stormwater conveyance structures;

- d. Final Inspection: when all work, including construction of stormwater management facilities and landscaping have been completed. Final inspection shall include a full, dated TV inspection of all stormwater pipes installed.

The *[Name of Town Administrative Entity]* or its agent 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 which does not comply shall be promptly corrected by the applicant or the applicant will be subject to the bonding provisions of this bylaw or the penalty provisions of this bylaw. The *[city/town]* may conduct random inspections to ensure effective control of erosion and sedimentation during all phases of construction.

1.47 Right-of-Entry for Inspection

When any new drainage control facility is installed on private property, or when any new connection is made between private property and a public drainage control system or sanitary sewer, the filing of an application shall be deemed as the property owner's permission to the *[Name of Town Administrative Entity]* 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 ordinance is occurring or has occurred, and to enter when necessary for abatement of a public nuisance or correction of a violation of this ordinance.

1.48 Application Review Fees

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 *[Name of Town Administrative Entity]*. All of the monetary contributions shall be credited to the utility enterprise fund, and shall be made prior to issuance of any building permit for development.

1.5 The Stormwater Management and Erosion Control Plan

1.51 Contents of the Stormwater Management and Erosion Control Plan

The application for a stormwater management permit shall consist of submittal of a stormwater management and erosion control plan, prepared by a professional engineer licensed by the Commonwealth of Massachusetts, which meets the design requirements provided by this Ordinance. The plan shall include sufficient information to evaluate the environmental characteristics of the affected areas, the potential impacts of the proposed development on water resources; and the effectiveness and acceptability of measures proposed for managing stormwater runoff. The Plan must be designed to meet the Massachusetts Stormwater Management Standards as set forth in this ordinance and the DEP Stormwater Management Handbook Volumes I and II. The applicant shall certify on the drawings that all clearing, grading, drainage, construction, and development shall be conducted in strict accordance with the plan. The minimum information submitted for support of a stormwater management plan shall be as follows:

- 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 & proposed topography with contours at 2 foot intervals,
- g. The existing site hydrology,
- h. A description & delineation 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 storm water 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:
 - i. locations, cross sections, and profiles of all brooks, streams, drainage swales and their method of stabilization,
 - ii. all measures for the detention, retention or infiltration of water,
 - iii. all measures for the protection of water quality,
 - iv. the structural details for all components of the proposed drainage systems and storm water management facilities,
 - v. notes on drawings specifying materials to be used, construction specifications, and typicals, and
 - vi. expected hydrology with supporting calculations.
 - vii. Proposed improvements including location of buildings or other structures, impervious surfaces, and drainage facilities, if applicable,
 - viii. 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 storm water, and spill prevention and response.
 - ix. Timing, schedules, and sequence of development including clearing, stripping, rough grading, construction, final grading, and vegetative stabilization, and
 - x. A maintenance schedule for the period of construction

1.52 Stormwater Management Performance Standards

1.521 Minimum Control Requirements

Projects must meet the Standards of the Massachusetts Stormwater Management Policy. These Standards are:

- a. No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or water of the Commonwealth.
- b. Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.
- c. Loss of annual recharge to groundwater should be minimized through the use of infiltration measures to the maximum extent practicable. The annual recharge from the post-development site should approximate the annual recharge rate from the pre-development or existing site conditions, based on soil types.
- d. For new development, stormwater management systems must be designed to remove 80% of the average annual load (post development conditions) of Total Suspended Solids (TSS). It is presumed that this standard is met when:
 - i. Suitable nonstructural practices for source control and pollution prevention and implemented;
 - ii. Stormwater management best management practices (BMPs) are sized to capture the prescribed runoff volume; and
 - iii. Stormwater management BMPs are maintained as designed.
- e. E. Stormwater discharges from areas with higher potential pollutant loads require the use of specific stormwater management BMPs (see Stormwater Management Volume I: Stormwater Policy Handbook). The use of infiltration practices without pretreatment is prohibited.
- f. F. Stormwater discharges to critical areas must utilize certain stormwater management BMPs approved for critical areas (see Stormwater Management Volume I: Stormwater Policy Handbook). Critical areas are Outstanding Resource Waters (ORWs), shellfish beds, swimming beaches, cold water fisheries and recharge areas for public water supplies.
- g. G. 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.
- h. H. Erosion and sediment controls must be implemented to prevent impacts during disturbance and construction activities.

- i. 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, storm sewers, and/or combined sewers, the [Name of Town Administrative Entity] may require an increase in these minimum requirements, based on existing stormwater system capacity.

1.53 Stormwater Management Measures

- a. Stormwater management measures shall be required to satisfy the minimum control requirements and shall be implemented in the following order of preference:

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;

Use of stormwater on-site to replace water used in industrial processes or for irrigation; Stormwater detention structures for the temporary storage of runoff which is designed so as not to create a permanent pool of water; and

Stormwater retention structures for the permanent storage of runoff by means of a permanent pool of water.

Retention and evaporation of stormwater on rooftops or in parking lots;

- b. 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. Justification shall be provided by the applicant for rejecting each practice based on site conditions.

- c. Best Management Practices shall be employed to minimize pollutants in stormwater runoff prior to discharge into a separate storm drainage system or water body.

- d. 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.

- e. 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.

1.54 Specific Design Criteria

Additional policy, criteria, and information including specifications and design standards may be found in the Stormwater Design Manual.

- a. Infiltration systems

Infiltration systems shall be equipped with clean stone and or filter fabric adjacent to the soil or other sediment removal mechanisms;

Infiltration systems greater than 3 feet deep shall be located at least 10 feet from basement walls;

Due to the potential for groundwater contamination from dry wells, they shall not be an acceptable method for management runoff containing pollutants;

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;

Infiltration systems shall not be used as sediment control basins during construction unless specific plans are included to restore or improve the basin surface;

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

Provisions shall be made for safe overflow passage, in the event of a storm which exceeds the capacity of an infiltration system.

b. Retention and detention ponds shall be designed and constructed in accordance with the criteria of the Stormwater Management, Volume Two: Stormwater Technical Handbook (March, 1997, Mass. Department of Environmental Protection, as updated or amended).

c. 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.

d. The [Name of Town Administrative Entity] 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 Department of Public Works.

e. 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 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;

f. 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.

g. 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.

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

i. The basic design criteria methodologies, and construction specifications, subject to the approval of the Department of Public Works and City Engineer, shall be those generally found in the most current edition of the Stormwater Management, Volume Two: Stormwater Technical Handbook (March, 1997, Mass. Department of Environmental Protection, as updated or amended).

1.55 Design Requirements for Erosion and Sediment Control Plan

1.551 The design requirements of the Erosion and Sediment Control Plan are:

- a. Minimize total area of disturbance
- b. Sequence activities to minimize simultaneous areas of disturbance.
- c. Minimize peak rate of runoff in accordance with the MA DEP Stormwater Policy.
- d. Minimize soil erosion and control sedimentation during construction. Prevention of erosion is preferred over sedimentation control.
- e. Divert uncontaminated water around disturbed areas
- f. Maximize groundwater recharge.
- g. Install, and maintain all Erosion and Sediment Control measures in accordance with the manufacturers specifications and good engineering practices
- h. Prevent off-site transport of sediment.
- i. 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).
- j. 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
- k. Prevent adverse impact from the proposed activities to habitats mapped by the Massachusetts Natural Heritage & 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.
- l. 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.
- m. Properly manage on-site construction and waste materials.

- n. Prevent off-site vehicle tracking of sediments.

1.56 Maintenance

1.561 Operation, Maintenance and Inspection Agreement

a. Prior to issuance of any building permit for which stormwater management is required, the *[Name of Town Administrative Entity]* 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 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:

The name(s) of the owner(s) for all components of the system.

Maintenance agreements that specify:

- (a) The names and addresses of the person(s) responsible for operation and maintenance.
- (b) The person(s) responsible for financing maintenance and emergency repairs.
- (c) A Maintenance Schedule for all drainage structures, including swales and ponds.
- (d) A list of easements with the purpose and location of each.
- (e) The signature(s) of the owner(s).

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.

iv. Stormwater management easement requirements:

The purpose of each easement shall be specified in the maintenance agreement signed by the property owner.

Stormwater management easements are required for all areas used for off-site stormwater control, unless a waiver is granted by the City.

Easements shall be recorded with the Registry of Deeds prior to issuance of a Certificate of Completion.

v. Changes to Operation and Maintenance Plans

The owner(s) of the stormwater management system must notify the *[Name of Town Administrative Entity]* of changes in ownership or assignment of financial responsibility. The maintenance schedule in the Maintenance Agreement may be amended to achieve the purposes of this by-law by mutual agreement of the *[Name of Town Administrative Entity]* 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.

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 City Engineer to correct a violation requiring maintenance work, satisfactory corrections are not made by the owner(s) within thirty days, the *[Name of Town Administrative Entity]* may perform all necessary work to place the facility in proper working condition. The owner(s) of the facility shall be assessed the cost of the work and any penalties.

1.562 Maintenance Responsibility

a. The owner of the property on which work has been done pursuant to this Ordinance 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

1.57 Performance Bond

The *[Name of Town Administrative Entity]* shall require from the developer a surety or cash bond, irrevocable letter of credit, or other means of security acceptable to the *[Name of Town Administrative Entity]* 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 section 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 Ordinance 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 *[Name of Town Administrative Entity]* of the stormwater management facilities being in compliance with the approved plan and the provisions of this Ordinance.

1.58 Enforcement and Penalties

1.581 Violations

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

1.582 Notice of Violation

When the [Name of Town Administrative Entity] determines that an activity is not being carried out in accordance with the requirements of this Ordinance, 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 Ordinance 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 municipality by filing a written notice of appeal within fifteen (15) days of service of notice of violation.

1.583 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 [Name of Town Administrative Entity] 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.

1.584 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 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.

1.585 Non-Criminal Disposition

As an alternative to criminal prosecution or civil action, the City of Westfield may elect to utilize the non-criminal disposition procedure set forth in [Name of Town] ordinances. 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.

1.586 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 [Name of Enforcement Entity] may take necessary corrective action, the cost of which shall become a lien upon the property until paid.

1.587 Holds on Occupancy Permits

Occupation permits will not be granted until corrections to all stormwater practices have been made and accepted by the [Name of Town Administrative Entity].

1.6 Severability

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

- f. All height limitations shall be measured from ground level to the highest part of the sign or its supporting structure, whichever is higher.
- g. The maximum height for freestanding signs, unless otherwise provided, shall not exceed fifteen (15) feet above ground level.
- h. Except where specifically prohibited, freestanding and projecting signs may be double-faced, and the maximum sign area shall apply to each side. The area of the sign shall include each and every part of the sign, including moldings and frames. Where the sign is supported by a post or pylon whose surface is being used for advertising purposes, the area of this post, pylon or other supporting members shall be considered as part of the total area and items of information.
- i. Wherever the message on a wall sign is divided between a number of panels or parts, the total area of all of the panels or parts shall be considered as one (1) sign, and where a sign consists of individual numbers or letters, the area of the smallest rectangle or rectangles which can collectively enclose all of the letters or numbers shall be the total sign area.
- j. Wall signs erected flat against the side of a building shall be within the sign band area.
- k. Every property shall be required to place their street address number(s) in four (4) inch high numbers on, or adjacent to, the entrance door. Commercial and Industrial uses shall be required to place their street address number(s) on any free standing ground signs.
- l. The supporting members for any pole sign, projecting sign, or any other sign shall be in acceptable proportion to the size of the sign.
- m. No sign shall be erected so as to obstruct any door, window or fire escape on a building.
- n. No more than one sign indicating the meetings and existence of any civic organization may be erected within a street right-of-way at each boundary line or each gateway of the City/Town. Said sign shall not exceed 25 square feet in area.
- o. If lighting is provided for a sign, the source of light shall be either from within the sign or shall be white light exterior to the sign and shielded so as prevent direct glare from the light source onto any public street or onto any adjacent property, unless otherwise permitted elsewhere in this bylaw.
- p. In any district one unlighted temporary sign offering premises for sale or lease for each parcel in one ownership shall be permitted, provided that it shall not exceed six square feet in surface area; and it shall be set back at least 10 feet from the street lot line or 1/2 of the building setback distance whichever is less.
- q. Temporary signs for advertising public functions or fundraising events for charitable or religious organizations shall be permitted for a period of twenty-one (21) days prior to and during the event and shall be removed within five (5) days after the event. The sign shall be non-illuminated, not larger than sixteen (16) square feet in area, not exceeding eight (8) feet in height and may be erected flat against a building or freestanding. This does not apply to banner signs.
- r. Temporary sale signs painted or attached to a window which must be removed at the expiration of the event sale for which it was erected or posted. Temporary signs may be erected or posted up to fourteen (14) days prior to the event or sale. Temporary sales signs must identify the sale date start and end. No more than twenty (20) percent of the square footage of any single window or single window display area shall be devoted to signs or other advertising material attached thereto or otherwise exposed to the public view.
- s. Temporary signs pertaining to campaigns, sales, promotions, drives or events of political, civic, philanthropic, educational or religious organizations shall be permitted provided such signs comply with the following:
 - i. In all Districts such signs:

1. shall not exceed one sign per candidate/cause per lot frontage (signs that are different but substantially equivalent for the same candidate/cause shall be considered the same sign)
 2. shall not exceed a size of six (6) square feet on each side, excluding incidental supporting frames or structures,
 3. shall not be any closer than ten (10) feet from any lot line,
 4. shall not be any higher (the top) than three (3) feet from the ground,
 5. may not be displayed on a building or structure unless said building or structure is the headquarters or chief office of the candidate or organization (said wall sign shall conform to the wall sign criteria for that Zoning District within which it is located),
 6. may only be permitted to be placed on a building which is not the headquarters or chief office of the candidate or organization, when the Building Inspector determines that, because of the size of the lot's setback areas and the location of the building on the lot, such a sign cannot be adequately displayed on the ground itself,
 7. shall not be illuminated or light emitting,
 8. shall not contain moving elements,
 9. shall not be displayed more than three (3) months prior to the event,
 10. shall not be displayed more than three (3) months in any calendar year,
 11. shall be taken down within three (3) days following the event date,
 12. shall not be posted on public property.
- ii. In all Business and Industrial Districts such signs:
 1. shall not exceed one ground sign and one wall sign per candidate/cause per lot frontage,
 2. must comply with the requirements for sign in that district
- t. A school, college or other educational institution may erect temporary signs for identification of special programs, alumni events, or other temporary or short-term (less than 12 weeks) educational programs. Such signs shall be permitted, provided that such signs:
 - i. Shall not exceed a size of three square feet and shall not be any closer than two feet from any lot line.
 - ii. The top of the sign shall not be more than four feet above the ground.
 - iii. Shall not be displayed for more than three days prior to nor one week (a total of 10 days) after the start of said program or event.
 - iv. For temporary events which occur every year, signboards must be of durable construction.
 - u. Fraternity or sorority – one (1) sign identifying the group residing on the premises and not to exceed twelve (12) square feet in area.
 - v. Each membership club, funeral establishment, hospital, place of public assembly, community facility or public utility may have one identification sign (not to exceed 10 square feet in surface area) and churches, community facilities not places of public assembly may have one additional sign (not to exceed 40 square feet in surface area), provided that such signs shall be set back at least 1/2 the required depth of the front yard setback.
 - w. Signs of builders, electrical contractors, painters and other artisans may be erected and maintained during the period in which such persons are performing work on the premises, provided that the size of any such sign shall not exceed sixteen (16) square feet in area. Such signs shall be removed promptly upon completion of the work.
 - x. Directional signs necessary for the safety and direction of residents, employees, customers, and visitors (whether in a vehicle or on foot) identifying parking areas, loading zones, entrances, exits and similar locations shall be permitted. The sign may include a logo, business or professional name (provided it is clearly secondary in nature to the primary directional function

of the sign) but shall not include any advertising message and shall not exceed three (3) square feet in size nor exceed a height of four (4) feet.

- y. Warning and no-trespassing signs, not exceeding three (3) square feet in area or as prescribed by a Town Department or State requirement shall be permitted.
- z. Flags or emblems of religious, educational, civic or governmental organizations may be flown from supports on the buildings or grounds occupied by the organization. The American Flag may be displayed whenever and wherever flown in accordance with the laws and rules and promulgated by the federal government.
- aa. Lawn signs identifying residents, not exceeding three (3) square foot in area for each side shall be permitted. The sign shall not contain any advertising message and shall not be illuminated, except by a light which is an integral part of a lamppost if used as a support.
- bb. Signs which are an integral part of vending machines, including gasoline pumps, soda machines and ATM machines shall be permitted, provided that they do not exceed the height and width of the machine on which they are located. No additional signs shall be provided at the facility or added to the machine beyond the height or width of the machine.
- cc. Real estate signs, announcing the sale, rental or lease of the premises on which the sign is located, such sign not to exceed six (6) square feet in area. If double-faced the sign shall not exceed twelve (12) square feet of area for both sides. The sign shall be non-illuminated. Such signs shall not be located closer to other such signs than one (1) in every one hundred fifty (150) feet, measured either along the front of the lot or along the depth of the lot.
- dd. On corner lots, no sign or portion thereof shall be located that would interfere with vehicular traffic site distances.
- ee. All signs shall be removed within 30 days of the date from which they no longer serve their intended function (i.e., no longer provide the service, establishment or product being advertised).
- ff. The Building Commissioner is authorized to order the repair or removal of any sign and its supporting structure which, in his or her judgment, is dangerous, or in disrepair or which is erected or maintained contrary to this chapter.

4. ADDITIONAL SIGN REQUIREMENTS FOR RESIDENTIAL DISTRICTS

- a. For approved residential subdivisions, townhouse and multifamily developments, one ground sign identifying the development shall be permitted, provided that:
 - i. it shall not exceed 12 square feet in surface area, on any one side and shall not have more than two sides.
 - ii. it shall be located on private property and set back at least 15 feet from any street lot line.
 - iii. the top of the sign shall not rise more than five feet above the lowest point on the ground or sidewalk within five feet of the sign.
 - iv. such a sign shall only be permitted so long as the approved access within the development is not a City/Town-accepted public way. Once said access has been accepted as a City/town right-of-way, said sign shall be removed, and a standard municipal street sign shall be installed.
- b. In the case of a dwelling or use accessory thereto – one (1) sign indicating the address and/or names of the owners or occupants for each household residing on the premises shall be permitted, provided that each sign is not over two (2) square feet in area, and the total area of all such signs shall not exceed a total of eight (8) square feet in area.
- c. No sign allowed under this section shall exceed four feet (4') in height above grade, except that projecting signs with a total area of three square feet or less may be up to six feet (6') in height above grade.

- d. Signs shall be set back from any property boundary a distance equal to or greater than their height above grade, and signs shall not be located so as to interfere with vehicular site distances.
- e. Non-Residential Signs
 - i. The Planning Board may issue a Special Permit permitting a larger sign for non-residential uses (uses other than 1-3 dwelling units) legally permitted and operating in a Residential District where they find all of the following:
 - 1. the type, size, scale, location, character and design of the sign is consistent with and complementary to the character of the neighborhood
 - 2. where such sign is a wall sign, it shall have one face and shall be affixed flush on the building's wall facing the street frontage
 - 3. where such sign is a free standing ground sign it shall:
 - (I) not have more than two (2) faces and such faces must be configured back to back.
 - (II) not exceed four (4) feet in height to its tallest point, including support structures.
 - (III) conform to the minimum side yard setback requirements for buildings in the district.
 - (IV) be setback at least 10' from a front lot line.
 - 4. for Family Home Day Care uses each sign face may not exceed nine (9) square feet in area, including support structures
 - 5. for all other non-residential uses permitted in those districts, each sign face, unless already regulated elsewhere in the Zoning Ordinance, may not exceed twenty-four (24) square feet in area, including support structures
 - 6. if illuminated, signs shall not be lit internally and shall not be illuminated during hours that the use is not in operation.
 - ii. The Planning Board may:
 - 1. permit a setback of less distance than the minimum required provided that it finds:
 - (I) that meeting the required setback is impractical or impossible
 - (II) that said distance is not less than half the distance between the front lot line and the front of the building located thereon.
 - (III) that the location of such sign will not be detrimental or inconsistent with the character of the neighborhood.
 - 2. require a sign size smaller than the maximum permitted or setbacks greater than the minimum permitted where they find that such sign and/or location would be more consistent with and complementary to the character of the neighborhood.
 - 3. permit one ground sign and one wall sign and/or more than one of both signs where they find that:
 - (I) it is necessary based on the nature of the use and the physical characteristics of the lot, and
 - (II) that the number of signs will not be detrimental to, or inconsistent with, the character of the neighborhood

5. ADDITIONAL SIGN REQUIREMENTS FOR BUSINESS & INDUSTRIAL DISTRICTS (unless otherwise specified)

- a. For All Business Districts
 - i. Permitted wall signs:
 - 1. One main (frontage) wall sign on the street frontage for each establishment in the structure plus one directory wall sign, provided that:

- (I) when an establishment is located on a lot with more than one frontage, a main (frontage) wall sign may only be displayed on one of the frontages. The other frontage(s) may display a side wall sign as allowed below.
 - (II) it shall be attached and parallel to the wall of the building
 - (III) it shall not project horizontally more than 12 inches from the wall to which it is attached (unless otherwise specified) and, if the sign is designed to allow pedestrian traffic under the sign, shall be a minimum of seven feet above the ground. Signs projecting more than 12 inches over a public way require approval by the Board of Public Works
 - (IV) the sign's surface area shall not be larger than 10% of the frontage wall area of the facade of the story which is occupied by the establishment or 100 square feet, whichever is less, and shall be displayed on that surface
2. One side wall sign per structure on each side wall facing a non-rear lot line, provided that:
 - (I) the surface area of the sign shall not be larger than 25 square feet; and
 - (II) side wall signs are not permitted on side walls which face or abut (within 100 feet) a residential zoning district.
 3. One rear wall sign (facing a rear lot line) per structure, provided that:
 - (I) the rear wall abuts upon a public right-of-way or a public or private parking lot; and
 - (II) the surface area of the sign shall not be larger than 25 square feet; and
 - (III) the sign shall not be higher than 10 feet above grade.
- ii. Flashing and Moving Signs
1. Clocks and signs indicating time and/or temperature, by means of white intermittent lighting are permitted in non-residential districts. Their longest dimension shall not exceed ten feet.
 2. The Planning Board may issue a Special Permit for signs that contain, include, or are illuminated by any flashing, blinking, intermittent, moving, scrolling, rotating, revolving, animated lights, or have any animated, mechanical or moving parts provided they.
- iii. Permitted awning/canopy and awning/canopy signs as follows:
1. An awning/canopy may display the street address for the building and may also have either one sign along the bottom of the front of the awning/canopy or a sign along the bottom of both sides of the awning/canopy, identifying the establishment located therein, provided that the letters, numbers, characters, logos, etc., of such address and signs do not exceed a height of four inches. The purpose of said additional awning/canopy signage is for pedestrian (not automobile) traffic.
 2. Instead of the wall sign permitted above, an awning/canopy attached to the building may have a sign of the size that would otherwise be allowed on the building wall itself. Said sign must conform to all other requirements for a wall sign.
 3. The entire backlit or illuminated area of a lit awning/canopy which has any letter or symbols anywhere on the canopy shall be considered a wall sign and must conform to the size and location requirements of wall signs.
 4. Awnings/canopies overhanging a public right-of-way must also be approved by the Department of Public Works.
- iv. Permitted free standing ground signs as follows:
1. one ground sign for each lot, provided that:
 - (I) it shall not exceed 100 square feet in surface area on any one side; and
 - (II) it shall be set back at least 15 feet from any street lot line; and

- (III) it shall not rise to more than 15 feet from the ground or sidewalk to the top of the sign; and
 - (IV) it shall not have more than two sign faces, which must be configured back to back.
 - (V) it shall be located on the same lot as the structure(s) or establishment(s) being advertised.
 - (VI) where a single lot is occupied by more than one business, whether in the same structure or not, there shall not be more than one ground sign per lot.
- v. Permitted temporary outdoor signs shall be permitted as follows:
 - 1. one temporary banner at a time per structure of no more than 25 square feet on a property for retail, service and restaurant uses for a cumulative period not to exceed 30 days per year.
- b. Neighborhood Business - Additional Sign Requirements
 - i. Ground Signs. One (1) lighted, non-interior illuminated or non-lighted ground sign may be permitted per parcel by a special permit issued by the Planning Board. If the parcel is occupied by more than one establishment, the multiple establishments may be advertised on the single ground sign. Any sign permitted under this section must meet the following requirements:
 - 1. The type, size, scale, location character and design of the sign must be consistent with and complementary to the character of the neighborhood.
 - 2. Each sign face may not exceed twenty-four (24) square feet in area, including support structures.
 - 3. Such sign may not exceed six (6) feet in height to its tallest point, including support structures.
 - 4. Such sign shall conform to the minimum side yard setback requirements for buildings in the district. The Planning Board may approve a setback of less distance than the minimum required provided that it finds:
 - (I) That said distance is not less than half the distance between the front lot line and the front of the building located thereon, and
 - (II) That the location of such sign will be consistent with and complementary to the character of the neighborhood.
 - c. Downtown/Central Business - Additional Sign Requirements
 - i. Wall Signs
 - 1. Main (frontage) Wall - one Wall Sign for each establishment in the structure, provided:
 - (I) when an establishment is located on a lot with more than one frontage a Main (frontage) wall sign may be displayed on all of the frontages.
 - 2. Awning/Canopy Signs
 - (I) The wall sign permitted under this Section may be placed on an awning/canopy attached to the building instead of being placed on the building wall itself. Such sign must conform to all of the requirements for a wall sign. Said awning/canopy may also display the street address for the building and may also have either: a) one additional sign along the bottom of the front of the awning/canopy; or b) an additional sign along the bottom of each side of the awning/canopy, identifying the establishment located therein, provided the letters, numbers, characters, logos, etc. of such signs do not exceed a height of six inches. The purpose of said additional awning/canopy, signage is for the visibility of pedestrian traffic.
 - 3. Ground Signs - The Planning Board may issue a Special Permit for one ground sign for each lot for each street frontage, provided that the Board finds that:

- (I) there must be unique features to the structure, the orientation of the structure, the location or setback of the structure, or the location of establishments in the structure, especially affecting such structure or establishment, but not generally affecting the zoning district, which restrict the visibility of wall sign(s) otherwise allowed by this Ordinance, and
 - (II) said ground sign is to be located on the same lot as the structure or establishment being advertised, and
 - (III) said ground sign does not exceed a height of fifteen (15) feet, nor have a surface area greater than eighty (80) square, though the Board may require a lesser height or size, and
 - (IV) if lighted, it shall be illuminated internally, or by indirect method with white light only
4. Projecting Blade Signs - The Planning Board may issue a Special Permit for a projecting “blade” sign (projecting perpendicular from the face of the building) in addition to a wall sign provided that the Board finds that:
- (I) There shall only be one blade sign per business. If there is more than one business in the same building, there may not be more than one sign per 20 feet of frontage on the same building.
 - (II) The sign may not project more than three feet from the façade of a building
 - (III) The sign may not exceed six square feet of total surface area per sign.
 - (IV) The sign may not exceed two inches in width.
 - (V) The bottom of the sign shall not be less than nine feet measured above the sidewalk.
 - (VI) The sign shall not be internally lit.
5. Overhanging Signs - Awnings/canopies and signs overhanging a public right-of-way must also be approved by the Department of Public Works.
- d. General Business & Highway Business – Additional Sign Requirements
- i. Shopping Centers - If a single lot is occupied by more than one business, whether in the same structure or not, there shall not be more than one ground sign at each street frontage providing access to the lot. When said sign is two sided back-to-back, each side may meet the maximum size permitted in that district. For the purposes of this section, primary street frontage shall mean that single street frontage on a public way from which the primary access to the uses on the lot is provided. Secondary street frontage shall mean that frontage from other public ways from which access to the site is also provided. All signs shall be setback from all property lines a distance at least equal to the sign’s height. Said sign may only include the names of the individual businesses on the lot, a name for the shopping center if one exists, and a message board. The size of the sign(s) shall be based on the anticipated cumulative gross floor area square footage of the site in accordance with the chart below:

District	Cumulative gross floor area (sq.ft.)	Maximum Size (square feet)		Maximum Height (feet)	
		Primary St. Frontage	Secondary St. Frontage	Primary St. Frontage	Secondary St. Frontage
General Business	<50,000	100	50	25	20
	50,000-100,000	150	75	25	20

	>100,000	200	75	25	20
Highway Business	<50,000	100	50	25	20
	50,000-100,000	200	75	30	20
	>100,000	300	75	30	20

- ii. The Planning Board may issue a Special Permit permitting additional Primary Street Frontage Signs (but no more than one per individual street) where they find that such additional streets generate traffic flows substantial enough to provide additional primary access to the site, and where such larger signs will be consistent with the character of the general area.
 - e. Industrial Districts - Additional Sign Requirements
 - i. Front wall sign
 - 1. One front wall sign for each establishment located in a building is permitted, provided that:
 - (I) The sign must be located on a portion of the front wall that is occupied by the establishment
 - (II) The sign's surface area shall not be larger than 7.5% of the frontage wall area of the facade of the story which is occupied by the establishment
 - (III) when an establishment is located on a lot with more than one frontage a Main (frontage) wall sign may be displayed on all of the frontages.
 - ii. Side Wall sign
 - 1. One side wall side per establishment is permitted, provided that:
 - (I) The surface area of each side wall sign shall not aggregate more than 5% of the side wall area of the facade of the story which is occupied by the establishment.
 - (II) side wall signs are not permitted on side walls which directly face or abut (within 100 feet) a residential zoning district.
 - iii. Free Standing Ground Sign
 - 1. Where a number of individually owned parcels are developed as a single collective entity (such as an industrial/business park or planned business development) the Planning Board may grant a special permit permitting one additional ground sign for each entrance to the development (not to a specific building) off of a collector street identifying the collective entity and/or the individual business located therein. Said sign must conform to all of the requirements for ground signs in the applicable zoning district.
6. SPECIAL PROVISIONS
- i. The Planning Board may issue a special permit allowing more than the number of signs herein permitted and/or for signs of a larger size or height than herein permitted, provided that:
 - 1. signs are located only where they are otherwise permitted in the district; and
 - 2. the Planning Board determines that the architecture of the building, the location of the building or the land or nature of the use being made of the building or land is such that additional signs or signs of a larger size would not detract from the character of the neighborhood and should be permitted in the public interest. Additional ground signs shall only be approved if there are exceptional circumstances to warrant their approval

and if all efforts are undertaken to keep additional ground signs as small and low as possible, and

3. the Planning Board specifies in the special permit the exact sign permitted, the size and location of the sign or signs, and, if applicable, imposes other restrictions. Any change in said signs requires a new or revised special permit unless the special permit specifies what types of changes are allowed.

Illicit Connections and Discharges to the Municipal Storm Drain System Bylaw

1.0 Purpose

Regulation of illicit connections and discharges to the municipal storm drain system is necessary for the protection of the [town/city] water bodies and groundwater, and to safeguard the public health, safety, welfare and the environment. Increased and contaminated stormwater runoff are major causes of :

- a. impairment of water quality and flow in lakes, ponds, streams, rivers, wetlands and groundwater;
- b. contamination of drinking water supplies;
- c. alteration or destruction of aquatic and wildlife habitat; and
- d. flooding.

The objectives of this bylaw are:

- a. To prevent pollutants from entering the [town/city] municipal separate storm sewer system (MS4);
- b. To prohibit illicit connections and unauthorized discharges to the MS4;
- c. To require the removal of all such illicit connections;
- d. To comply with state and federal statutes and regulations relating to stormwater discharges; and,
- e. To establish the legal authority to ensure compliance with the provisions of this bylaw through inspection, monitoring, and enforcement.

2.0 Definitions

For the purposes of this bylaw, the following shall mean:

Authorized Enforcement Agency: The _____, its employees or agents designated to enforce this bylaw.

Best Management Practice (BMP): An activity, procedure, restraint, or structural improvement that helps to reduce the quantity or improve the quality of stormwater runoff.

Clean Water Act: The Federal Water Pollution Control Act (33 U.S.C. § 1251 *et seq.*) as hereafter amended

Discharge of Pollutants: The addition from any source of any pollutant or combination of pollutants into the municipal storm drain system or into the waters of the United States or Commonwealth from any source.

Groundwater: All water beneath the surface of the ground.

Illegal Discharge: Any direct or indirect non-stormwater discharge to the municipal storm drain system, except as specifically exempted in Section 7 or permitted pursuant to Section 8 of this bylaw. The term does not include a discharge in compliance with an NPDES Storm Water Discharge Permit or resulting from fire fighting activities exempted pursuant to Section 7, subsection 4, of this bylaw.

Illicit Connection: Any surface or subsurface drain or conveyance, which allows an illegal discharge into the municipal storm drain system. Illicit connections include conveyances which allow a non-stormwater discharge to the municipal storm drain system 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 bylaw.

Impervious Surface: Any material or structure on or above the ground that prevents water from infiltrating the underlying soil

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 man-made or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drainage system owned or operated by the [town/city].

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

Non-Stormwater Discharge: Any discharge to the municipal storm drain system not composed entirely of stormwater.

Person: Any individual, partnership, association, firm, company, trust, corporation, and, any agency, authority, department or political subdivision of the Commonwealth or the federal government, to the extent permitted by law, and any officer, employee, or agent of such person.

Pollutant: Any element or property of 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:

- a. paints, varnishes, and solvents;
- b. oil and other automotive fluids;
- c. liquid and solid wastes and yard wastes;
- d. refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordnances, accumulations and floatables;
- e. pesticides, herbicides, and fertilizers;
- f. hazardous materials and wastes; sewage, fecal coliform and pathogens;
- g. dissolved and particulate metals;
- h. animal wastes;
- i. rock; sand; salt, soils;
- j. construction wastes and residues;
- k. and noxious or offensive matter of any kind.

Process wastewater means 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.

Stormwater: Runoff from precipitation or snow melt.

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, or 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. Ch.21C and Ch.21E, and the regulations at 310 CMR 30.000 and 310 CMR 40.0000.

Watercourses: A natural or man-made 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, costal 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.

3.0 Applicability

This bylaw shall apply to flows entering the municipally owned storm drainage system.

4.0 Responsibility for Administration

The _____ shall administer, implement and enforce this bylaw. Any powers granted to or duties imposed upon the _____ may be delegated in writing by the _____ to employees or agents of the _____.

5.0 Regulations

The _____ may promulgate rules and regulations to effectuate the purposes of this bylaw. Failure by the _____ to promulgate such rules and regulations shall not have the effect of suspending or invalidating this bylaw.

6.0 Prohibited Activities

6.1 Illegal Discharges

No person shall dump, discharge, cause or allow to be discharged any pollutant or non-stormwater discharge into the municipal storm drain system, watercourse, or into the waters of the Commonwealth. Emergency pumping performed by the Fire Department must utilize appropriate best management practices (BMPs) and follow hazardous materials disposal guidelines to prevent contamination of the municipal storm drainage system with hazardous materials. If hazardous materials are observed within the flooded area, or are suspected to be contained within the flooded area, a qualified hazmat technician must be consulted before pumping. If hazardous materials are observed at any point during pumping, cessation of pumping is required until a qualified hazmat technician can be consulted and BMPs put in place to prevent the contamination of nearby water ways and the municipal storm drainage system.

6.2 Illicit Connections

No person shall construct, use, allow, maintain or continue any illicit connection to the municipal storm drain system, regardless of whether the connection was permissible under applicable law, regulation or custom at the time of connection.

6.3 Obstruction of Municipal Storm Drain System

No person shall obstruct or interfere with the normal flow of stormwater into or out of the municipal storm drain system without prior approval from the _____.

6.4 Exemptions

This section shall not apply to any of the following non-stormwater discharges or flows provided that the source is not a significant contributor of a pollutant to the municipal storm drain system.

- a. Waterline flushing;
- b. Flows from potable water sources;
- c. Springs;
- d. Flows from riparian habitats and wetlands;
- e. Diverted stream flows;
- f. Rising groundwaters;
- g. Uncontaminated groundwater infiltration as defined in 40 CFR 35.2005(20), or uncontaminated pumped groundwater;
- h. Water from exterior foundation drains, footing drains (not including active groundwater dewatering systems), crawl space pumps, or air conditioning condensation;
- i. Discharges from landscape irrigation or lawn watering;
- j. Water from individual residential car washing;
- k. Discharges from dechlorinated swimming pool water (less than one ppm chlorine) provided it is allowed to stand for one week prior to draining and the pool is drained in such a way as not to cause a nuisance;
- l. Discharges from street sweeping;
- m. Discharges or flows resulting from fire fighting activities;
- n. Dye testing, provided written notification is given to the _____ prior to the time of the test;
- o. Non-stormwater discharges permitted under an NPDES permit, waiver, or waste discharge order administered under the authority of the United States Environmental Protection Agency, provided that the discharge is in full compliance with the requirements of the permit, waiver, or order and applicable laws and regulations; and
- p. Discharges for which advanced written approval is received from the _____ if necessary to protect public health, safety, welfare or the environment.

7.0 Emergency Suspension of Storm Drainage System Access

The _____ may suspend municipal storm drain system access to any person or property without prior written notice when such suspension is necessary to stop an actual or threatened illegal discharge that presents or may present imminent risk of harm to the public health, safety, welfare or the environment. In the event any person fails to comply with an emergency suspension order, the _____ may take all reasonable steps to prevent or minimize harm to the public health, safety, welfare or the environment.

8.0 Notification of Spills

Notwithstanding any other requirements of local, state or federal law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials at that facility operation which is resulting or may result in illegal discharge of pollutants that person shall take all necessary steps to ensure containment, and cleanup of the release. In the event of a release of oil or hazardous materials, the person shall immediately notify the municipal fire and

police departments and the _____. In the event of a release of non-hazardous material, said person shall notify the _____ no later than the next business day. Written confirmation of all telephone, facsimile or in person notifications shall be provided to the _____ within three business days thereafter. If the discharge of prohibited materials is from a commercial or industrial facility, the facility owner or operator of the facility shall retain on-site a written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

9.0 Enforcement

9.1 Enforcement Agent

The _____ or an authorized agent of the _____ shall enforce this bylaw, and the regulations promulgated thereunder, as well as the terms and conditions of all permits, notices, and orders, and may pursue all civil and criminal remedies for such violations.

9.2 Orders

The _____ may issue a written order to enforce the provisions of this bylaw or the regulations thereunder, which may include: (a) elimination of illicit connections or discharges to the storm drainage system; (b) termination of access to the storm drainage system; c) performance of monitoring, analyses, and reporting; (d) cessation of unlawful discharges, practices, or operations; and (e) remediation of contamination in connection therewith. If the _____ determines that abatement or remediation of contamination is required, the order shall set forth a deadline for completion of the abatement or remediation. Said order shall further advise that, should the violator or property owner fail to abate or perform remediation within the specified deadline, the [town/city] may, at its option, undertake such work, and expenses thereof shall be charged to the violator or property owner.

Within thirty (30) days after completing all measures necessary to abate the violation or to perform remediation, the violator and the property owner will be notified of the costs incurred by the [town/city], including administrative costs. The violator or property owner may file a written protest objecting to the amount or basis of costs with the _____ within thirty (30) days of receipt of the notification of the costs incurred. If the amount due is not received by the expiration of the time in which to file a protest or within thirty (30) days following a decision of the _____ affirming or reducing the costs, or from a final decision of a court of competent jurisdiction, the costs shall become a special assessment against the property owner and shall constitute a lien on the owner's property for the amount of said costs. Interest shall begin to accrue on any unpaid costs at the statutory rate provided in M.G.L. Ch. 59, § 57 after the thirty-first day at which the costs first become due.

9.3 Equitable Remedy

If anyone violates the provisions of this bylaw, regulations, permit, notice, or order issued thereunder, the _____ may seek injunctive relief in a court of competent jurisdiction to restrain the person from activities which would create further violations or compelling the person to abate or remediate the violation.

9.4 Non-Criminal Disposition

As an alternative to criminal prosecution or civil action, the [town/city] may elect to utilize the non-criminal disposition procedure set forth in M.G.L. Ch.. 40, §21D. The _____ shall be the enforcing person. The penalty for the 1st violation shall be \$50. The penalty for the 2nd violation shall be \$100. 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.

9.5 Right-of-Entry

To the extent permitted by state law, or if authorized by the owner or other party in control of the property, the _____, its agents, officers, and employees may enter upon privately owned property for the purpose of performing their duties under this bylaw and regulations and may make or cause to be made such examinations, surveys or sampling as the _____ deems reasonably necessary

9.6 Remedies Not Exclusive

The remedies listed in this bylaw are not exclusive of any other remedies available under any applicable federal, state or local law.

10.0 Severability

If any provision, paragraph, sentence, or clause, of this bylaw shall be held invalid for any reason, all other provisions shall continue in full force and effect.

11.0 Transitional Provisions

Residential property owners shall have 120 days from the effective date of the bylaw to comply with its provisions provided good cause is shown for the failure to comply with the bylaw during that period.

MODEL STORMWATER MANAGEMENT / LID ORDINANCE/BYLAW
Pioneer Valley Planning Commission
March 17, 2011

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 post-development runoff volume and quality to be equivalent to or an improvement on pre-development runoff conditions 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 concurrent with other permit application review.

Example #1 (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 #2 (Holyoke) - The City Engineer shall administer and implement this division. A Building Permit shall not be issued without a Stormwater Permit. For projects that do not trigger review by any City Board or Commission, the City Engineer shall independently conduct an administrative Stormwater Management Plan review and issue a Stormwater Permit. For

projects that trigger Subdivision, Special Permit, Site Plan, Conservation Commission or any other Review, the City Engineer's review of the Stormwater Management Plan shall take place concurrently, and the appropriate reviewing Board or Commission shall approve the Stormwater Management Plan pursuant to recommendations made by the City Engineer. Once approved by the

Example #3 (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 $\leq 25\%$ 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): Stormwater management techniques appropriate to the size, scale, and location of the development proposal that limit off-site stormwater runoff (both peak and non-peak flows) to levels substantially similar to natural hydrology (or, in the case of a redevelopment site, that reduce such flows from pre-existing conditions), by emphasizing decentralized management practices and the protection of on-site natural features. LID approaches 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.

COMMENT: Some communities have categorized projects as major and minor projects, creating different Stormwater Management Plan submittal requirements under Section 5. The objective is to minimize costs associated with development of a Stormwater Management Plan for those projects, typically smaller (or minor) projects, that may have a minimal impact on stormwater runoff, but collectively contribute to runoff problems and thus need to be evaluated for that potential. Major and Minor projects can be defined under Section 3, or defined under Section 5.

C. Exemptions

The following use 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. Alternatively, this exemption could be for disturbances of less than 5,000 or 10,000 square feet so that the larger single-family home disturbances are reviewed.

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 (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. If the project triggers Definitive Subdivision, Special Permit, Site Plan, Conservation Commission or any other Board or Commission review, the authorized permitting agency shall include the Stormwater Management Plan in the applicable public hearing(s).

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 a complete application within ____ days 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.

Example (Holyoke) – The Stormwater Permit Fee is found in the Board of Public Works Fee Schedule.

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.

COMMENT: The following use of the distinction between Minor and Major Projects is best for those communities that are experiencing problems with stormwater runoff associated with the construction of single-family homes disturbing less than one acre. NPDES Phase II does not require site disturbances of less than 1 acre to be regulated. However, many communities find that the collective disturbance of many ANR projects significantly deteriorates the quality of stormwater runoff, increases peak flows, and causes extreme downstream erosion and degradation. The items to be documented in a Stormwater Management Plan for Minor Projects are information that would be needed for construction of a single-family home and are not above and beyond the parameters of normal construction activity. However, the information is sufficient for local officials to evaluate the impact of site development on runoff.

2. Minor Projects - 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. Major Projects - 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 monumentation and 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;

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.

o. Erosion and Sediment Control Plan (ESCP) for Construction Activities:

(1) 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;
- (2) Timing, schedules, and sequence of development including clearing, stripping, rough grading, construction, final grading, and vegetative stabilization;
 - (3) An inspection and maintenance schedule for the period of construction.

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 development that disturbs more than one acre of land must utilize low impact development techniques, and projects of all sizes 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. As-Built Affidavit

When site construction is complete, the design engineer must either:

- 1. Submit an affidavit that the construction complies with the approved Stormwater Management Plan, or
- 2. If as-built construction deviated from the approved Stormwater Management Plan, submit an affidavit indicating what changes were made along with as-built plans and a statement that the construction will meet all applicable stormwater management requirements as detailed in this division/section.

The affidavit must be submitted to _____ for review and approval.

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 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

Occupancy 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.

COMMENT: Some communities are seeking to incentivize Low Impact Development techniques by offering the following bonuses.

Section 7 Incentives for exceeding stormwater management performance standards and implementing Low Impact Development (LID) techniques

If an applicant demonstrates that the Stormwater Management Plan substantially incorporates Low Impact Development (LID) techniques or other enhanced practices as described in this division/section, and/or substantially exceeds the requirements of this division/section, the applicant may submit a request to the authorized permitting agency for:

- A. A waiver of permit review fees up to 100%; and/or
- B. A 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.); and/or
- C. A density or dimensional bonus.

LID techniques manage rainfall at or near the source and may include reducing impervious surface coverage (i.e. through street design, street width, parking design, sidewalks, etc.), treating and infiltrating stormwater at the source, utilizing environmentally sensitive site design and, preserving open space and natural areas, etc. For example, LID runoff management techniques such as rain gardens, green roofs, bioretention basins, etc. may help a project to qualify for these incentives.

All abatements and waivers are granted at the discretion of the authorized permitting agency. Requests must be made in writing and must fully state how the project's Stormwater Management Plan substantially incorporates LID techniques or exceeds the performance standards described in the division/section.

RESIDENTIAL LOW IMPACT DEVELOPMENT

Prepared by the Pioneer Valley Planning Commission

Section 1.0 Stormwater Management Bylaw

1.1 Purpose

The purpose of this bylaw is to protect, maintain and enhance the public health, safety, environment and general welfare by establishing minimum requirements and procedures to control the adverse effects of increased post-development stormwater runoff and non-point source pollution associated with new development and redevelopment. Smart site planning and proper management of post-development stormwater runoff will minimize damage to public and private property and infrastructure, safeguard public health, safety, environment and general welfare of the public, protect water and aquatic resources, and promote groundwater recharge to protect surface and groundwater drinking water supplies.

1.2 Applicability

This bylaw shall be applicable to all land disturbance uses requiring a Special Permit, Site Plan Approval, and residential uses including single-family detached dwellings creating land disturbances and requiring a Building Permit.

1.3 Application Procedures

1. For land disturbance uses requiring a Special Permit, a Stormwater Management Plan should be submitted to the Permit Granting Authority for review and approval.
2. For land disturbance uses requiring Site Plan Approval, an Stormwater Management Plan should be submitted to the Permit Granting Authority for review and approval.
3. For all residential uses not requiring a Special Permit or Site Plan Approval, a residential Stormwater Management Plan identifying post-construction drainage controls for the roof, driveway and any drains, including their locations on a site plan, shall be submitted to the Zoning Code Enforcement Officer on a form provided by the Zoning Code Enforcement Officer prior to application for a Building Permit. The Zoning Code Enforcement Officer will refer Stormwater Management Plan submittals to the Conservation Commission and Board of Health for review and comment to ensure consistency with this bylaw. For residential uses not requiring a Special Permit or Site Plan Approval, the Zoning Code Enforcement Officer will have authority to render a final decision as to whether the Stormwater Management Plan is satisfactory.
4. The Conservation Commission and Board of Health shall have 30 days to provide comments to the Zoning Code Enforcement Officer. If comments are not received within 30 days, the Zoning Code Enforcement Officer may render a decision without comment.

5. The Zoning Code Enforcement Officer shall render a decision regarding whether the Stormwater Management Plan is consistent with the standards of this bylaw within 45 days of submittal of such plan.

6. If the Stormwater Management Plan is determined to be inconsistent with this bylaw, the project proponent may amend and re-submit the plan at any time, in order to meet the requirements of this bylaw.

1.4 Stormwater Management Plan Contents

1. This plan shall be submitted in accordance with the criteria established in this bylaw and must be submitted with the stamp and signature of a Professional Engineer (PE) licensed in the Commonwealth of Massachusetts.

2. The Stormwater Management Plan shall fully describe the project in drawings, narrative and calculations. For uses causing land disturbance and requiring a Special Permit and Site Plan Approval, the Stormwater Management Plan shall contain the following:

- a. Contact Information: Name, address and telephone number of all persons having legal interest in the property, and the parcel number (map and lot) of the property or properties affected;
- b. A locus map;
- c. Existing site plan;
- d. Existing zoning and land use at the site;
- e. Proposed land use;
- f. Location(s) of existing and proposed easements;
- g. Location(s) of existing and proposed utilities;
- h. Existing and proposed topography at the site with contours at 2-foot intervals;
- i. Existing site hydrology (both groundwater recharge and surface runoff);
 - j. Description and delineation of existing stormwater conveyances, impoundments, wetlands, drinking water resource areas, swimming beaches or other critical environmental resource areas, on or adjacent to the site into which stormwater flows;
- k. Delineation of 100-year flood plains, if applicable;
 - l. Estimated seasonal high groundwater elevation in areas to be used for stormwater retention, detention or infiltration;
 - m. Existing and proposed vegetation and ground surfaces with runoff coefficients for each;
 - n. Drainage area map with pre- and post-construction watershed boundaries, drainage area and stormwater flow paths, including municipal drainage system flows;
 - o. Recharge area analysis that calculates pre-and post-construction annual groundwater recharge rates on the parcel;

p. A description and drawings of all components of the proposed LID Management system including:

- i. Locations, cross sections, and profiles of all brooks streams, drainage swales and their method of stabilization;
- ii. Structural details and constructions specifications for the detention, retention or infiltration of water;
- iii. Any other information requested by the permit granting authority or the Building Inspector.

q. Hydrologic and hydraulic design calculations for the pre- and post-development conditions for the 2-year, 10-year and 100-year 24 hour storm events. Such calculations shall include:

- i. Description of the design storm frequency, intensity and duration;
- ii. Time of concentration;
- iii. Soil Runoff Curve Number (RCN) based on land use and soil hydrologic group;
- iv. Peak runoff rates and total runoff volumes for each watershed area;
- v. Information on construction measures used to maintain the infiltration capacity of the soil where any kind of infiltration is proposed;
- vi. Infiltration rates, where applicable;
- vii. Culvert capacities;
- viii. Flow velocities;
- ix. Data on the increase in rate and volume of runoff for the specified design storms, and
- x. Documentation of sources for all computation methods and field test results.

r. Post-Development downstream analysis if deemed necessary by the granting authority. The permit granting authority may request that the applicant evaluate the hydrologic impacts immediately downstream of the project.

s. Soils Information from test pits performed at the location of proposed Stormwater Management facilities, including but not limited to soil descriptions, depth to seasonal high groundwater, depth to bedrock, and percolation rates. Soils information will be based on site test pits logged by a Massachusetts Registered Soil Evaluator, or a Massachusetts Registered Professional Engineer;

t. Landscaping plan describing the woody and herbaceous vegetative stabilization and management techniques to be used within and adjacent to the stormwater practice.

3. For single-family residential uses creating land disturbance and requiring a building permit, the contents of the Stormwater Management Plan shall include a description of the site hydrology and proposed systems for management of runoff from impervious surfaces including roofs and driveways and the locations of any foundation or curtain drains and their outfalls. The contents of the Stormwater Management Plan shall be submitted on a form provided by the Zoning Code Enforcement Officer.

1.5 Operation and Maintenance Plan

1. An Operation and Maintenance Plan (O&M Plan) is required at the time of application for all Special Permit and Site Plan Approval projects rendering 15 percent or more of a site impervious. The maintenance plan shall be designed to ensure compliance with this Bylaw and that the Massachusetts Surface Water Quality Standards, 314, CMR 4.00 are met in all seasons and throughout the life of the system. The Operation and Maintenance Plan shall remain on file with the permit granting authority and shall be an ongoing requirement. The O&M Plan shall include:

- a. The name(s) of the owner(s) for all components of the system;
 - b. A map showing the location of the systems and facilities including catch basins, manholes/access lids, main, and stormwater devices;
 - c. 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) An Inspection and Maintenance Schedule for all LID Management facilities including routine and non-routine maintenance tasks to be performed;
 - (iv) A list of easements with the purpose and location of each;
 - (v) The signature(s) of the owner(s).

2. Stormwater Management Easement(s)

- a. Stormwater management easements shall be provided by the property owner(s) as necessary for:
 - (i) Access for facility inspections and maintenance;

(ii) Preservation of stormwater runoff conveyance, infiltration, and detention areas and facilities, including flood routes for the 100-year storm event;

(iii) Direct maintenance access by heavy equipment to structures requiring regular maintenance.

b. The purpose of each easement shall be specified in the maintenance agreement signed by the property owner.

c. Stormwater Management easements are required for all areas used for off-site stormwater control, unless a waiver is granted by the Building Inspector.

d. Easements shall be recorded with the Hampshire County Registry of Deeds prior to issuance of a Building Permit by the Building Department.

3. Changes to Operation and Maintenance Plans

a. The owner(s) of the Stormwater Management system must notify the permit granting authority 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 permit granting authority and the Responsible Parties. Amendments must be in writing and signed by all Responsible Parties. Responsible Parties shall include owner(s), persons with financial responsibility, and persons with operational responsibility.

4. Stormwater Performance Standards

The following performance standards must be met for the Stormwater Management Plan to be determined to be in conformance with this bylaw:

a. Open space must be preserved to the maximum extent possible through the use of site planning that identifies important natural resource areas, such as critical recharge areas and species habitat, and seeks to prevent disturbance of these areas by development.

b. Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

c. Loss of annual recharge to groundwater should be minimized through the use of infiltration measures to the maximum extent possible. The annual recharge from the post-development site should approximate the annual recharge from the pre-development or existing site conditions based on soil types.

d. Stormwater must be managed to prevent flooding of neighboring and other down gradient properties.

e. Existing vegetation should be preserved to the maximum extent possible and native plant communities must be replicated in post-construction landscaping.

f. Appropriate best management practices to meet the intent of this bylaw include but are not limited to: detention/retention basins, drywells and other infiltration devices equipped with oil/grease pretreatment systems, rain gardens, green roofs, rain barrels, porous pavement, vegetated swales, and constructed wetlands.

MODEL STORMWATER UTILITY BYLAW/ORDINANCE

Section _____. Established.

There is hereby established within the department of (public works (DPW)/highway department (HD)), a division known as the stormwater management division under the day-to-day supervision of the deputy superintendent of public works and the general supervision of the superintendent of public works.

Section _____. Purpose.

The stormwater management division shall administer the stormwater management program of the (city/town). It shall be funded by revenue collected through the stormwater utility fee and such other revenue as may, from time to time, be appropriated. The stormwater management program is designed to promote the health and safety of the public, to protect property from flooding and the damage caused by stormwater runoff, and to protect and manage water quality by controlling the level of pollutants in stormwater runoff and the flow of water as conveyed by manmade and by natural stormwater management systems and facilities whether publicly or privately owned.

Section _____. Authority.

This article is adopted in accordance with the authority granted, inter alia, by 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 and such other powers as granted to cities in the said General Laws.

Section _____. Definitions.

The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Credit means a reduction in the amount of a Stormwater Utility Fee charge to the owner of a particular property for the existence and use of privately owned, maintained and operated on-site or off-site stormwater management systems or facilities, or continuing provision of services or activities that reduce or mitigate the (Town's/City's) cost of providing stormwater management services for that particular property.

Developed land shall mean a parcel of land in single and separate ownership altered from its natural state to include impervious surface area greater than four hundred (400) square feet.

Drainage system shall mean natural and manmade channels, swales, ditches, swamps, rivers, streams, creeks, wetlands, branches, reservoirs, ponds, drainage ways, inlets, catch basins, gutters, pipes, culverts, bridges, head walls, storm sewers, lakes, and other physical works, properties, and improvements that transfer, control, convey or otherwise influence the movement of stormwater runoff.

Dwelling unit means the individual, private premises contained in any building intended, whether occupied or not, as the residence for one household, regardless of the number of individuals in the household. A building may contain more than one dwelling unit.

General Laws means the General Laws of the Commonwealth of Massachusetts.

Improved property means property altered from its natural state by construction or installation of greater than four hundred (400) square feet of impervious surfaces.

Impervious surface means those areas which prevent or impede the infiltration of stormwater into the soil in the manner in which it entered the soil, in natural conditions, prior to development. Common impervious surfaces include, but are not limited to, rooftops, buildings or structures, sidewalks, walkways, patio areas, driveways, parking lots, storage areas, compacted gravel and soil surfaces, awnings and other fabric or plastic coverings, and other surfaces which prevent or impede the natural infiltration of stormwater runoff which existed prior to development.

Non-residential property means improved property that is not residential property as defined herein including, but not limited to such property as commercial and office buildings, public buildings and structures, industrial and manufacturing buildings, storage buildings and storage areas, parking lots, parks, recreation properties, tennis courts, swimming pools, public and private schools and universities, research facilities and stations, hospitals and convalescent centers, airports, agricultural uses, water and wastewater treatment plants, and any other form of use not otherwise mentioned which is not a residential property, and which has private parking lots and private drives or roads

Residential property means improved property, without regard to form of ownership, containing three or fewer dwelling units except as may be modified from time-to-time herein by the term “single family”. Residential properties shall not include improved property containing structures used primarily for nonresidential purposes (i.e. hotels, motels, retirement centers, nursing homes or assisted living homes or properties designated as “mixed use” properties by the Board of Assessors.

Stormwater shall mean the runoff from precipitation that travels over natural state or developed land surfaces and enters a drainage system.

Stormwater management services mean all services provided by the (Town/City) which relate to the:

- (a) Transfer, control, conveyance or movement of stormwater runoff through the (Town/City);
- (b) Maintenance, repair and replacement of existing stormwater management systems and facilities;
- (c) Planning, development, design and construction of additional stormwater management systems and facilities to meet current and anticipated needs;
- (d) Regulation of the use of stormwater management services, systems and facilities; and

(e) Compliance with applicable State and Federal stormwater management regulations and permit requirements. Stormwater management services may address the quality of stormwater runoff as well as the quantity thereof.

Stormwater management systems and facilities mean those natural and manmade channels, swales, ditches, rivers, streams, creeks, branches, reservoirs, ponds, drainage ways, inlets, catch basins, pipes, headwalls, storm sewers, lakes and other physical works, properties and improvements which transfer, control, convey, detain, retain, treat or otherwise influence the movement of stormwater runoff.

Stormwater Utility Fee means the periodic user fee imposed pursuant to this article by the (Town/City) of _____ for providing stormwater management services.

Undeveloped land shall mean all land that is not altered from its natural state to an extent that results in greater than four hundred (400) square feet of impervious surface area.

Section _____. Stormwater Utility Fee Established; Quarterly Billing; Deposit To Special Revenue Account.

(a) Pursuant to section 16 of Chapter 83 of the General Laws, the (town/city) hereby establishes a charge for the use of the stormwater management services of the (town/city) to be known as the stormwater utility fee.

(b) The stormwater utility fee is imposed on each parcel of residential property and each parcel of nonresidential property, whether occupied or not. The fee shall be billed in advance on a quarterly basis to the record title owner of the property. The quarterly billing shall be consolidated in the same bill as is sent to the said property owner for other services provided by the city supported by fees, including water service, solid waste management and sanitary sewer use.

(c) Receipts generated from the stormwater utility fee shall be deposited to a special revenue account to be known as the stormwater management account set up in accordance with the authority granted by Section 53E of Chapter 44 of the General Laws. The funds deposited to this account shall be used to fund the stormwater management program of the city.

(d) The Superintendent of (public works/highway department), under the general supervision of the superintendent of (public works/highway department), shall within forty-five (45) days after the close of each fiscal year, prepare an annual report of the change in cash balances which shall detail the cash receipts and disbursements for the year and which shall be submitted to the (Select Board/Mayor, City Council and (town/city) auditor.

Section _____. Rates.

(a) The (Select Board/City Council) shall establish reasonable rates to defray the cost of administering and implementing the stormwater management program of the (town/city). The initial rates, and any later modifications, shall be based upon recommendation of the

(Board/Superintendent) of public works and shall be set by the adoption of a written Resolution by vote of the (Select Board/City Council). A schedule of said rates shall be on file in the office of the (Town/City Clerk) of the (Town/City) of _____.

(b) There shall be two classifications for the rates, Residential and Non-residential. Residential rates will be billed at a flat rate per the fee structure adopted by the (Select Board/City Council) as provided in Exhibit A.

(c) Non-residential rates shall be based upon the total area of impervious surface on a parcel of land in single and separate ownership as determined by the (Engineering/Public Works/Highway) Department by identifying such parcels from the records of the Board of Assessors and utilizing available GIS data layers including building footprints, building structures, driveways, pathways, pools, sport courts, and parking areas. Any impervious areas within the (town/city)-owned right-of-way will not be attributed to the parcel and will not be considered as part of the total impervious area of the parcel.

Section _____. Scope of Responsibility for Stormwater Management Systems and Facilities

(a) The (Town/City) owns or otherwise has rights which allow it to operate, maintain, improve and access those stormwater management systems and facilities which are located:

(1) Within public road rights-of-way;

(2) On private property but within easements granted to, and accepted by, the (Town/City) of _____, or are otherwise permitted to be located on such private property by written agreements for rights-of-entry, rights-of-access, rights-of-use or such other lawful means to allow for operation, maintenance, improvement and access to the stormwater management system facilities located thereon;

(3) On public land which is owned by the (Town/City) and/or land of another governmental entity upon which the (Town/City) has agreements providing for the operation, maintenance, improvement and access to the stormwater management systems and facilities located thereon.

(b) Operation, maintenance and/or improvement of stormwater management systems and facilities which are located on private or public property not owned by the (Town/City), and for which the (Town/City) lacks a lawful right of entry, maintenance and repair shall be and remain the legal responsibility of the property owner, except as otherwise provided for by state and federal laws and regulations.

Section 18-200. Purposes of the Fund.

Receipts from the stormwater utility fee shall be used for the following purposes:

(a) The acquisition by gift, purchase or condemnation of real and personal property, and interests therein, necessary to construct, operate, and maintain stormwater management systems and facilities.

(b) All costs of administration and implementation of the stormwater management program, including the cost of labor attributable to the stormwater management program and the establishment of reasonable operating and capital reserves to meet unanticipated or emergency stormwater management requirements.

- (c) Engineering and design, debt service and related financing expenses, construction costs for new facilities, and enlargement or improvement of existing facilities.
- (d) Operation and maintenance of the stormwater system, including catch basin cleaning, ditch maintenance and street sweeping.
- (e) Capital projects for stormwater management.
- (f) Illicit discharge detection and elimination.
- (g) Monitoring, surveillance, and inspection of stormwater control devices.
- (h) Water quality monitoring and water quality programs.
- (i) Retrofitting developed areas for pollution control.
- (j) Inspection and enforcement activities.
- (k) Billing and related administrative costs.
- (l) Other activities which are reasonably necessary including costs related to regulatory compliance.

Section _____. Stormwater Utility Fee Exemptions.

- (a) The (Town/City) finds that all real property in the (Town/City) contributes to runoff and either uses or benefits from the maintenance of the stormwater system. Therefore, except as provided in this section or otherwise provided by law, no public or private property located in the (Town/City) of _____ shall be exempt from the stormwater utility fee charges. No exception, credit, offset, or other reduction in stormwater utility fee charges shall be granted based on age, tax status, economic status, race, religion or other condition unrelated to the cost of providing stormwater management services and facilities.
- (b) Notwithstanding the foregoing, the (Town/City) establishes exemptions to the Stormwater Utility Fee as follows:
 - (1) Undeveloped land.
 - (2) (Town/City)-owned property.
 - (3) Railroad rights-of-way (tracks). However, railroad stations, maintenance buildings, and/or other improved property used for railroad purposes shall not be exempt from Stormwater Utility Fee charges.
 - (4) Public streets, highways and rights-of-way. However, maintenance buildings and/or other improved property used for road maintenance purposes shall not be exempt from Stormwater Utility Fee charges. All other State, Federal, and County properties are subject to the user fee charges on the same basis as private properties.

Section _____. Stormwater Utility Fee Credits.

- (a) The superintendent of (highway department/public works) is hereby authorized to grant credits to property owners to be applied against the stormwater utility fee based on the technical and procedural criteria set forth in the Stormwater Utility Credit Policy (Credit Policy) as developed, maintained and, from time to time, amended by the Board of (Public Works/Highway Department/Selectmen). The Credit Policy shall be available for inspection by the public at the (Public Works/Highway Department/Town Hall).
- (b) Any credit allowed against the stormwater utility fee charge is conditioned on continuing compliance with the (Town/City)'s design and performance standards as stated in the Credit Policy and/or upon continuing provision of the controls, systems, facilities, services, and activities provided, operated, and maintained by the property owner or owners upon which the credit is based. The superintendent of (highway department/public works) may revoke a credit at

any time for noncompliance with applicable standards and criteria as established in the Credit Policy or this article.

(c) In order to obtain a credit, the property owner must make application to the (Town/City) on forms provided by the (highway department/public works) for such purpose, the forms to be fully completed in accordance with the procedures outlined in the Credit Policy.

(d) When an application for a credit is deemed complete by the superintendent of (highway department/public works) shall have thirty (30) days from the date the complete application is accepted to either grant the credit in whole, grant the credit in part, or deny the credit. Credits applied for by the property owner and granted in whole or in part, shall apply to all stormwater utility fee charges in accordance with the terms defined in the Credit Policy.

Section _____. Stormwater Utility Fee Billing, Delinquencies, Collections, Abatements.

(a) Failure to receive a stormwater utility bill is not justification for non-payment. The property owner, as identified from public land records of the (Town/City) of _____, shall be obligated to pay the appropriate stormwater utility fee for that property. If a property is unbilled, or if no bill is sent for a particular parcel of developed land, the (Town/City) may back bill for the fees as applicable for a period not to exceed one year of charges, but no late fees or delinquency charges of any kind shall be charged or recovered from any property owner so back billed.

(b) Stormwater utility bills shall be committed to the (Town/City) collector for collection. The (Town/City) collector shall notify the superintendent of (highway department/public works) monthly of the amounts collected, and shall keep records of all paid and unpaid stormwater utility bills.

(c) In any case of nonpayment of a stormwater utility bill for sixty (60) days after the same is due, the (Town/City) collector shall send a notice to the delinquent, and shall inform the superintendent of (highway department/public works) in writing that such notice has been sent.

(d) In accordance with the authority granted by Sections 16A through 16F of Chapter 83 of the General Laws, charges for the stormwater utility fee, together with interest thereon and costs relative thereto, shall be a lien upon the real estate for which the charge was billed. Such lien shall take effect by operation of law on the day immediately following the due date of such charge and, unless dissolved by payment or abatement, shall continue until such charge has been added to or committed as a tax in accordance with the requirements of Section 16C of Chapter 83 of the General Laws, and thereafter, unless so dissolved, shall continue as provided in Section 37 of Chapter 60 of the said General Laws.

(e) In addition to the method of collection specified in Sections 16A through 16F of the General Laws, the overdue charge may be collected through any other lawful means.

(f) In the event that a property owner believes the stormwater utility fee is improperly calculated or is otherwise incorrect, the property owner may, within thirty (30) days from the date of issuance of the stormwater utility bill, and after payment of the bill in full, apply to the superintendent of (highway department/public works) for an abatement. The application for abatement shall be supported by such information as is necessary for a reasonable person to conclude that it is more likely than not that the billing is in error. The superintendent of (highway department/public works) shall have sixty (60) days to consider the request for abatement and render a written decision which may deny the abatement, grant the abatement in full or grant the abatement in part.

Section 18-204. Appeals, Hearings.

(a) In the event that a property owner is aggrieved by a written decision from the superintendent of (highway department/public works) denying an application for abatement in whole or in part, or denying an application for a credit, in whole or in part, the property owner shall have thirty (30) days from the date of the written decision to file an appeal to the board of (highway department/public works/selectmen). The appeal shall be in writing and shall specify the grounds thereof. Upon the filing of the notice of appeal with the (highway department/public works/selectmen), the department shall forthwith transmit to the board of (highway department/public works/selectmen) all documents constituting the record upon which the particular decision was made. The board of (highway department/public works/selectmen) shall set a date for hearing which shall be within ninety (90) days of the date of the filing of the appeal and notice thereof setting forth the place, date and time of hearing shall be sent to the property owner no less than ten (10) days prior to the hearing date. The board of (highway department/public works/selectmen) shall render a written decision within ten (10) days of the conclusion of the hearing affirming the action of the department or reversing the action. If reversing the denial of an abatement, the decision shall specify the sum to be abated, which shall not exceed the amounts paid. If reversing the denial of a credit, the decision shall specify the credit to be applied prospectively against future charges unless the property owner has paid the full amount of the stormwater utility fee as charged and has also requested an abatement.

(b) In the event that a property owner fails to pay the stormwater utility fee as charged and the (Town/City) utilizes the process set forth in sections 16A through 16F of Chapter 83 of the General Laws to collect the unpaid charges, the property owner shall have the right to seek an abatement by filing an application for abatement with the board of (highway department/public works/selectmen) in accordance with the remedy specified in Section 16E of Chapter 83 of the said General Laws with a copy delivered to the board of assessors. The application for abatement shall conform to the requirements for a notice of appeal as set forth in subsection “a”, above, and the process for a hearing before the board of (highway department/public works/selectmen), including the applicable time limits, shall be as set forth therein. In the event that the board of (highway department/public works/selectmen) denies the abatement, in whole or in part, it shall, in its written decision, include a statement notifying the property owner of the right to seek a review of the decision by the filing of an appeal with the appellate tax board of the Commonwealth of Massachusetts within three months of the date of the decision of the board of (highway department/public works). As the right to appellate tax board review under this subsection “b” is derived from applicable sections of the General Laws as contained in Chapters 59 and 83 thereof, to the extent that the terms of this ordinance conflict with the terms specified therein, the terms specified in the General Laws control.

MODEL TRADITIONAL NEIGHBORHOOD DISTRICT (TND) BYLAW/ORDINANCE AND SUBDIVISION REGULATIONS

1.0 TRADITIONAL NEIGHBORHOOD DEVELOPMENT

1.1 CONCEPT AND INTENT

Traditional Neighborhood Development (TND) focuses on building well-planned, housing within close proximity of the town center. It is a pedestrian-oriented concept which provides an alternative to highway-based suburban sprawl. TNDs may link up with, or adjoin, existing town centers, or they may be built outside of town, with their own stores and other town center amenities. TNDs are established to preserve land, promote energy conservation, and provide alternatives to automobile use, such as walking, biking, and public transport. TNDs include a variety of residential dwellings interspersed with small scale commercial establishments and public spaces. They are characterized by:

- a. walkable neighborhood centers and focal points;
- b. small, efficient lots with modest sized buildings fronting on, and aligned with, streets in a disciplined manner, generally uninterrupted by parking lots;
- c. generally regular geometric patterns of streets and blocks arranged to provide comprehensible routes of travel;
- d. well-configured squares, greens, gardens, and parks woven into street and block patterns and dedicated to collective social activity, recreation and visual enjoyment;
- e. civic buildings for assembly or other civic purposes, sited to act as visual landmarks and symbols of identity within the community;

1.2 PURPOSES

The purpose of this bylaw/ordinance is to encourage traditional neighborhood developments that:

- a. provide a variety of housing types and commercial services;
- b. are designed to provide more efficient use of open space associated with development;
- c. preserve the rural, historic, and agricultural character of the community by directing new development to appropriate locations;
- d. promote the creation of a neighborhood center that exhibits the design features of traditional neighborhoods, hamlets, villages, and small towns in Massachusetts.
- e. consist of a harmonious grouping of buildings connected by plazas, pedestrian links, and open space.;
- f. facilitate the provision and maintenance of adequate public services and infrastructure.

1.3 PROCEDURES FOR IMPLEMENTING THE TND

Traditional Neighborhood Developments shall be allowed by right in the TND district but must comply with the Lot Development, Design, Parking and other standards in this bylaw/ordinance

1.31 Procedures for Review

An applicant for TND development shall follow the submission procedures as outlined in the (Name of Community) Subdivision Regulations.

1.32 Location

The (town name) TND shall be an overlay zoning district for that portion of the (name of town) labeled "TND" on the map annexed to this TND Bylaw and declared to be a part hereof. The boundaries of the TND district will be as shown on the map entitled "Traditional Neighborhood Development District", dated _____, and on file with the Town/City Clerk.

1.4 GENERAL LOT DEVELOPMENT STANDARDS FOR A TND

1.41 General Standards

- a. The minimum tract size for development is 40 acres.
- b. Public water and sewer service is required for all development. All utility lines such as telephone, cable television, and electric are to be located underground.
- c. The tract of land to be developed shall be in one ownership, or shall be the subject of an application filed jointly in accordance with an approved plan
- d. All uses which are permitted by right in underlying zoning district bylaw are permitted by right in the TND district.

1.42 Permitted Uses

- a. **Residential Uses.** Each of the following residential uses is permitted within the TND District: single family dwelling, single family semi-detached dwelling, single family attached dwelling, two-family dwelling, townhouse, cluster dwelling, guest house, home occupation, and elderly housing.
- b. **Commercial Uses.** Each of the following non-residential (commercial) uses is permitted within the TND District: professional office (such as law office, doctor's office, or corporate office); church, public and private schools, daycare center, artists studio and accessory gallery use, bakery, restaurant (without drive-in service), bicycle shops, garden supplies, office equipment and supplies, neighborhood markets and hotels/motels. Other uses may be permitted by the planning board based on similarity of use.
- c. **Community and Public Service Uses** including a public park, playground, recreation and community building, public parking lot, child care and adult day care service, cultural or civic use, and places of worship are permitted within the TND District.
- d. **Accessory Uses.** Buildings and structures customarily incidental to any primary use located on the same lot are permitted within the TND District.

1.43 Lots & Buildings

- a. All lots shall share a frontage line with a street, square, courtyard or park (public access).
- b. All buildings, except accessory structures, shall have their main entrance (include in definitions) opening onto a street, square, courtyard, or park.
- c. Stoops, open colonnades, and open porches may encroach into front setbacks as indicated in this bylaw.
- d. All lots shall have an uninterrupted sidewalk 5 feet wide the entire width of the lot.

1.44 General Building Requirements

- a. The primary building entrances for small business and office establishments shall generally open to the front sidewalk
- b. Civic buildings shall be located adjacent to greens, parks, or squares.
- c. Within the TND district, setback restrictions of the (town name) Zoning

Bylaw/Ordinance shall not apply. Setbacks shall be those established by the TND bylaw in Section 4.5.

- d. The front of an attached garage shall be set back at least twenty (20) feet from the front facade of the principal building of which the garage is a part.

1.45 Building Regulations for Specific Lot Types and Frontages

A varied mix of land uses is fundamental to the concept of a TND. The following table of land uses establishes lot size, frontage and setback requirements for each land use type:

Table _____ TND Building Regulations

Land Use Type	Lot Size	Setbacks	Frontage
<p>Open Space Open space is land not covered by buildings, parking lots, private residential yards, easements, setbacks, streets, public or private golf courses. Open space may be used solely for parks, street boulevards, greenbelts, squares, community gardens, and as natural areas. Open space must be owned by a property owner’s association, a land trust or similar organization, or town.</p>	N/A	N/A	N/A
<p>Civic Community meeting hall, library, post office, museum, historical society, public school, theater for performing arts, etc.</p>	N/A	N/A	N/A
<p>Residential type I One and two-family detached dwellings. Their function is residential, but they may contain limit office and limited lodging.</p>	<p>Max.-20,000 sq.ft. Min. lot size: 4,000 sq.ft.</p>	<p>Front-10 ft. min-40 ft. max. Side – 8 ft. min Rear – 30 ft. min.</p>	<p>Min – 24 ft. Max – 150 ft.</p>
<p>Residential Type II Attached home lots reserved for townhouses or row houses.</p>	<p>Max. – 5,000 sq. ft. Min – 2,800 sq. ft.</p>	<p>Front – 5 ft. min 15 ft. max. Side – 0 ft. min Rear – 35 ft. min</p>	<p>Min- 16 ft./unit Max. – 30 ft./unit</p>
<p>Small Business/Office These lots are reserved for small-scale retail and office uses. Structures may provide a variety of uses and are designed to be flexible and compatible with residential and other commercial use lots.</p>	<p>Max. – 20,000 sq. ft. Min – 2,560 sq. ft.</p>	<p>Front – 0 ft. Side – 0 ft. required Rear – 20 ft. required</p>	<p>Max. – 250 ft. Min. – 24 ft.</p>

Table _____ TND Building Regulations continued

<p>Commercial These lots are reserved for somewhat larger commercial enterprises, usually requiring greater parking spaces.</p>	<p>Max. – 20,000 sq. ft. Min. – 10,000 sq. ft.</p>	<p>Front – Max. 15 ft. Side – 0 ft. required Rear – 20 ft. required</p>	<p>Max. – 250 ft. Min. – 24 ft.</p>
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1.46 Miscellaneous Design Standards

- a. **Porches.** Porches are encouraged for residential uses and may be built within the setback line or required front area. Where porches are not built, a “picket” fence or garden wall a minimum of two (2) feet in height is required.
- b. **Pedestrian Crossings.** Street and pedestrian way design shall minimize pedestrian crossings at through streets. 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 6 feet wide at the same surface elevation as the adjacent pavement. The warning bands shall be located between twenty and sixty feet from a pedestrian crossing.
- c. **Lighting.** Street lights shall be provided along all active pedestrian ways no more than one hundred feet apart. Such street lights shall consist of a pole or pedestal mounted luminaire, ten to twelve feet in height, having a full-spectrum bulb of not more than one hundred seventy-five watts.
- d. **Appearance/Architectural Design:** Architectural design shall be compatible with the character and scale of buildings in the neighborhood and the Town/City through the use of appropriate building materials, screening, breaks in roof and wall lines 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.

1.47 Landscape Standards

- a. Street trees shall be planted within the right-of-ways parallel to the street along all streets. Trees shall have a minimum spread of 7’ and a minimum caliper of 2.5” at the time of planting.
- b. Tree spacing shall be determined by species type. Large maturing trees shall be planted a minimum of 40 feet and a maximum of 50 feet on center. Small and medium maturing trees shall be planted a minimum of 10 feet and a maximum of 30 feet on center.

1.48 Modifications to Standards

The Planning Board may permit the modification of the provisions of this bylaw/ordinance, including but not limited to provisions relating to the percentage of types of dwelling units and the amount of commercial development, in order to encourage traditional neighborhood development, based on the following standards:

- a. The design and improvement of the TND shall be in harmony with the purpose and intent of this bylaw.
- b. The design and improvement of the TND shall generally enhance the development plan, or in any case not have an adverse impact on its physical, visual, or spatial

characteristics.

- c. The modification shall not result in configurations of lots or streets which shall be impractical or detract from the appearance of the proposed TND.
- d. Landscaping and other methods shall be used to insure compliance with the design standards and guidelines of this bylaw.
- e. The minimum lot size of any lot to be created shall not be reduced below the requirements of this bylaw.
- f. The landowner shall demonstrate that the proposed modification will improve the TND.

1.5 PARKING

1.51 General Standards

There shall be no minimum parking requirements in the TND. Land reserved for parking shall comply with the following maximum parking regulations within the TND.

- a. Office: Three (3) parking spaces per one thousand (1,000) square feet.
- b. Small Business: Five (5) parking spaces per one thousand (1,000) square feet.
- c. Restaurants: Twenty (20) spaces per one thousand (1,000) square feet.
- d. Residential: One and one-half (1.5) spaces per dwelling unit.

1.52 Specific Standards

- a. Parking lots shall generally be located at the rear of, or at the side of buildings and shall be no closer than 6 feet from a building.
- b. When two adjacent lots contain parking areas it is encouraged to develop them as one parking area.
- c. 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 particular residential properties, and provide the parking area with a reasonable measure of shade, when trees reach maturity. In order to achieve these objectives, parking lots exposed to view shall be surrounded by a minimum of a five foot high, year-round visually impervious screen, hedge, or wall. The height of any required screen shall decrease where driveways approach sidewalks or walkways, in order to provide adequate visibility of pedestrians from motor vehicles, and shall not interfere with clear sight requirements.
- d. 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. Parking lots with ten or less spaces may not require interior landscaping if the planning board determines that there is adequate perimeter landscaping. If this perimeter landscaping is found to be inadequate, and in parking lots with eleven or more spaces, a minimum of one deciduous shade tree shall be planted for every six parking spaces. A six foot planting diamond or equivalent planter is required. Choice of plant materials, buffer width, type of screening, location, and frequency of tree planting shall be flexible, provided these objectives are substantially satisfied.
- e. Parking lot layout shall take into consideration pedestrian circulation - pedestrian crosswalks shall be provided, where necessary and appropriate, and shall be distinguished by textured paving, and integrated into the wider network of pedestrian walkways.

1.53 Property Owner's Association

- a. Membership in a Property Owners Association (POA) established by the Master Developer shall be mandatory for all property owners within the TND, and shall be required as a covenant in all deeds to property in the TND granted after Definitive Plan approval.
- b. Common elements including, but not limited to, open space, recreation, plazas, roads, parking, sewer, water, and stormwater management facilities which will not be publicly owned, shall be subject to a form of ownership established in private agreements acceptable to the town, upon recommendation of the town's attorney.
- c. The Master Developer shall prepare documents which provide at a minimum that the POA shall accept title to any open space or Civic Lots which may be deeded to them, and shall provide for the maintenance of any common area improvements, private streets or sidewalks, rights-of-way, Civic Buildings, utilities, open space or Civic Lots or other property owned by the owners association. The documents shall establish voting and use rights and shall provide for the collection of dues, levies or assessments to cover expenses including, but not limited to, tax liabilities, maintenance, insurance, and municipal or state assessments. The homeowner's association shall have the authority to acquire a lien upon the property of any of its members in order to secure collection of any amounts due.
- d. The town shall be authorized to maintain the common elements and assess the private ownership accordingly if private ownership fails to function as required in any private agreements.

1.54 Severability and Enforcement

- a. **Conflict with other laws.** All development activities with the TND shall comply with applicable laws, regulations, and standards of the (Name of Town), 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 laws.
- b. **Severability.** If any section or provision of this TND Bylaw is found by a court of competent jurisdiction to be invalid, such invalidity shall not affect the validity of any other section or provision of this TND Bylaw.
- c. **Enforcement.** The administration, enforcement, and penalties of (refer to appropriate local zoning bylaw section) are hereby included by reference as applicable to the TND. In addition to the Town's enforcement rights and obligations, the homeowner's association(s) shall have these same enforcement rights and the authority to seek equitable remedies at law against any lot owner, tenant, or other TND user if a nuisance or violation of the TND has been created.

Active Pedestrian Way: Land area or areas developed for immediate use by pedestrians, including sidewalks, bicycle paths and jogging trails.

Building Height: The vertical distance from the average finished ground level of a building to: the highest point of the coping of a flat roof; or to the decline of a mansard roof; or to the average of the heights of the eaves and the height of the highest ridgeline for a pitched or hipped roof.

Build-to-Line: A line establishing a location for all, or a specified portion of, a structure's

facade or vertical face.

1.6 STREET STANDARDS

1.61 Street Standards for Inclusion in Subdivision Regulations

TND Streets and layouts shall meet the following performance standards:

- a. Streets serve as the main public space of any town and are the primary vantage points from which a town is observed. They should be designed as a public space containing sidewalks, trees, lighting, signs and buildings.
- b. Design of streets should provide for both the movement of traffic and to invoke the unique qualities of the place.
- c. Street networks should be designed to be a series of interconnected streets to allow traffic to filter through a variety of routes rather than concentrating all traffic from a neighborhood onto a single major collector road. The network should facilitate the movement of traffic at a slower speed to encourage pedestrian traffic through the use of on-street parking, narrower streets, smaller curb radii, and placing buildings closer to the streets.
- d. Pedestrian activity is also encouraged by the relationship of width of the street to the height of adjacent buildings or trees. A height of 1 and a width of 3 is preferred. In any case, the maximum height to width ratio should be 1 to 5.

1.62 General Street Standards

- a. A hierarchy of street types shall be established as described in sections 2.0 through 6.0.
- b. All streets, alleys and pedestrian pathways shall connect to other streets within the neighborhood and connect to existing and projected through streets outside the development.
- c. Alleys shall be provided for access to the rear of residential lots
- d. Streets may terminate at the intersection of another street or at the rear of a private or public lot.
- e. All lots and private/public tracts shall be accessible by a street with a minimum all-weather driving surface of 20 feet.
- f. The average perimeter of all blocks within the TND shall not exceed 1500 feet. No block side shall have more than 500 feet of street frontage without a dedicated street alley or pedestrian pathway providing access through it.
- g. Prominent streets shall be designed to have a unique terminal view, such as a specifically designed building facade, a scenic view, or a public monument.
- h. Street layouts forming blocks shall be connected in a grid fashion and generally rectilinear with "deformations" as may be physically proper to adapt streets to topographic or other natural conditions, including the preservation of large trees, and waterbodies.

1.63 Type 1 Lane or Alley: A lane shall be a private street or easement and shall not be dedicated to the community and shall be characterized by the following:

- a. Adjacent land uses shall include: garages, parking pots, and accessory units above garages.
- b. The minimum paved width shall be 12 feet.
- c. The width of the right-of-way or easement shall be 20 feet.
- d. Buildings or fences shall be set back a minimum of 3 feet.

- e. No parking is permitted on either side of the right-of-way.
- f. Lane or alley lighting shall be provided on all garages or on poles adjacent to parking areas. Lighting fixtures and poles shall be consistent in architectural style and shall complement the predominant architectural theme.
- g. Design speed shall not exceed 10 m.p.h.

1.64 Type 2 Two-way residential street (parking on one side) shall be characterized by:

- a. Adjacent land uses shall include small and medium single family lots, duplex units, townhouses, multi-family, large lot single family with large setbacks.
- b. The right-of-way width is 44 feet.
- c. The paved width is 24 feet.
- d. Curbside parking shall be permitted on only one side of the road.
- e. Sidewalks shall be provided on both sides of the road, and shall be a minimum of four feet in width.
- f. Curbing shall be required. Granite block curbing or equivalent is recommended.
- g. Decorative street lamps, a maximum of twelve feet in height shall be provided on both sides of the street, at a minimum spacing of 80 feet on center, and at intersections.
- h. Design speed shall not exceed 25 m.p.h.

1.65 Type 3 Two-way residential street (parking on two sides) shall be characterized by the following:

- a. Adjacent land uses shall include small, medium, and large single family lots, duplex units, townhouses, multi-family, and home offices.
- b. The right-of-way width shall be 60 feet.
- c. The paved width shall be 34 feet.
- d. Curbside parking is permitted on both sides of the street, except within 25 feet of any intersection.
- d. Sidewalks are required on both sides of the street, a minimum of five feet in width.
- f. Curbing shall be required.
- g. Design speed shall not exceed 25 m.p.h.

1.66 Type 4 Commercial Mixed Use street shall be characterized by:

- a. Adjacent land uses shall include: community buildings, commercial, office or retail mixed use.
- b. The right-of- way width is 64 feet.
- c. The paved width is 40 feet.
- d. Parallel parking shall be provided on both sides of the street. Diagonal head-in parking may be permitted along the front of commercial uses and/or the community green, in which case no parking will be permitted on the other side of the street. Curbside parking shall not be permitted within 25 feet of an intersection.
- e. Planted parkways with a minimum width of five feet shall be provided, except where the road abuts a community green. The planting parkway abutting the community green shall be a minimum of nine feet in width. Along commercial uses, brick pavers may be substituted for vegetative ground cover typically found in parkways of residential areas. Sidewalks shall have a minimum width of six feet, except along commercial uses where the sidewalk shall be ten feet in width. At corners, handicapped ramps shall be provided and sidewalks shall be continued across street surfaces using paving materials to

delineate crosswalks.

- f. Design speed shall not exceed 25 m.p.h.

1.67 Type 5 Two lane arterials are characterized by:

- a. Adjacent land uses shall include agricultural, open space, large lot single family estates (six plus acres).
- b. The right-of-way width shall be 70 feet.
- c. The paved width shall be 22 feet.
- d. A six foot wide bicycle path or a five foot wide sidewalk shall be located on a minimum of one side of the road, with a minimum setback of six feet from the roadway.
- e. Curbside parking is not permitted.
- f. The design speed shall not exceed 45 m.p.h.
- g. Decorative street lamps, not exceeding sixteen feet in height, shall be provided at intersections.

MODEL TRANSFER OF DEVELOPMENT RIGHTS BYLAW/ORDINANCE

Prepared by Pioneer Valley Planning Commission 9-5-14

SECTION 1.0 PURPOSES

- 1.00 The purposes of this bylaw/ordinance is to allow for the transfer of development rights from outlying lands designated as critical resource areas to designated areas and properties within and near developed centers in the Town/City, in order to further the following public interests:
- a) The protection of farmland, aquifer recharge and areas of important rural character;
 - b) The protection of greenbelts along river corridors;
 - c) The protection of the visual and ecological integrity of the upland and mountain areas;
 - d) The preservation of remaining rural, historic and agricultural character through the fostering of compact, appropriately dense housing and mixed use business development in and near existing downtown and outlying village centers and other areas already served by public services, infrastructure, transportation, and access to employment.
 - e) Promoting the retention and strengthening of existing traditional neighborhood developments with compact, pedestrian-friendly, predominantly residential areas on gridded streets in village centers;
 - f) The preservation, rehabilitation, and restoration of historic structures, buildings, sites, and landscapes;
 - g) The preservation and enhancement of property values and the opportunity for a fair economic return to property owners; and
 - h) The preservation of the remaining rural, historic, and agricultural character of the community by directing compact new development to appropriate locations adjacent to existing village centers.

SECTION 2.0 TRANSFER OF DEVELOPMENT RIGHTS

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

SECTION 3.0 ELIGIBILITY & PERMITTING

- 3.1 All lots shown on a plan, or described in a deed, recorded at the Registry of Deeds in a Sending Area are eligible to apply for a Special Permit from the Special Permit Granting Authority to transfer all or part of the development rights on the subject property or properties in the Sending Area to a lot in the Receiving Area. The Special Permit Granting Authority shall be that permit granting body authorized to act on the associated use or development method for which the transfer is sought.

SECTION 4.0 ESTABLISHMENT OF SENDING AND RECEIVING AREAS

- 4.1 The following areas are hereby established as overlay districts:

- a) TDR Sending (TDRS) District
- b) TDR Receiving (TDRR) District

These districts are as delineated on the Official Zoning Map incorporated as part of this Zoning Bylaw/Ordinance.

SECTION 5.0 SPECIAL PERMIT PROCESS FOR TRANSFER OF DEVELOPMENT RIGHTS

- 5.1 Any applicant proposing to develop specified land in a Receiving Area at an increased density allowed under Table 2 of this Bylaw/Ordinance with transfer of development rights shall make an application 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 shall document the basis for the number of development rights proposed for transfer.
- 5.2 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:
 - a) After conferring with the Conservation Commission, all acreage which is identified as wetlands, Floodplain District, 100-year floodplain, or riverfront area under the Mass Rivers Protection Act shall be added together to constitute the Unbuildable Land Area. The Conservation Commission may require the applicant to complete wetland delineations or identify the boundaries of riverfront resource area. Fifty percent (50%) of the Total Unbuildable Land Area shall then be subtracted, leaving a Net Parcel Area.
 - b) Eight percent (8%) of the Net Parcel Area shall then be subtracted, to account for land which would be used for roads if the parcel were developed. The remainder shall be considered the Net Buildable Area for the purposes of this calculation.
 - c) Using the minimum lot area and frontage for the applicable zoning district(s) for the parcels in the Sending Area, determine the number of lots allowable in the Sending Area property or properties based on a conceptual development plan;
- 5.3 The Special Permit Granting Authority shall review the applicant's assessment of acreage and lots eligible for transfer, and shall make a final determination of the lots eligible for transfer.
- 5.4 The applicant shall also file with the Special Permit Granting Authority a preliminary development plan for the parcel in the Receiving Area, indicating the lots created using the transferred development rights, and illustrating all wetland and floodplain areas.
- 5.5 The applicant shall propose and the Special Permit Granting Authority shall determine one or more entities to hold the permanent restriction on the property or properties in the Sending Area. The restriction may: (1) be conveyed to the Town/City and be accepted by it for conservation or farmland use, or (2) be conveyed to a non-profit organization, the principal purpose of which is the conservation of open space or preservation of farmland, or (3) be conveyed to a private, non-profit or public entity for the purposes for which the restriction is established, with the restriction being made enforceable by the Town/City and providing that the land in question shall be kept in an open or natural state, or shall be actively farmed, and shall not be built upon for residential use or developed for accessory uses such as parking or roadway. The entity or entities and the applicable state agencies shall be notified of the application and shall be provided with drafts of the proposed permanent restriction for review and comment.

- 5.6 Approval of the Special Permit shall require the applicant to submit to the Town/City Clerk, with a copy to the Special Permit Granting Authority, a valid instrument granting to the Town, or other entity authorized in Section 5.5 above, a permanent Conservation Restriction or Agricultural Preservation Restriction for the eligible land in the TDR Sending District from which development rights are transferred. If the designated holder(s) of the restriction(s) includes the Town/City, then the restriction shall be transmitted as a gift of land interest to the Town/City for conservation purposes to be under the care, control, and custody of the conservation commission in accordance with G.L. c. 40, Section 8C, subject to the certification of the Conservation Commission, and the approval of the Board of Selectmen.
- 5.7 The Special Permit Granting Authority shall not approve any Special Permit for Transfer of Development Rights for a project where the subject property in the TDR Receiving District is not served by public sewer and water lines.
- 5.8 Upon final approval of site plans and acceptance by the recipient or recipients of the permanent restriction, the Special Permit Granting Authority shall make a decision to grant, deny, or grant with conditions, the Special Permit to increase in number and density of units in the TDR Receiving District, based on Tables 1 and 2 in Section 6.0.

In addition to the Special Permit findings under Section (Special Permit section of zoning bylaw/ordinance), the Special Permit Granting Authority shall find that the following criteria are met before granting a Special Permit for transfer of development rights:

- a) The proposed use is in harmony with the purposes of this Article, as set forth in Section 1.00.
- b) The proposed use meets all of the procedural, dimensional and density requirements, and design standards of this Article, except as otherwise altered by another Special Permit.

- 5.9 Following the granting of a Special Permit under this Article, and upon a determination by Town Counsel that the Conservation Restriction or Agricultural Preservation Restriction document is valid and sufficient, the Select Board shall vote to authorize acceptance of the Conservation Restriction or Agricultural Preservation Restriction by either the Conservation Commission or a designated non-profit land trust or other approved entity. If the Special Permit application is valid and sufficient, the Conservation Commission, acting on behalf of the Town, shall accept the Conservation Restriction for recording in the County Registry of Deeds.

SECTION 6.0 TDR DIMENSIONAL & DENSITY REGULATIONS

- 6.1 Each residential building lot within the TDR Sending District authorized under Section 5 is equivalent to one of the development rights in the TDR Receiving District shown in the following Table 1, Exchange Standards for Transfer of Development Rights.

TABLE 1. EXCHANGE STANDARDS FOR TRANSFER OF DEVELOPMENT RIGHTS

Sending District	Receiving District	Notes
1 RESIDENTIAL BUILDING LOT EQUALS:	A 5% increase in maximum building coverage for a single commercial or industrial lot	1) The Planning Board may allow an increase in building coverage from the maximum building coverage required in Table 2 - Dimensional Regulations, up to a maximum 75% building coverage for commercial or industrial uses.

OR	1.2 residential building units, plus a 5% increase in residential building coverage	2) An additional 10% increase in the number of units may be allowed if the development provides for affordable home ownership. Affordable housing shall be as defined in Section ____ and controlled by deed.
OR	1 neighborhood commercial building lot	3) See Section ____ 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.
OR	A reduction in required parking of twenty commercial parking spaces, or	4) The Planning Board may reduce the minimum parking requirements in Section ____ of the Zoning Bylaw 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. To obtain this waiver, the applicant shall 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.).
OR	an increase of 5 feet in building height, or	5) The maximum increase in building height shall be 15 feet.
OR	A reduction in minimum front setback requirements of five feet	6) The maximum reduction in front setback requirements shall be five feet.
OR	A reduction in minimum side or rear yard requirements of five feet	6) The maximum reduction in side or rear yard requirements shall be five feet.
OR	A reduction of 20 feet in frontage requirements.	6) The maximum reduction in frontage requirements shall be 40 feet.

6.2 For development rights purchased for every one (1) lot meeting minimum dimensional requirements for the zoning district within the TDR Sending District, the developer can add the equivalent of 1.2 residential lots or one neighborhood commercial lot in a Traditional Neighborhood Development in the TDR Receiving District above what could normally be built under the underlying zoning standards, provided the dimensional requirements indicated in Table 2 of this Bylaw and other requirements of the bylaw are met. Fractions of building lots at or above 0.5 shall be rounded up to the next whole number.

For example, if a developer buys the development rights to 14 buildable lots in the TDR Sending District, the developer is entitled to:

$$14 \text{ lots} \times 1.2 = 16.8 \text{ lots}$$

in addition to the underlying density in the TDR Receiving District. In this example case, with the transfer of development rights the applicant could construct 17 units above what could normally be built under the underlying zoning standards.

- 6.3 A landowner may sell less than the total number of development rights available on a parcel or parcels, provided that the subject property is subdivided and a permanent restriction as required under the Section 5 of this bylaw is placed on the portion from which development rights are transferred.
- 6.4 The maximum limits on density, building coverage, and parking reductions permitted to be developed by Special Permit in the TDR Receiving District shall be determined by reference to the Table 2, TDR Dimensional Standards for TDR Receiving District found below in this section.

TABLE 2. TDR DIMENSIONAL STANDARDS FOR RECEIVING AREAS*

Underlying Zoning District	Dimensional Requirements in Underlying Zone	Dimensional Requirements in Receiving District (with TDR)
R-VC Village Center Residence	Min. Lot Size: 15,000 s.f. Min. Frontage: 120 ft. Min. Front Setback: 15 ft. Min. Side Setback: 15 ft. Min. Rear Setback: 15 ft. Max. Building coverage: 25% Max. Lot Coverage: 40% Max. Height: 35 feet	Min. Lot Size: 12,000 s.f. Min. Frontage: 100 ft. Min. Front Setback: 10 ft. Min. Side Setback: 10 ft. Min. Rear Setback: 10 ft. Max. Building coverage: 35% Max. Lot Coverage: 45% Max. Height: 40 feet
B-VC Village Center Business	Min. Lot Size: 15,000 s.f. Min. Frontage: 100 ft. Min. Front Setback: 10 ft. Min. Side Setback: 25 ft. Min. Rear Setback: 25 ft. Max. Building coverage: 35% Max. Lot Coverage: 70% Max. Height: 40 feet	Min. Lot Size: 10,000 s.f. Min. Frontage: 80 ft. Min. Front Setback: 10 ft. Min. Side Setback: 15 ft. Min. Rear Setback: 15 ft. Max. Building coverage: 45% Max. Lot Coverage: 85% Max. Height: 50 feet
B-G General Business	Min. Lot Size: 12,000 s.f. Min. Frontage: 100 ft. Min. Front Setback: e Min. Side Setback: e Min. Rear Setback: e Max. Building coverage: 70% Max. Lot Coverage: 95% Max. Height: 50 feet	Min. Lot Size: 10,000 s.f. Min. Frontage: 80 ft. Min. Front Setback: Min. Side Setback: Min. Rear Setback: Max. Building coverage: 75% Max. Lot Coverage: 95% Max. Height: 50 feet
B-L Limited Business abutting B-G	Min. Lot Size: 20,000 s.f. Min. Frontage: 125 ft. Min. Front Setback: 20 ft. Min. Side Setback: 25 ft. Min. Rear Setback: 25 ft. Max. Building coverage: 35% Max. Lot Coverage: 70% Max. Height: 35 feet	Min. Lot Size: 15,000 s.f. Min. Frontage: 80 ft. Min. Front Setback: 10 ft. Min. Side Setback: 15 ft. Min. Rear Setback: 15 ft. Max. Building coverage: 45% Max. Lot Coverage: 85% Max. Height: 40 feet

*Note: Sample for illustration purposes only.

- 6.5 TDR Transaction Reporting: Buyers and sellers must report to the Building Commissioner all TDR transactions (options, sales, gifts, donations) within ten (10) business days of the effective date of the transaction.

SECTION 7.0 RELEASES OF RESTRICTIONS

- 7.1 No Conservation Restriction or Agricultural Preservation Restriction which has been conveyed under this Bylaw may be released unless the provisions for release of Agricultural Preservation Restrictions such restrictions in M.G.L. Chapter 184, Section 32 have been met, which include:

- a) 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;
- b) The restriction shall only be released by its holder(s) only if the land is no longer deemed suitable for agricultural or horticultural purposes and the release is approved by vote of the Amherst Select Board and Conservation Commission and/or by the holder's governing body if a private non-profit land trust, and by a two-thirds vote of both branches of the Massachusetts General Court, in accordance with the provisions of Article 97 of the Amendments to the Massachusetts Constitution.

SECTION 8.0 ALTERNATE METHOD FOR TDR TRANSACTIONS

- 8.1 In lieu of transferring development rights using the process described Sections 5-7 above, an applicant for a Special Permit under Section 5 may elect to make a cash contribution to the Town/City Conservation Fund to be used for the purpose of purchasing agricultural preservation restrictions, conservation restrictions or other permanently protected open space for conservation purposes. The Conservation Commission shall oversee all expenditures from this fund.
- 8.2 In either case, 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 farmland required by the average cost for the purchase of Agricultural Preservation Restrictions in the _____ County over the previous three years, as determined by the Conservation Commission.
- 8.3 Additionally, a combination of cash contribution and transferred development rights may be applied towards an application under this bylaw.

SECTION 9.0 REGISTRY OF WILLING SELLERS

The Town shall establish and maintain a confidential registry of landowners in the Sending Area who have expressed interest in selling development rights under this bylaw. Applicants for TDR may use this registry to seek development rights from landowners.

SECTION 10.0 BANKING OF DEVELOPMENT RIGHTS

- 10.1 Development rights in the TDR Sending Zone may be purchased, donated, or exchanged, or any combination thereof, by private for-profit or non-profit entities or by government agencies, and banked for future use in the Receiving Zone. A Special Permit is not required for purchasing Development Rights, but is required for transfer and use of Development Rights in the Receiving Zone. The number of development rights eligible for banking shall be determined by the landowner and Planning Board or planning staff using the procedure under Section 6 above.
- 10.2 A parcel must be placed under a permanent restriction as defined under this bylaw prior to or simultaneously with sale, donation, or exchange of development rights from the parcel. An instrument defining the number of development rights sold, donated, or exchanged in the initial transaction and in each subsequent transaction shall be recorded in the _____ County Registry of Deeds, and a copy thereof delivered to the Building Commissioner.
- 10.3 Banked development rights may be redeemed for use in the Receiving Area, upon approval under a Special Permit granted as set forth in Section 5.

SECTION 11.0 TRADITIONAL NEIGHBORHOOD DEVELOPMENT REGULATIONS

11.1 Minimum Standards Required for a Traditional Neighborhood Development

The Traditional Neighborhood Development permits greater residential densities than allowed in the Residential _____ district. This greater density is only permitted when development rights from the Sending Area are transferred to the Receiving Area as described in this ordinance. The following standards are required for the approval of a Traditional Neighborhood Development:

- a) Public water and sewer service is required for all development. 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 one ownership, or shall be the subject of an application filed jointly in accordance with an approved plan.

11.2 Uses Allowed by Special Permit in a Traditional Neighborhood Development

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, 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. These uses may include:
 - Service oriented business, including bank, barber shop, beauty salon, medical or dental clinic, and automatic self-serving laundry;
 - 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;
- c) Home office;
- d) Accessory uses, buildings, and structures customarily incidental to any primary use located on the same lot.

11.3 TND Design Standards

1. Porches are encouraged for residential uses. Open porches may be built within the setback line or required front yard.
2. Street and pedestrian way design shall minimize pedestrian crossings at through streets. 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 6 feet wide at the same surface elevation as the adjacent pavement. The warning bands shall be located between twenty and sixty feet from a pedestrian crossing.
3. Street lights shall be provided along all active pedestrian ways no more than one hundred feet apart. Such street lights shall consist of a pole or pedestal mounted luminaire, ten to twelve feet in height, having a full-spectrum bulb of not more than one hundred seventy-five watts.
4. Architectural design shall be compatible with the historic character and scale of buildings in the neighborhood and the City through the use of appropriate building materials, screening, breaks in roof and wall lines, 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.
5. Stoops, open colonnades, and open porches may encroach into front setbacks as indicated in this ordinance but not closer than ten (10) feet from the street right of way.
6. All lots shall have an uninterrupted sidewalk at least 5 feet wide the entire width of the lot frontage.

7. The front of an attached garage shall be set back at least twenty (20) feet from the front facade of the principal building of which the garage is a part.

11.4 TND Landscape Standards

1. Street trees shall be planted within the right-of-ways parallel to the street along all streets. Trees shall have a minimum height of 6' and a minimum caliper of 2.5" at the time of planting. Where possible, a minimum of six (6) feet wide landscaped belt will be created to plant the street trees.
2. Tree spacing shall be determined by species type. Large maturing trees shall be planted a minimum of 40 feet and a maximum of 50 feet on center. Small and medium maturing trees shall be planted a minimum of 10 feet and a maximum of 30 feet on center.
3. Utilities shall be located in the street and not in the tree belt, wherever possible.

11.5 Parking Standards

1. Parking required for residential uses, if not provided on individual lots, may be provided on street, or in combined parking lots, provided each dwelling unit has at least one parking space within five hundred (500) feet from its property boundary.
2. Parking lots 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 commercial, office or mixed-use building.
3. When two adjacent lots contain parking areas it is encouraged to develop them as one 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-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 deciduous shade tree shall be planted for every six parking spaces. A six 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

<u>Use</u>	<u>Minimum Parking Spaces Required</u>	<u>Maximum Parking Spaces Permitted</u>
a) Residential	One (1) space per dwelling unit	Two (2) spaces per dwelling unit
b) Other Uses	As per Section 2001 of this ordinance	

11.6 Annual Review

1. The Planning Board shall conduct an annual review of this ordinance at an advertised public meeting in order to assess the success of the ordinance and whether it sets a fair market for development rights. The Planning Board shall make recommendations to the Town for any changes needed in the ordinance structure or process.

Model Water Supply Protection Zoning Bylaw

Prepared by the Pioneer Valley Planning Commission

1.0 Purpose of District

To promote the health, safety and welfare of the community by protecting and preserving the surface and groundwater resources of the Town and the region from any use of land or buildings which may reduce the quality and quantity of its water resources.

1.1 Definitions

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

Groundwater: All water found beneath the surface of the ground.

Hazardous Waste: A waste which is hazardous to human health or the environment. Hazardous wastes have been designated by the Regulations in 310 CMR 30.130 adopted pursuant to the Massachusetts Hazardous Waste Management Act, Massachusetts General Laws, Chapter 21C.

Impervious Surfaces: Materials or structures on or above the ground that do not allow precipitation to infiltrate the underlying soil.

Primary Aquifer Recharge Area: Areas which are underlain by surficial geologic deposits including glaciofluvial or lacustrine stratified drift deposits or alluvium or swamp deposits, and in which the prevailing direction of groundwater flow is toward public water supply wells or potential sites for such wells.

Secondary Aquifer Recharge Area: Areas which are underlain by surficial geologic deposits including till or bedrock, and in which the prevailing direction of surface waterflow is toward public water supply wells or potential sites for such wells.

Toxic or 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 of the (Town/City) of _____. Toxic or hazardous materials include, without limitation, synthetic organic chemicals, petroleum products, heavy metals, radioactive or infectious wastes, acids and alkalis, and all substances defined as Toxic or Hazardous under Massachusetts General Laws (MGL) Chapter 21C and 21E and 310 CMR 30.00, and also include such products as solvents and thinners in quantities greater than normal household use.

Trucking Terminal: Business which services or repairs commercial trucks which are not owned by the business.

Wastewater Treatment Works: Any wastewater treatment plants or works, including community septic systems, which require a permit from the (State Agency).

Watershed: Lands lying adjacent to water courses and surface water bodies which create the catchment or drainage areas of such water courses and bodies.

Zone I Recharge Area: That circle of a 400-foot radius extending around the wellhead of a drinking water well with the wellhead at its center and including all land within the boundaries of said circle.

Zone II Recharge Area: Means that area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at safe yield, with no recharge from precipitation). It is bounded by the groundwater divides which result from pumping the well and by the contact of the aquifer with less permeable materials such as till or bedrock. In some cases, streams or lakes may act as recharge boundaries. In all cases, Zone II shall extend up gradient to its point of intersection with prevailing hydrogeologic boundaries (a groundwater flow divide a contact with till or bedrock, or a recharge boundary).

1.2 Scope of Authority

The Water Supply Protection District is an overlay district and shall be superimposed on the other districts established by this bylaw. All regulations of the Town of _____ Zoning By-law applicable to such underlying districts shall remain in effect, except that where the Water Supply Protection District imposes additional regulations, such regulations shall prevail.

1.3 District Delineation

1.3.1 The Water Supply Protection District is herein established to include all lands within the Town of _____, lying within the primary and secondary recharge areas of groundwater aquifers and watershed area of reservoirs which now or may in the future provide public water supply. The map entitled "Water Supply Protection District," Town of _____, on file with the Town Clerk, delineates the boundaries of the district.

1.3.2 Where the bounds delineated are in doubt or in dispute, the burden of proof shall be upon the owner(s) of the land in question to show where they should properly be located. At the request of the owner(s) the Town may engage a professional hydrogeologist to determine more accurately the location and extent of an aquifer or primary recharge area, and may charge the owner(s) for all or part of the cost of the investigation.

1.4 Permitted Uses

The following uses are permitted within the Water Supply Protection District, provided that they comply with all applicable restrictions in this bylaw:

1.4.1 Single family residences;

1.4.2 Residential accessory uses, including garages, driveways, private roads, utility rights of way, and on-site wastewater disposal systems;

1.4.3 Agricultural uses such as farming, grazing and horticulture;

1.4.4 Forestry and nursery uses;

- 1.4.5 Outdoor recreational uses, including fishing, boating, and play areas;
- 1.4.6 Conservation of water, plants, and wildlife; wildlife management areas;
 - 1.4.7 Excavation for earth removal, provided that the requirements of Section 4.6 are met, and an earth removal permit is granted by the Board of Selectmen;
- 1.4.8 Day care centers, family day care homes, and school age child care programs;
- 1.4.9 Structures for educational or religious purposes.

1.5 Prohibited Uses

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

1.5.1 Business and industrial uses, not agricultural, which generate, treat, store, or dispose of hazardous wastes, including but not limited to metal or jewelry plating, chemical or plastics manufacturing, wood preserving, furniture stripping, dry cleaning, and auto body repair, photography laboratories, asphalt plants, hazardous materials processing or transfer, laboratory operations, machine shops, metal working, electronic components or semi-conductor manufacturing, except for the following:

- (1) Very small quantity generators of hazardous waste, as defined by 310 CMR 30.00 as amended which generate less than 20 kilograms or 6 gallons of hazardous waste per month may be allowed by Special Permit in accordance with Section 4.8 of this bylaw;
- (2) Household hazardous waste collection centers or events operated pursuant to 310 CMR 30.390 as amended;
- (3) Waste oil retention facilities required by M.G. L. C.21, s.52A; and
 - (4) Treatment works for the remediation of contaminated water supplies, which are approved by Mass. Department of Environmental Protection and designed in accordance with 314 CMR 5.00 as amended.

1.5.2 Business or industrial uses, not agricultural, which dispose of process wastewaters on-site;

1.5.3 Motor vehicle and boat service and repair businesses, car washes, motor vehicle gasoline sales, automotive body and repair shops, commercial fuel oil storage and sales;

1.5.4 Solid waste landfills, dumps, auto recycling, auto graveyards, junk and salvage yards, landfilling or storage of sludge and septage, with the exception of the disposal of brush or stumps;

- 1.5.5 Storage of liquid petroleum products, except for the following:

- (1) Storage which is incidental to:
 - (a) Normal household use, outdoor maintenance, or the heating of a structure;
 - (b) Emergency generators required by statute, rule or regulation;
 - (c) Waste oil retention facilities required by statute, rule, or regulation;
 - (d) Treatment works approved by the Massachusetts Department of Environmental Protection designed in accordance with 314 CMR 5.00 for the treatment of contaminated ground or surface waters provided that storage, listed in items 1-4 above, shall be in a free standing, above ground container within a structure or within the basement of a structure, with secondary containment adequate to contain a spill the size of the containers total storage capacity. The storage tank and piping must comply with all applicable provisions of 527 CMR 9.00 Massachusetts Board of Fire Prevention regulations.
- (2) Replacement of storage tanks or systems for the keeping, dispensing or storing of gasoline, which existed the time of adoption of this bylaw, provided that:
 - (a) All such replacement storage tanks or systems shall be located underground as required by Mass. Board of Fire Prevention regulation 527 CMR 14;
 - (b) All such storage systems shall be protected by one of the secondary containment systems specified in Mass. Board of Fire Prevention regulations 527 CMR 9.08 (3);
 - (c) The head of the Fire Department may deny an application for tank replacement, or approve it subject to conditions if he or she determines that it constitutes a danger to public or private water supplies, in accordance with 527 CMR 9.26(4)(d).

Replacement of all other storage tanks for liquid petroleum products other than gasoline must be above ground.

1.5.6 Outdoor storage of salt, de-icing materials, pesticides or herbicides;

1.5.7 Dumping or disposal of any hazardous material or hazardous waste on the ground, in water bodies, in septic systems or in other drainage system. This shall include the use of septic system cleaners which contain toxic chemicals such as methylene chloride and 1-1-1 trichlorethane.

1.5.8 Stockpiling and disposal of snow or ice removed from highways and streets located outside of the Water Supply Protection District that contains sodium chloride, calcium chloride, chemically treated abrasives or other chemicals used for snow and ice removal;

1.5.9 Wastewater treatment works subject to a groundwater discharge permit under 314 CMR 5.00 except the following:

- (1) The replacement or repair of an existing system(s) that will not result in a design capacity greater than the design capacity of the existing system(s);
- (2) The replacement of an existing subsurface sewage disposal system(s) with wastewater treatment works that will not result in a design capacity greater than the design capacity of the existing system(s); and
- (3) treatment works designed for the treatment of contaminated ground or surface waters subject to 314 CMR 5.00.

1.5.10 Residential, commercial or industrial uses within Zone I of any municipal water supply well;

1.5.11 Multifamily residents uses which are not served by the municipal sewer system.

1.6 Performance Standards

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

1.6.1 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.

1.6.2 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.

1.6.3 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, 333 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.

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

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

1.6.6 All hazardous materials, as defined in M.G.L. Chapter 21E, 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 the size of the container's total storage capacity.

1.6.7 For commercial and industrial uses, to the extent feasible, run-off from impervious surface shall be recharged on the site by stormwater 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 three foot minimum separation between the bottom of the structure and maximum groundwater elevation.

1.6.8 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.

1.7 Area Regulations

Within the primary aquifer recharge area, the minimum allowable lot size shall be 40,000 square feet in areas not served by municipal sewerage systems.

1.8 Special Permit Uses

1.8.1 Uses Allowed by Special Permit obtained from the Planning Board:

- (1) Commercial, industrial, governmental or educational uses which are allowed in the underlying district, and which are not prohibited in Section 6;
 - (2) With respect to pre-existing non-conforming uses, any of the following changes in an existing business, commercial or industrial use:
 - (a) Increase in generation of hazardous wastes above quantities permitted in the Special Permit for the use;
 - (b) Increase in impermeable surfaces to greater than 15% of lot area or 2500 square feet, whichever is greater;
 - (c) Change of use;
 - (d) Enlargement in the building footprint greater than 25% of the existing footprint.
- (3) The rendering impervious of greater than 15% of the area or 2,500 square feet whichever is greater, 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:

(a) For commercial 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 stormwater infiltration basin, 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.

(b) For residential uses, recharge shall be attained through site design that incorporates natural drainage patterns and vegetation. To the extent possible, stormwater 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 to the extent possible as determined in accordance with infiltration standards and specifications established by the Soil Conservation Service. 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 stormwater management plan.

(4) Excavation for removal of earth, loam, sand, gravel and other soils or mineral substances 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 or structural foundations, freshwater ponds, utility conduits or on-site sewage disposal:

(a) Access road(s) to extractive operation sites shall include a gate or other secure mechanism to restrict public access to the site.

(b) Upon completion of earth removal operations, all altered areas shall be restored with topsoil and vegetative plantings suitable to control erosion on the site. All fine materials, such as clays and silts, removed as part of the earth removal operation and leftover as by-products, shall be disposed of off-site to prevent damage to aquifer recharge characteristics.

1.8.2 Requirements for Special Permit in the Water Supply Protection District

The applicant shall file six (6) copies of a site plan prepared by a qualified professional with the Special Permit Granting Authority. The site plan shall at a minimum include the following information where pertinent:

- (1) A complete list of chemicals, pesticides, fuels and other potentially toxic or hazardous materials to be used or stored on the premises in quantities greater than those associated with normal household use.
- (2) Those businesses using or storing such toxic or hazardous materials shall file a hazardous materials management plan with the Planning Board, Hazardous Materials Coordinator, Fire Chief, and Board of health which 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.
- (3) The applicant will submit evidence of compliance with the Regulations of Massachusetts 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.
- (4) Drainage recharge features and provisions to prevent loss of recharge.
- (5) Provisions to control soil erosion and sedimentation, soil compaction, and to prevent seepage from sewer pipes.
- (6) Periodic water quality monitoring may be required by the SPGA, including sampling of wastewater disposed to on-site systems and sampling from groundwater monitoring wells to be located and constructed as specified in the Special Permit with reports to be submitted to the SPGA, the Board of Health, and the Board of Water Commissioners. The costs of monitoring, including sampling and analysis, shall be borne by the owner of the premises.

1.8.3 Additional Procedures for Special Permit in the Water Supply Protection District:

- (1) The Special Permit Granting Authority shall follow all special permit procedures contained in Section ___ of this By-law. In addition the Special Permit Granting Authority shall distribute copies of all application materials to the Board of Health, the Conservation Commission, and the Water Commissioners, each of which shall review the application, and following a vote, shall submit recommendations and comments to the Special Permit Granting Authority. Failure of boards to make recommendations within 35 days of distribution of the applications shall be deemed to be lack of opposition. One copy of the application materials shall be transmitted to or retained by the Town Clerk for viewing by the public during office hours.
- (2) The Special Permit Granting Authority may grant the required special permit only upon finding that the proposed use meets the following standards and those specified in Section ___ of this bylaw. The proposed use must:
 - (a) In no way, during construction or thereafter, adversely affect the existing or potential quality or 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.
- (3) The Special Permit Granting Authority shall not grant a special permit under this section unless the petitioner's application materials include, in the Board's opinion, sufficiently detailed, definite and credible information to support positive findings in relation to the standards given in this section.

1.9 Non-conforming Use

Non-conforming uses which lawfully existed, begun or in receipt of a building or special permit prior to the first publication of notice of public hearing for this bylaw may be continued. Such non-conforming uses may be extended or altered, as specified in M.G.L. Ch. 40a, Sec. 6, provided that there is a finding by the Planning Board that such change does not increase the danger of surface or groundwater pollution from such use.

