

# **Innovative Water Bylaws and Ordinances in Massachusetts: Protecting Rivers and Streams Through Local Authority**

MASSACHUSETTS  
Rivers Alliance



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## **Disclaimer**

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## **I. Introduction**

Because Massachusetts, as a home rule state, delegates much of the responsibility for governing its citizens to local authorities, the onus of best practices and enacting strong, local environmental protections falls to the Commonwealth's cities and towns. However, because conservation rules can differ significantly from one community to the next, environmental protections for natural resources vary widely in effectiveness.

This paper features some of the most innovative bylaws and ordinances currently in place in Massachusetts cities and towns to ensure the protection and conservation of rivers and streams; case studies that illustrate how existing bylaw or ordinance language could be strengthened to protect rivers; and best practices for educating the public and ensuring support in passing a new bylaw or ordinance.

## **II. Home Rule Authority Background**

Massachusetts is one of only ten states in the nation that has granted municipalities "home rule" authority. Home rule provisions in the United States date back to the mid-18<sup>th</sup> century, when they were established to strengthen local autonomy and self-governance for municipalities, cities, towns, and counties. Distinctions about "right to self-rule" emerged as legal precedent under the Supreme Court case *Hunter v. City of Pittsburgh* (1907), where the "Dillon Rule," which granted local authority only under the guise of specific state approval, was established as precedent; states were deemed "supreme" in all matters unless stated otherwise by the General Court. However, under the adoption of Amendment Article 89 and M.G.L. Ch. 43B in 1966, Massachusetts determined that any municipality in the Commonwealth could exercise any power ordinarily granted to the state legislature with approval of its legislative body (i.e. city council or town meeting) with the exception of powers delegated exclusively to the state: election regulation, taxation, municipal crediting, disposal of parkland, imposition of criminal penalties and enactment of private/civil laws. The state legislature also retained the ability to overturn local decisions on a case by case basis. A community can "petition" for home rule authority beyond the scope of these powers, approved only by local and state legislative consent. Home rule authority is what gives cities and towns the authority to adopt ordinances and bylaws to regulate particular uses within their boundaries.

## **III. Bylaw Categories and Model Language**

This paper highlights current municipal bylaw and ordinance language for the following categories:

- Coldwater fisheries
- Flood hazard protection
- Greywater
- Illicit water withdrawals
- Impervious cover - permeable paving and parking
- Private wells and nonessential outdoor watering restrictions
- Stormwater management
- Water savings cost estimates
- Wetlands protection

In the interest of brevity, we have included only a portion of the relevant bylaw or ordinance language in this document. We have highlighted sections that we consider to be particularly unique in each of the featured bylaws or ordinances. We encourage readers to review the entirety of the featured bylaw or ordinance language by visiting the town or city websites of the included communities.

### Coldwater Fisheries

**Context:** Strong coldwater fish species populations demonstrate that stream or river ecosystems are healthy and that water quality is excellent. Coldwater streams and rivers also provide critical habitat for a variety of rare and recreationally-important species. Coldwater fisheries often serve as indicators of the health of the watersheds they inhabit. A decline in cold water fish populations can serve as an early warning that the health of an entire aquatic system is at risk. It is critical to recognize the value of these resources and carefully protect them, to ensure their longevity. Increasing temperatures due to climate change make this a challenge, yet protecting these high quality streams is critical to ensuring future of coldwater fisheries in Massachusetts.

**Municipality:** Sudbury - Wetlands Administration Bylaw and Wetlands Administration Bylaw Regulations, 2.6 Cold Water Fisheries Resources. Sudbury's wetlands protection bylaw makes explicit the protection of fisheries as a component of essential protections for the bylaw. Sudbury's wetlands protection regulations include performance standards designed to protect these coldwater resources to the greatest extent possible, even beyond those designated by the Massachusetts Division of Fisheries as coldwater fishery resources.

#### *ARTICLE XXII WETLANDS ADMINISTRATION XXII (11) 1998*

##### *SECTION 1. PURPOSE*

*The purpose of this bylaw is to maintain the quality of surface water, the quality and level of the ground water table and water recharge areas for existing, or potential water supplies; to protect the public health and safety; to protect persons and property against the hazards of flood water inundation; to protect the community against the costs which may be incurred when unsuitable development occurs in wetland resource areas; and to provide for the reasonable protection and conservation of certain irreplaceable natural features, resources and amenities for the benefit and welfare of the present and future inhabitants of the Town of Sudbury. Accordingly, this bylaw protects the wetlands, related water resources, and certain adjoining land areas in the Town by providing for prior review and control of activities deemed to have a significant or cumulative adverse effect upon wetlands values, including but not limited to the following: protection of public and private water supply, protection of ground water, flood control, erosion and sedimentation control, storm damage prevention, avoidance of water and soil pollution, **protection of fisheries**, wildlife habitat, rare species habitat including rare plant species, agriculture, aqua culture, and recreation values, deemed important to the community (collectively, the "wetlands values protected by this bylaw".) This bylaw is intended to utilize the Home Rule authority of this municipality to protect additional resource areas, for additional values, with additional standards and procedures to augment those of the Wetlands Protection Act, G.L. Ch. 131, §40 and Regulations thereunder, 310 CMR 10.00.*

*Sudbury Wetlands Administration Bylaw Regulations*

## 2.6 COLD WATER FISHERIES RESOURCES

*Cold water fish species survive in only the coldest and cleanest water. They serve as indicators of the health of the watersheds they inhabit. Strong cold water fish species populations demonstrate that stream or river ecosystem is healthy and that water quality is excellent. A decline in cold water fish populations can serve as an early warning that the health of an entire aquatic system is at risk.*

*In recognition of the need to address threats to cold water fisheries (with Fisheries being a protected resource under the Sudbury Wetlands Administration Bylaw) the following definitions and performance standards shall apply to any work within areas subject to jurisdiction under this Bylaw where a cold water fishery is identified or presumed.*

*Cold Water Fisheries Resources are defined as waters that contain at least one of the following species:*

- Brook trout (*Salvelinus fontinalis*)*
- Rainbow trout (*Oncorhynchus mykiss*)*
- Brown trout (*Salmo trutta*)*
- Creek Chubsucker (*Erimyzon oblongus*)*
- Fall fish (*Semotilus corporalis*)*
- Slimy Sculpin (*Cottus cognatus*)*
- (Longnose sucker (*Catostomus catostomus*))*

***Whereas most of our local streams have not been investigated to determine suitability for survival of the above cold water fish species, all streams, and/or stream segments, that meet one or more of the following criteria shall also be considered cold water fisheries resources:***

- Any stream designated as a cold water fishery in 314 CMR 4.0;0*
- Any stream designated as a cold water fishery by the MA Division of Fisheries and Wildlife;*
- Waters where there is evidence based on a fish survey that a cold water fish population and habitat exist are also cold water fisheries;*
- The mean maximum daily temperature in a stream over a seven day period generally does not exceed 70 degrees F near the stream bottom, and suitable habitat factors exist. Since coldwater fish species are known to seek cooler water, they will during a hot spell, migrate to cooler water where springs or spring-fed seeps enter the river. Therefore water temperatures are to be measured near the bottom, and at the coolest locations.*

*Because of the temporary migration to cooler water, a stream that temporarily exceeds 70 degrees F, will not be removed from the CFR (Cold Water Fisheries Resource) listing. The temporarily (fish) vacated stream will be repopulated as the water cools, and is still to be considered a CFR.*

*If a stream qualifies for, and is designated as a CFR, the entire stream from its feeder streams, or its spring-fed seeps, to its effluence to the next stream, will be considered a CFR.*

*The failure of a stream or stream segment to appear in 314 CMR 4.00 or on the MA DFW list of cold water fisheries does not mean it is not a cold water fisheries resources. If the stream meets the temperature and habitat criteria, it will be considered a cold water fisheries resource for the purposes under this Bylaw, unless and until the applicant overcomes this presumption with qualified documentation.*

*In the case of challenges to the presumption of cold water fisheries resources, the Conservation Commission may require that the determination be postponed until the appropriate time period consistent with the evidence being presented. The Commission may also require its own site visits as necessary to confirm the evidence.*

*Evidence gathered at inappropriate times shall be considered faulty and invalid and can be grounds for a denial of a permit.*

*Activities within riparian areas that: a) reduce its natural vegetative cover, especially any reduction in streamside forest cover; b) contribute to an excessive level of nutrients or sediments getting into adjacent watercourses; c) involve the use and/or release of heavy metals, pesticides, herbicides and other toxics; or d) increase its imperviousness are likely to result in a degradation of a riparian area's fisheries protection function.*

*To protect the functioning of Cold Water fisheries Resources, the following performance standards for habitat creation, water quality, water quantity, and food shall apply. Further background for the purpose of the following standards can be found in Riverways (Department of Ecological Restorations') Fact Sheet #4: Functions of Riparian Areas for Fisheries Protection dated July 8, 1997, incorporated herein.*

- Maintain and/or restore an undisturbed, vegetated (forested) state within the riverfront area. Although a streamside forest at least 80 feet wide on each side of a river or stream is adequate to ensure maximum stream shading, as much of the remainder of the riparian area as possible shall be kept in or restored to a naturally vegetated state in order to effectively filter out excess sediments, nutrients and other pollutants before they reach the water, as well as maintain adequate groundwater recharge. Streamside forests help maintain streamflow in summer so that fish don't lose their habitat by having it dry up on them. Streamside forest areas serve as living biological buffers to absorb excessive levels of sediment, nutrients and other pollutants generated by adjacent development as well as from the stream itself. This function is key to maintaining the high water quality needed by a host of riverine organisms*
- Retaining canopy shade along streams where most of the forest cover has been removed for other land uses is important. Riparian trees are valuable because stream temperature drops rapidly once a stream enters a forested riparian area.*
- Logs, stumps and other large woody debris in and/or overhanging the water (even where undercut by the current) shall be left undisturbed to maximize food source and in-stream habitat for fish and other aquatic organisms as well as helping to keep harmful sediment movements under control.*
- Connections between rivers and adjacent floodplains shall be maintained, as floodplains are valuable foraging, spawning and nursery habitat for some fish species.*

- *The level of phosphates and nitrates in the CWFR shall be established pre-construction. Post-construction monitoring of these levels shall be required and may continue with the Certificate of compliance. Should levels rise post-construction, the commission reserves the right to require reduction/mitigation of these levels. Phosphates and nitrates leaching from septic systems or running off fertilized cropland, pastureland, lawns, golf courses and the like, contribute to excessive levels of nutrients in streams, triggering a chain reaction of adverse impacts. Excessive nutrients promote excessive algae and aquatic nuisance weed growth which, in addition to inhibiting the growth of other aquatic vegetation of greater value to aquatic organisms, reduces the level of dissolved oxygen in the water. The resulting hypoxic (low oxygen) or anoxic (zero oxygen) state can cause fish kills and decreases in aquatic insect populations, as well as disruptions in the normal reproduction, food web, and water chemistry balance.*
- *The baseflow of stream shall be established pre-construction. Post construction baseflow monitoring shall be required and may continue in the Certificate of Compliance. Should baseflows decrease post-construction the Commission reserves the right to require the applicant to determine the cause of these reduced flows and mitigate for any reduction harmful to the functioning of the stream to support cold water fish species.*
- *Blockage of CFRs is not permitted without a special limited permit issued by the Conservation Commission. Therefore, any use that creates blockage of a CFR, such as stream crossing (through the water) with vehicles and resulting rutting, is not allowed except by special permit for repair vehicles. Stream crossing using an in-place bridge is permitted.*
- *The creation of man-made dams of any sort is prohibited, unless approved by Dept. of Mass. Fish & Wildlife and the Sudbury Conservation Commission.*
- *Any activity, disturbance, construction (including dams or other blockages), or habitat modifications in the CFR Watershed that will increase the stream's temperature, is prohibited.*

### Flood Hazard Protection

**Context:** Floodplain management is an important aspect of public health and safety, as well as river health. A floodplain is an area adjacent to a river, creek, lake, stream or other waterways that is subject to flooding when there is a significant run-off event. As climate change increases extreme storms and precipitation events in the Northeast region, it will be critical to ensure floodplains remain protected to accommodate for flooding events.

**Municipality:** Chatham - Protective Zoning Bylaw, Section IV Overlay Regulations, B. Floodplain District. Chatham's floodplain overlay district makes explicit the need for protections of public health and safety due to flooding incidences and restricts new residential development within the floodplain district.

#### *B. Flood Plain District*

##### *1. Purpose*



*The purposes of the Flood Plain District are to protect the public health, safety, and general welfare, to protect human life and property from the hazards of flood and tidal waters, to preserve the natural flood control characteristics, and the flood storage capacity of the flood plain, and to preserve and maintain the ground water table and water recharge areas within the flood plain. (5/9/16 ATM)*

## *2. Definitions*

*In the Flood Plain Overlay District the following definitions shall apply:*

- a. "BASE FLOOD" means the flood having a one (1) percent chance of being equaled or exceeded in any given year.*
- b. "BASE FLOOD ELEVATION" is the computed elevation to which floodwater is anticipated to rise during the base flood. Base Flood Elevations (BFEs) are shown on Flood Insurance Rate Maps and on flood profiles. The BFE is the regulatory requirement for the elevation of structures. (5/9/16 ATM)*
- c. "DEVELOPMENT" means any manmade change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations.*
- d. "ELEVATION CERTIFICATE" is the Town of Chatham's official record that provides elevation information for substantial improvements in all identified Special Flood Hazard Areas (SFHA). Elevation Certificates are used to provide elevation information necessary to ensure compliance with community floodplain management ordinances, to determine the insurance premium rate, and to support a request for a Letter of Map Amendment (LOMA) from FEMA. Elevation Certificates are signed and stamped by a registered land surveyor, engineer, or architect. (5/9/16 ATM)*
- e. "FREEBOARD" is a term used to describe a factor of safety expressed in feet above the 1-percentannual-chance flood level. (5/9/16 ATM)*
- f. "FUNCTIONALLY DEPENDENT USE" means a use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, but does not include long-term storage or related manufacturing facilities.*
- g. "LOWEST FLOOR" means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor; provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of State and local regulations.*
- h. "MANUFACTURED HOME" means a structure, transportable in one (1) or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when connected to the required utilities. For flood plain management purposes the term "manufactured home" also includes park trailers, travel trailers, and other similar vehicles placed on a site for greater than one hundred eighty (180) consecutive days. For insurance purposes the term "manufactured home" does not include park trailers, travel trailers, and other similar vehicles.*
- i. "NEW CONSTRUCTION" means for the purpose of determining insurance rates, structures for which the "start of construction" commenced on or after the effective date of an initial FIRM or after December 31, 1974, whichever is later. For flood plain management purposes, "new*

*construction" means structures for which the "start of construction" commenced on or after May 12, 1980.*

*j. "STRUCTURE" means for flood plain management purposes, a walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a mobile home. "Structure" for insurance coverage purposes, means a walled and roofed building, other than a gas or liquid storage tank, that is principally above ground and affixed to a permanent site, as well as a mobile home on a foundation. For the latter purpose, the term includes a building while in the course of construction, alteration or repair, but does not include building materials or supplies intended for use in such construction, alteration or repair, unless such materials or supplies are within an enclosed building on the premises.*

*k. "SUBSTANTIAL IMPROVEMENT" means repair, construction or alterations costing fifty (50)*

*percent or more of the market value of the structure before improvement, or, if damaged, before damage occurred, or in the case of a foundation, work that impacts fifty (50) percent or greater of the perimeter of the foundation. (5/9/16 ATM)*

### *3. District Location*

*The Flood Plain District is herein established as an overlay district. The District includes all special flood hazard areas within the Town of Chatham designated as Zone AE or VE on the Barnstable County Flood Insurance Rate Map (FIRM) issued by the Federal Emergency Management Agency (FEMA) for the administration of the National Flood Insurance Program. The map panels of the Barnstable County FIRM that are wholly or partially within the Town of Chatham are panel numbers 25001C0609J, 25001C0616J, 25001C0617J, 25001C0626J, 25001C0627J, 25001C0628J, 25001C0629J, 25001C0631J, 25001C0633J, 25001C636J, 25001C0637J, 25001C0638J, 25001C0639J, 25001C0641J, 25001C0850J, and 25001C0875J dated July 16, 2014. The exact boundaries of the District may be defined by the 100-year base flood elevations shown on the FIRM and further defined by the Barnstable County Flood Insurance Study (FIS) report dated July 16, 2014. The FIRM and FIS report are incorporated herein by reference and are on file with the Town Clerk, Planning Board, and Building Inspector.*

### *4. Development Regulations*

*a. New construction or substantial improvement of residential structures shall have the lowest floor (including basement) elevated to not less than one (1) foot above the base flood elevation. New construction or substantial improvement of non-residential structures shall either be similarly elevated or together with attendant utility and sanitary facilities be flood proofed to not less than base flood elevations. Incremental improvements shall be considered substantial improvements (see definitions) if within a five-year (5) period, they cumulatively meet the definition of "substantial improvement." (5/11/93 ATM)*

*b. No land within areas designated as V (Velocity) zones of the FIRM maps shall be developed unless such development is demonstrated by the applicant to be located landward of the reach of the mean high tide. Any manmade alteration of sand dunes in the course of such development within said designated V zones which might increase the potential for flood damage shall be prohibited. Incremental improvements shall be considered substantial improvements (see definitions) if within a five-year period, they cumulatively meet the definition of "substantial improvement." (5/11/93 ATM)*

- c. All development in the district including structural and non-structural activities whether permitted by right or by Special Permit, and as allowed by Section IV.A.2 of the Protective Bylaw, must be in compliance with Flood Resistant Design and Construction requirements of the MA State Building Code. (5/9/16 ATM)*
- d. Landscape material up to two feet in depth at the foundation and tapered to meet grade within ten feet (10) of the foundation shall not be calculated towards grade plane and shall not be considered fill as regulated in Section IV.A.4 of this Bylaw. (5/9/16 ATM)*
- e. Demolition debris shall be removed from the site within fourteen (14) days of completion and not stored within a resource area or a buffer strip. If a dumpster is used to contain the debris, the dumpster will be covered. The debris will be properly disposed of in accordance with applicable federal, state, and local regulations. (5/9/16 ATM)*
- f. Construction material and excavation materials will be stored completely outside of the Flood Plain District when possible based on the boundaries of the parcel and the boundaries of the designated floodplain. (5/9/16 ATM)*
- g. Exposed, disturbed, or erodible soils will be protected to minimize erosion, sedimentation, pollution, and damage to the subject and adjacent properties. (5/9/16 ATM)*

#### *5. Prohibited Uses*

*The following uses and activities are prohibited in the VE Zone.*

- a. Addition, alteration or reconstruction of an existing structure that results in an increase in building footprint.*
- b. Repair of a substantially damaged existing structure which results in an increase in building footprint.*
- c. Any increase in impervious surface on a residential lot. This may include, but is not limited to, swimming pools, tennis/basketball courts and retaining walls. For functionally dependent projects allowed in the VE Zone, impervious surfaces accessory to the use are allowed provided a Massachusetts registered civil engineer certifies in writing that the impervious surface will not cause an increase in wave run-up, a deflection or channelization of flood waters, or an increase in the velocity of flow. (5/9/16 ATM)*

#### *6. Administration*

- a. The Building Inspector shall review all proposed development within the flood district to assure that all necessary permits have been received from those government agencies from which approval is required by Federal or State law.*
- b. The Building Inspector shall obtain and maintain records of elevation and flood-proofing levels for new construction or substantial improvement within the flood district. (5/9/16 ATM)*

### Greywater

**Context:** Greywater is wastewater generated in homes and buildings free from fecal contamination. Although it is dangerous to ingest, proper greywater management and reuse can promote water conservation and reduce waste water entering municipal water systems. Best practice emphasizes direct infiltration (or storage for no longer than 24 hours) with proper hydrological drainage through permitting for single-family and, ideally, multi-family homes.

**Municipality:** Mashpee - Mashpee, Board of Health Regulations Part IV. These regulations describe permissions for greywater discharge systems under the following conditions.

*DEFINITIONS:*

*Blackwater:* Wastewater from toilets, urinals and any drains equipped with garbage grinders.

*Greywater:* Any putrescible wastewater discharged from domestic activities including but not limited to washing machines, sinks, showers, bath tubs, dishwashers or other source except toilets, urinals and any drains equipped with garbage grinders.

*REGULATIONS:*

1. The Board of Health hereby approves the use of composting toilets for the collection and disposal of blackwater with the following conditions:

a. The composting compartment must be inspected annually by a Department of Environmental Protection (DEP) approved inspector of composting systems. A copy of the inspection report shall be submitted to the Board of Health within 30 days of the inspection.

b. The composted material shall be removed at intervals according to the manufacturer's specifications. The compost shall be transported by a DEP approved hauler AND disposed of at a DEP approved location.

2. In recognition of the fact that the majority of pathogenic organisms are found in blackwater, while some still exist in greywater, the Board of Health approves the following greywater discharge systems and conditions:

a. The filtered greywater may be discharged internally into a DEP and Board of Health approved greenhouse absorption system OR;

b. The filtered greywater may be discharged externally into a DEP and Board of Health approved soil absorption system with nitrogen removal capability.

c. The soil absorption system shall be located a minimum of 75 feet from any wetland or bordering vegetated wetland as verified by the Mashpee Conservation Commission. This contrasts with the standard setback requirement of 100 feet for 72 the traditional Title V soil absorption system in recognition of the lower pathogenic content in greywater.

d. The bottom of the soil absorption system shall be a minimum of 4 feet above groundwater, adjusted if applicable.

e. If there does not exist a minimum of 4 feet of naturally occurring permeable soil between the bottom of the leaching facility and groundwater, then there shall exist a minimum of 2 feet of naturally occurring permeable soil between the bottom of the soil absorption system and groundwater with an additional 3 feet of naturally occurring permeable soil below the groundwater elevation.

f. The leaching area requirement for the greywater discharge system may be reduced to 60% of the standard Title V area requirement.

g. The soil absorption system and the greywater filtering system must be inspected annually by a DEP approved greywater discharge system inspector. The filters must be replaced at intervals according to the manufacturer's specifications. A copy of the inspection report must be submitted to the Board of Health within 30 days of the inspection.

h. No garbage grinders shall be allowed to be installed. Therefore a septic tank is not required.

- i. For new construction, a standard Title V system must be approvable on-site. This standard Title V system must meet State requirements only.*
- j. Plans for gray/blackwater septic systems must be drawn by a licensed professional engineer or registered sanitarian.*
- k. Any variance from these regulations must be submitted in writing by the plan designer and will be considered by the Board of Health on a case-by-case basis.*
- l. Failure to submit the annual inspection reports to the Board of Health within 30 days of their completion shall constitute a determination by the Board of Health that the system is in failure. The Board may, at which time, hire an inspector to conduct the inspection with all associated costs borne by the owner. Failure to pay for these costs will result in the board's condemnation of the septic systems and the placing of a lien against the property.*

### Illicit Water Withdrawals

**Context:** Excessive water withdrawals can make vulnerable rivers and streams go dry. While the state permits water withdrawals through the Massachusetts Water Management Act, the threshold for the Act is 100,000 gallons per day (gpd). Commercial users looking to avoid the regulatory system may seek to withdraw directly from the source. Excessive withdrawals lead to diminished river flows, poorer water quality and damage to natural habitats such as wetlands.

**Municipality:** Norton – Section 163-11 General Bylaws. Norton’s bylaw makes explicit the prohibition of water withdrawals from waters within the community for any commercial purposes. The bylaw also provides flexibility for the Board of Water/Sewer Commissioners to establish a separate hydrant or outlet for commercial water use as needed.

#### *§ 163-11 General Bylaws*

*Withdrawal prohibited; exceptions; designation of public hydrants or outlets.*

*A. The extraction or withdrawal of water for commercial purposes of water from any pond, stream, river, watercourse, surface, or subsurface water into a tank vehicle, or into any tank contained in or on a vehicle, shall be prohibited.*

*B. This bylaw shall not apply to municipal fire apparatus.*

*C. The Board of Water/Sewer Commissioners may, but need not, designate one or more public water hydrants or other public water outlets in the Town of Norton to furnish water for commercial purposes to a tank vehicle or a tank contained in or on a vehicle. Said hydrant(s) or outlet(s) shall not allow any backflow into the public water system and shall be under the supervision and control of the Board of Water/Sewer Commissioners.*

### Impervious Cover - Permeable Paving and Parking

**Context:** Impervious cover (man-made surfaces incapable of infiltration/absorption) prevents rainwater from being absorbed into the ground, replenishing groundwater, and providing clean baseflow for rivers and streams. Instead, impervious cover carries rain, and especially stormwater, more quickly over land, picking up pollutants as it travels. Stormwater is responsible for increased pollution and warmer water temperature in rivers and other waterbodies, and it exacerbates flooding. To address these problems, impervious cover square footage should be

reduced to restore more naturally occurring hydrological systems. This includes the following for instances of best practice:

- **Parking requirements** that bioretention landscaping represent no less than ten percent of parking area development, island planting areas be a minimum of 25 square feet, and permeable pavement be specifically addressed and permitted where possible (residential drives, parking stalls, emergency access ways)
- **Thoroughfare requirements** stipulating permitting of shared/common use driveways, minimizing cul-de-sac radii (35 feet maximum if possible), construction of perforated curbs that are flush with pavement, and options for sidewalk siting with land contours (not explicitly parallel to street)
- **Drainage options** emphasizing the use of roadside swales and outflow/stormwater systems that are detached from streets (relying instead on vegetated areas or natural hydrology for absorption and water flow)

At the time that this report was developed, there did not appear to be a single municipality in the Commonwealth that met *all* of the standards above, but some communities fulfill more of these criteria than others.

**Municipality:** Mashpee - Mashpee, Article VIII Section 174-41 of zoning bylaws. Mashpee's bylaw details sustainable parking lot design that minimizes impervious cover and removal of native plantings. Specifically, the bylaw stipulates a minimum ratio of 1:5 of landscaping or natural area to paved area in parking regions and substantial preservation of existing vegetation, with further stormwater provisions promoting roadside swales and natural drainage options.

#### *§174-41 Parking Lot Design*

*G. The perimeter of any parking area over ten (10) spaces and any driveway or parking lot islands shall have curbs and gutters of granite, cast-in-place concrete or other edge treatment, not including bituminous concrete, suitable to control parking lot drainage, prevent erosion and maintain the pavement edge in good condition. A minimum five (5') foot radius shall be required for all vertical barrier curbs adjacent to parking lot driveways, islands and planting areas, with a fifteen (15') foot radius preferred along major driveways or those expected to be used by significant numbers of trucks or large vehicles.*

*H. Parking facilities shall be sloped a minimum of three quarter (¾%) percent to drainage grate inlets, catch basins or curb inlets and in all cases shall be constructed so that ponding of drainage within the paved surface shall not occur. Stormwater from parking areas shall be treated to minimize the amount of nitrogen reaching groundwater to the greatest extent feasible.*

*I. No structure, fence, post or other solid object other than curbing shall be allowed within three (3') feet of the paved surface of any parking area or driveway, except for shopping cart storage areas and handicapped access or preferred parking signs authorized by the permitting authority.*

*J. Sidewalks shall be provided where appropriate along the perimeter of the parking area and within parking lot islands to facilitate safe movement of pedestrians.*

*K. No parking area will be allowed within ten (10') feet of the property line of abutting property owners, or such larger buffer area distance as may be required by the Zoning*



*By-law. The minimum buffer area may be reduced by the permitting authority if written endorsement of such reduction is received from the owner of the abutting property. Such setback area shall be left in its natural state, or revegetated in conformance with the requirements of the Zoning By-law in accordance with plans approved by the permitting authority. Larger buffer areas may be required where the parking area abuts residential property, publicly-owned parcels, water bodies or wetlands or where such buffer is required to maintain existing scenic or historic vistas from public ways or public lands.*

*L. In addition to any undisturbed buffer areas required by the permitting authority or the Zoning By-law, the use of landscaped berms or additional plantings to screen parking areas from view from abutting properties or public roadways is encouraged.*

*M. For projects involving more than ten (10) parking spaces, any parking area (i.e. the area within any proposed parking field) shall have a minimum ratio of 1:5 of landscaping or natural area to paved area unless the permitting authority determines that, due to the shape or configuration of the parking area such landscaping would be impractical.*

*Natural vegetation shall be retained in any such landscaped area to the greatest extent possible.*

*N. Site and parking lot design should preserve any large or outstanding trees, specimen trees or groves of trees to the greatest extent possible. No trees over ten (10) inches in diameter at breast height may be removed without approval of the permitting authority for the project. Large parking lot islands are encouraged to help accomplish such preservation, to provide opportunities for denitrification of stormwater runoff and to improve the visual character of the parking area.*

*O. Plantings shall not be located within three (3') feet of the curb or pavement edge, to allow for car overhangs, unless low-lying ground cover is used.*

*P. Plantings shall be installed in exact accordance with planned dimensions to avoid any adverse change in parking due to improper location.*

*Q. Irrigation facilities shall be installed, unless the permitting authority determines that it is infeasible or unnecessary, to ensure proper maintenance of parking lot landscaping.*

*Water for in-ground irrigation shall be provided from private wells unless the Mashpee Water District specifically authorizes connection to the municipal water system for irrigation use.*

*R. No more than forty (40%) percent of the area within the drip line of any tree to be planted or retained within or adjacent to a parking area, when fully grown, may be made impervious, unless a certified arborist or landscape architect can demonstrate that the long-term health of such tree will not be adversely affected.*

### Private Wells and Nonessential Outdoor Water Use Restrictions

**Context:** The ability to limit nonessential water use is a critical tool for communities to protect public water supplies and the environment, especially during times of drought. In many communities in Massachusetts, private wells are currently exempt from outdoor non-essential watering restrictions. Private wells generally draw on the same groundwater reserves that support public water supplies and sustain streams and rivers. Varying watering restrictions for neighbors (and even neighboring communities) raises concerns about fairness. Enforcement becomes increasingly challenging when some water users must follow restrictions and others do not. While some private wells are used only for irrigation, in areas without public water supplies,

private wells provide residents with all of their water. Without watering restrictions and little to no oversight by town or state government, these wells may dry up during summer months, creating a serious public health problem. Private wells should be included as resources subject to nonessential outdoor watering restrictions to protect the water resources within the community to the greatest extent possible.

**Municipality:** Wenham - Wenham, Chapter 21, Section 3 of town bylaws. Wenham’s bylaw pertains to the definition of “water users” in the town, specifically including private well users as water users subject to water restrictions.

*Water Users or Water Consumers shall mean all public and private users of the Town of Wenham's public water system, and/or of groundwater within the borders of the Town of Wenham and extracted from the Ipswich River Watershed. The restrictions shall apply to all water used in the town of Wenham, to include Town water and water supplied by private wells, irrespective of any person's responsibility for billing purposes for water used at any particular facility. Seasonal Restrictions shall prohibit outdoor watering through a sprinkler or lawn irrigation system between the hours of 9 am to 5 pm between May 1 and September 30 of each year using town water or private well water.*

### Stormwater Management

**Context:** Low impact development (LID) describes practices that minimize impact to waterways or aquatic habitats through the use of existing natural features. LID approaches emphasize promoting natural stormwater systems and treatment. These includes the direction of clean runoff to vegetated areas capable of absorption or infiltration, promotion of surficial bioretention systems (as opposed to underground or artificial networks), institution of “LID features” including green roofs, rain gardens, and natural swales, and application of LID water management design standards. Best practice for LID also includes the use of structural best management practices (BMPs) for removal of at least 80% of average annual suspended solids (post development), 30% of total nitrogen loads and 40% of total phosphorus loads with further stipulations that annual discharge from a site post-development should be equal or less than pre-development levels. The content of the Massachusetts Stormwater Handbook (volumes I and II) and stipulations laid out in the Wetlands Protection Act (310 CMR 10.05) serve as particularly valuable resources in the establishment of best management practice bylaws for stormwater regulation: alignment with these principles is encouraged as a minimum in municipal regulation. The excellent sample bylaw included below, however, exceeds these recommendations.

**Municipality:** Westwood - Stormwater management bylaw. This bylaw stipulates land disturbance review processes for nearly all new development consistent with LID stormwater standards for best practice. The bylaw mandates compliance with performance and design guidelines emphasizing LID techniques and conservation, with permit requirements for development disturbing more than one-half acre of land and administrative review stipulated for all projects disturbing at least 5,000 square feet.

### *ARTICLE III – STORMWATER MANAGEMENT AND LAND DISTURBANCE* *Section 1. Applicability*



A. Article III of this Bylaw shall apply to all activities that result in disturbance of five thousand (5,000) square feet of land or more that drains to the municipal separate storm sewer system (MS4). Except as authorized by the Stormwater Authority in a Land Disturbance Permit or as otherwise provided in these regulations, no person shall perform any activity that results in disturbance of five thousand (5,000) square feet of land or more. There are two levels of reviews based on the amount of land proposed to be disturbed as part of a single project as follows:

(1) Administrative Land Disturbance Review is required for projects disturbing at least five thousand (5,000) square feet but less than one-half (1/2) acre (21,780 square feet) of land.

(2) A Land Disturbance Permit is required for disturbance of one-half (1/2) acre (21,780 square feet) or more of land or proposed use is listed as a land use of higher potential pollutant loads as defined in the Massachusetts Stormwater Management Standards, regardless of the amount of land to be disturbed.

B. Exemptions:

(1) Maintenance of existing landscaping, gardens or lawn areas associated with a single family dwelling conducted in such a way as not to cause a nuisance;

(2) Construction of fencing that will not substantially alter existing terrain or drainage patterns;

(3) Construction of utilities other than drainage (gas, water, electric, communication, etc.) which will not alter terrain or drainage patterns or result in discharge of sediment to the MS4;

(4) Normal maintenance and improvement of land in agricultural or aquacultural use, as defined by the Wetlands Protection Act regulation 310 CMR 10.04; and

(5) Disturbance of land or redevelopment that are subject to jurisdiction under the Wetlands Protection Act and demonstrate compliance with the Massachusetts Stormwater Management Standards and the Town of Westwood Stormwater Management Regulations as reflected in a valid Order of Conditions issued by the Conservation Commission.

#### Section 2. Permit Required

An applicant seeking an approval and/or permit shall file an appropriate application with the Stormwater Authority in a form and containing information as specified in this Bylaw and in regulations adopted by the Stormwater Authority. Approval or permit must be obtained prior to the commencement of land disturbing or redevelopment activity based on thresholds described in the Town of Westwood Stormwater Management Regulations (Regulations). Permit procedures and requirements are outlined in the Regulations. Where appropriate, said Regulations will require an Erosion and Sedimentation Control Plan and/or an Operation and Maintenance Plan. Any person that fails to follow the requirements of a Land Disturbance Permit and/or the requirements of an Erosion and Sedimentation Control Plan, or Operation and Maintenance Plan issued under the Regulations shall be in violation of the Town of Westwood Bylaws.

#### Section 3. Entry

Filing an application for an approval or permit grants the Stormwater Authority and its employees or agents permission to enter the site to verify the information in the application and to inspect for compliance with approval or permit conditions.

#### Section 4. Inspection and Site Supervision

The Stormwater Authority or its designated agent shall make inspections as outlined in the Regulations to verify and document compliance with the Land Disturbance Permit.

### Section 5. Surety

The Stormwater Authority may require the applicant to post before the start of land disturbance or construction activity a surety bond, irrevocable letter of credit, cash, or other acceptable security. The form of the bond shall be approved by the Stormwater Authority and be in an amount deemed sufficient by the Stormwater Authority to ensure that the work will be completed in accordance with the permit. If the project is phased, the Stormwater Authority may release part of the bond as each phase is completed in compliance with the permit.

Section 6. Final Reports Upon completion of the work, the applicant shall submit a report, including certified as-built construction plans, from a Professional Engineer (P.E.), surveyor, or Certified Professional in Erosion and Sedimentation Control (CPESC), certifying that all erosion and sedimentation control devices, and approved changes and modifications, have been completed in accordance with the conditions of the approved Erosion and Sediment Control Plan and Stormwater Management Plan. Any discrepancies shall be noted in the cover letter.

### Section 7. Enforcement

The Stormwater Authority or its authorized agent shall enforce this Bylaw, the Regulations, and any associated orders, violation notices, and enforcement orders, and may pursue all civil and criminal remedies for such violations...

These permit procedures and stipulations are included in the Town of Westwood Stormwater Management Regulations:

### ...Section 11. Performance and Design Standards

#### A. Design of stormwater management system(s) and components

(1) Developments are to be designed to provide for adequate collection and disposal of stormwater runoff from the project site in accordance with MassDEP Stormwater Management Standards, Westwood DPW Standard Details (for subdivisions), recognized engineering methodologies and these Regulations with an emphasis to include Low Impact Development (LID) techniques in the design.

(2) Provisions are to be made for the adequate disposal of surface runoff so that no flow is conducted over Town ways, or over land not owned by or controlled by the Applicant unless an easement in proper form is obtained permitting such discharge.

(3) LID techniques are to be used where adequate soil, groundwater and topographic conditions allow. These may include but not be limited to reduction in impervious surfaces, disconnection of impervious surfaces, bioretention (rain gardens) and infiltration systems (see Appendix A for LID credits and incentives)

(4) Hydrologic calculations, to document the peak rate and volume of runoff from pre development and post development condition, are to be completed utilizing TR-55 and TR-20 methodologies.

(5) Watershed area for hydrologic analysis and BMP sizing calculations are to include at a minimum the site area and all upgradient areas from which stormwater runoff flows onto the site.

(6) For purposes of computing runoff, all pervious lands in the site are assumed prior to development to be in "good hydrologic condition" regardless of the conditions existing at the time of the computation.

(7) Length of sheet flow used for times of concentration is to be no more than 50 feet.

- (8) Utilize the 24-hour rainfall data taken from the NRCS Extreme Precipitation in New York and New England website <http://precip.eas.cornell.edu/>
- (9) Soils tests to be conducted by a Registered Professional Engineer or Massachusetts Soil Evaluator, performed at the location of all proposed infiltration BMPs and LID techniques, to identify soil descriptions, depth to estimated seasonal high groundwater, depth to bedrock, and soil texture.
- (10) The design infiltration rate shall be determined from the on-site soil texture and published Rawls rates or saturated hydraulic conductivity tests.
- (11) Size drainage pipes to accommodate the 25-year storm event and maintain velocities between three (3) and ten (10) feet per second using the Rational Method.
- (12) Size drainage swales to accommodate the 25-year storm event and velocities below four (4) feet per second
- (13) Size culverts to accommodate the 50-year storm event and design adequate erosion protection. Design stream crossing culverts in accordance with the latest addition of the Massachusetts Stream Crossing Handbook.
- (14) Size stormwater basins to accommodate the 100-storm event with a minimum of one foot of freeboard
- (15) All drainage structures are to be able to accommodate HS-20 loading. (16) Catch basins structures are to be as detailed in Westwood DPW Standard Details and spaced a maximum of two hundred and fifty (250) feet apart in roadways.
- (17) Catch basins adjacent to curbing are to be built with a granite curb inlet as shown in Westwood DPW Standard Details.
- (18) Catch basins at low points of road and on roads with profile grades greater than 5% are to be fitted with double grates (parallel with curb) as detailed in Westwood DPW Standard Details.
- (19) All drain pipes are to be reinforced concrete pipe or HDPE pipe and have a minimum diameter of twelve (12) inches
- (20) Drainage pipes are to be installed with a minimum of two and one-half (2.5) feet of cover and O-rings as detailed in Westwood DPW Standard Details.
- (21) Drainage manholes structures are to be as detailed in Westwood DPW Standard Details and spaced at a maximum of every two hundred and fifty (250) feet.
- (22) Outfalls are to be designed to prevent erosion of soils and pipes twenty-four (24) inches or larger are to be fitted with grates or bars to prevent ingress.
- (23) Drainage easements are to provide sufficient access for maintenance and repairs of system components and be at least twenty (20) feet wide.
- (24) Minimize permanently dewatering soils by:
- (a) Limiting grading within four (4) feet of seasonal high groundwater elevation (SHGWE);
  - (b) Raising roadways to keep roadway section above SHGWE; and
  - (c) Setting bottom floor elevation of building(s) a minimum of two (2) feet above SHGWE.

B. Design of erosion controls(s) should include the following:

- (1) Minimize total area of disturbance;
- (2) Sequence activities to minimize simultaneous areas of disturbance;
- (3) Minimize peak rate of runoff in accordance with the MassDEP Stormwater Standards;

- (4) Minimize soil erosion and control sedimentation during construction;
- (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 Massachusetts Erosion and Sedimentation Control Guidelines for Urban and Suburban Areas, manufacturer's specifications and good engineering practices;
- (8) Prevent off-site transport 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 significant alteration of 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 from the proposed activities;
- (12) Institute interim and permanent stabilization measures, which shall be instituted on a disturbed area as soon as practicable but no more than fourteen (14) days after construction activity has temporarily or permanently ceased on that portion of the site;
- (13) Properly manage on-site construction and waste materials, including truck washing and cement concrete washout facilities; and
- (14) Prevent off-site vehicle tracking of sediments.

#### Water Savings Cost Estimates

**Context:** Water efficiency accomplishes more with less by using the best available technology to use water in smarter and more innovative ways. Water “saved” through efficient technologies results in less water being pumped out of groundwater or surface water resources, which means more water for healthy rivers and streams.

**Municipality:** Natick - Article 82 General Bylaw. Natick’s water savings cost estimate bylaw requires new developments consider all options for conserving water supply and minimizing wastewater disposal.

#### *Section 1 Purpose and Intent*

*It is the intent of this By-Law to conserve the water supply of the Town, to minimize wastewater disposal, to protect and extend the water supply, to prevent sewage overflow and to protect the health and safety of the public*

#### *Section 2 Definition*

*For the purposes of this By-Law, the term "water savings cost estimate" shall mean the estimated cost of installing, financing, maintaining and replacing a water use system including the cost savings in consumption of water by use of mitigating measures and alternative solutions including but not limited to ultra low flow devices, composting toilets, recycling and reuse systems, and use of non potable water.*

*Section 3 Procedures*

*a. A water savings cost estimate shall be required to conserve water supply and minimize wastewater disposal.*

*b. Evidence shall be required to show that the applicant intends to utilize such devices, techniques or equipment that are consistent with Sections 1 & 2 of this By-Law.*

*Section 4 Applicability*

*a. This By-Law shall become effective upon the approval of this by-law by the Attorney General.*

*b. This By-Law shall apply in all Use Districts for any new water-using development, including all commercial and industrial developments and residential development in excess of three (3) units or for the modification or replacement of a water-using system in an existing structure or building or residential development in excess of three (3) units.*

*Section 5 Rules and Regulations*

*The Conservation Commission shall promulgate rules and regulations upon consultation with the Board of Health, the Building Commissioner and the Director of Public Works for the implementation of this By-Law.*

*Section 6 Administration and Enforcement Agents*

*a. The Building Commissioner shall not issue a building or occupancy permit unless the following are submitted with such application:*

*(1) A water savings cost estimate*

*(2) Construction methods to be implemented that are consistent with Sections 1 and 2 of this By-Law*

*(3) A certificate from the Director of Public Works certifying that an adequate supply of potable water can be supplied to such building or structure.*

*b. The Building Commissioner and the Director of Public Works shall condition new water connections upon the conformity of this By-Law respecting the implementation of measures to effectively conserve, recycle and reuse water.*

*Section 7 Application*

*a. All practical measures to conserve, recycle and reuse water as developed in said water savings cost estimates and compatible with State codes and federal, state and local laws shall be implemented.*

*Section 8 Approval & Disapproval; Notice & Hearing; Certificate of Adequacy*

*a. The Conservation Commission shall determine conformity with the By-Law. A public hearing shall be held by the Conservation Commission before approval, approval subject to conditions, or disapproval of the requirements of this By-law is given.*

*b. The Director of Public Works shall issue no certificate of adequacy to supply water unless the existing potable water supply requirements of the inhabitants of the Town fall within safe yield of the watershed systems pursuant to any such determination made by the Department.*

*Section 9 Costs*

*The applicant shall assume all costs that may be incurred to comply with this By-Law.*

*Section 10*                      *General Requirements*

*Failure to provide permits, certificates, and approvals as required by this By-Law shall not be due to failure by the applicant to apply to the appropriate agency for their grant.*

*Section 11*                      *Appeals*

*Person aggrieved by a decision of the Board of Health, the Conservation Commission, the Building Commissioner or the Director of Public Works as to the denial of building, occupancy permits or water connections in this By-Law may appeal said decision under any applicable law.*

*Section 12*                      *Severability*

*A conflict of one part or provision of this By-Law with any law shall not affect the validity or applicability of any other part or provision of this By-Law.*

Wetlands Protection

**Context:** Wetlands protect drinking water, prevent storm damage, and provide fish and wildlife habitats. Wetlands also support fishing, tourism, recreation, and educational opportunities. These valuable resource areas are found in every community across Massachusetts and are an important part of a watershed. Since the early 1900's, Massachusetts has lost nearly one third of its wetlands. Concerned about the historic loss of wetlands, the Massachusetts Legislature adopted the nation's first wetlands protection laws in the early 1960s. The purpose of the Massachusetts Wetlands Protection Act is to protect public health, safety, and welfare by preserving the ability of wetlands to absorb floodwaters, filter pollutants, recharge water supplies, and support fisheries and wildlife. The state Act and accompanying state wetlands regulations limit development in or near wetlands, rivers, and floodplains and require filing for a permit from the local conservation commission for projects in and near these areas. While the state law provides a foundation for wetlands protection, it does not adequately protect certain areas, such as buffer strips adjacent to wetlands. The loss of wetlands means the loss of the important benefits they provide. Wetlands with strong local conservation protections help to improve water quality, quantity and biodiversity in a watershed.

**Municipality:** Arlington - Regulations for Wetlands Protection (Section 23, 24, 25, 31). Arlington's wetlands protection regulations include several provisions that provide substantial wetlands protections within the community, far beyond the status quo of the model state wetlands regulations. Novel highlighted provisions include compensatory floodplain storage requirements with a ratio of 2:1 instead of the state suggested 1:1, an aggressive vegetation replacement policy with strong performance standards, inclusion of the 100 foot wetlands buffer as an adjacent upland resource area to provide additional protection to land directly abutting waters, and the explicit inclusion of reporting on considerations of adaptation planning in a proposed project to promote climate change resilience so as to protect and promote resource area values in the future.

***Section 23 - Land Subject to Flooding (Bordering and Isolated)***

*A. Findings.*

*(1) Bordering land subject to flooding.*



*(a) Bordering land subject to flooding is an area which floods from a rise in a bordering waterway or water body. Such areas are presumed to be significant to flood control and storm damage prevention and protection of surrounding land and other homes or buildings. In these ways, bordering land subject to flooding is important in mitigating the negative impacts of climate change.*

*(b) Bordering land subject to flooding provides a temporary storage area for floodwater which has overtopped the bank of the main channel of a creek, brook, river or stream or the basin of a pond or lake. During periods of peak runoff, floodwaters are both retained (i.e., slowly released through evaporation and percolation) and detained (slowly released through surface discharge) by bordering land subject to flooding. Over time, incremental filling of these areas causes increases in the extent and level of flooding by eliminating flood storage volume or by restricting flows, thereby causing increases in damage to public and private properties and downstream resource areas.*

*(c) The hydrologic regime, plant community and structure, topography, soil, and proximity to water bodies or vegetated wetlands provide important food, shelter, migratory, and overwintering areas, and breeding for wildlife.*

*(d) The hydrologic regime, surrounding plant community, topography, soil, and proximity to water bodies or vegetated wetlands make bordering land subject to flooding allow vegetation to successfully grow in these areas.*

*(2) Isolated land subject to flooding.*

*(a) Isolated land subject to flooding is an isolated depression or a closed basin which serves as a ponding area for runoff or high groundwater which has risen above the ground surface. Such areas are likely to be locally significant to flood control and storm damage prevention. In this way, isolated land subject to flooding is important in mitigating the impacts of climate change. In addition, where such areas are underlain by pervious material they are likely to be significant to public or private water supply and to groundwater supply. Where such areas are underlain by pervious material covered by a mat or organic peat and muck, they are also likely to be significant to the prevention of pollution. Isolated land subject to flooding provides important breeding habitat for amphibians and some rare plants. Isolated land subject to flooding provides a temporary storage area where runoff and high groundwater pond and slowly evaporate or percolate into the substrate. Filling causes lateral displacement of the ponded water onto contiguous properties, which may result in damage to said properties.*

*(b) Isolated land subject to flooding, where it is underlain by pervious material, provides a point of exchange between groundwater and surface waters. Contaminants introduced into said area, such as road salts, find easy access into the groundwater. Where these conditions occur and a mat of organic peat or muck covers the substrate of the area, said mat serves to detain and remove contaminants which might otherwise enter the groundwater.*

*B. Definitions, critical characteristics and boundaries.*

*(1) Bordering land subject to flooding.*

*(a) Bordering land subject to flooding is an area with low, flat topography adjacent to and inundated by floodwaters rising from brooks, creeks, rivers, streams, pond or lakes. It extends from the banks of these waterways and water bodies; where a bordering vegetated wetland occurs, it extends from said wetland.*

*(b) The topography and location of bordering land subject to flooding specified in the foregoing Subsection B(1)(a) are critical to the protection of the interests specified in subsection A(1) above.*

*(c) The boundary of bordering land subject to flooding is the estimated or observed maximum lateral extent of floodwater which will theoretically result or has resulted from the statistical 1%-annual-chance flood (also known as the one-hundred-year frequency storm).*

*1. Said boundary shall be that determined by reference to the most recently available flood profile data prepared for the Town of Arlington within which the work is proposed under the National Flood Insurance Program (NFIP, currently administered by the Federal Emergency Management agency, successor to the U.S. Department of Housing and Urban Development). Said boundary, so determined, shall be presumed accurate. This presumption may be overcome only by credible evidence from a registered professional engineer or other professional competent in such matters.*

*2. Notwithstanding the foregoing, where NFIP profile data is unavailable or is determined by the Commission to be outdated, inaccurate or not reflecting current conditions, the boundary of bordering land subject to flooding shall be the maximum lateral extent of floodwater which has been observed or recorded or the Commission may require the applicant to determine the boundary of Bordering Land Subject to Flooding by engineering calculations which shall be:*

*i. based upon a design storm of 8.48 inches of precipitation in 24 hours (from "Cornell" atlas);*

*ii. based upon the standard methodologies set forth in U.S. Soil Conservation Service Technical Release No. 55, Urban Hydrology for Small Watersheds and Section 4 of the U.S. Soil Conservation Service, National Engineering Hydrology Handbook; and*

*iii. prepared by a registered professional engineer or other professional competent in such matters.*

*(2) Isolated land subject to flooding.*

*(a) Isolated land subject to flooding is an isolated depression or closed basin without an inlet or an outlet. It is an area which at least once a year confines standing water. Isolated land subject to flooding may be underlain by pervious material, which in turn may be covered by a mat of peat or muck.*

*(b) The characteristics specified in the foregoing Subsection B(2)(a) are critical to the protection of the interests specified in Subsection A(2) above.*

*(c) The boundary of isolated land subject to flooding is the perimeter of the largest observed or recorded volume of water confined in said area.*

*C. No activity, other than the maintenance of an already existing structure, which will result in the building within or upon, or removing, filling, dredging or altering of, land subject to flooding shall be conducted without written permission of the Conservation Commission.*

*D. The Commission may permit activity on land subject to flooding provided it shall not result in the following:*

*(1) Flood damage due to filling which causes lateral displacement of water that would otherwise be confined within said area;*

*(2) Adverse effect on public and private water supply or groundwater supply, where said area is underlain by pervious material;*



(3) *An adverse effect on the capacity of said area to prevent pollution of the groundwater, where the area is underlain by pervious material which in turn is covered by a mat of organic peat and muck.*

*The applicant shall take into consideration the impacts of climate change on the activities proposed on land subject to flooding, especially in terms of the compensatory flood storage as a climate change resilience strategy. Any such activity shall provide compensatory flood storage for all flood storage volume that will be lost at each elevation. Compensatory flood storage shall be at a 2:1 ratio, minimum, for each unit volume of flood storage lost at each elevation.*

*Compensatory flood storage shall mean a volume not previously used for flood storage, shall have an unrestricted hydraulic connection to the same waterway or water body, and, with respect to waterways, shall be provided within the same reach of the river, stream, or creek. No new parking areas or garages shall be used as compensatory flood storage. The Commission has found that use of such areas or garages results in a significant or cumulative effect upon the resource area values protected by the Bylaw, and has found that these facilities can result in the uncontrolled acute or chronic release of these harmful materials into the resource areas protected by the Bylaw. The Commission has also found that using these structures for flood storage can result in the damage of vehicles and property under flooding conditions.*

*E. No work shall be performed within 50 feet of land subject to flooding that abuts an estimated habitat area as designated on the most current map prepared by the Massachusetts Natural Heritage and Endangered Species Program unless the Applicant can demonstrate by a preponderance of credible evidence that the work will not have any short term or long term adverse effect on the resource area values protected by the Bylaw.*

#### **Section 24 - Vegetation Removal and Replacement**

*A. Findings: Vegetation in a resource area protected by the Bylaw is significant for wildlife, wildlife habitat and water quality. In addition, vegetation controls flood and storm damage, thereby mitigating potential impacts of climate change. Vegetation provides food, shelter, socialization, shade, water detention, sediment control, bank stabilization, biodiversity, pollutant uptake, evapotranspiration of water, aesthetics, and atmospheric purification. In addition, plant size ordinarily is proportional to habitat value; i.e., large wooded trees are of greatest habitat value, followed by bushes, and then ground cover. Thus, an adequate quantity of vegetation must be maintained so that resource areas protected by the Bylaw can provide the resource area values protected by the Bylaw, including, but not limited to: flood control, storm damage prevention, pollution abatement, wildlife protection, aesthetic value, and recreation.*

*B. No vegetation in a resource area protected by the Bylaw shall be damaged, extensively pruned, or removed without written approval by the Commission and in-kind replacement. Extensive pruning is defined as removal of 20% or more of limbs or growth. For extensive pruning or removal of vegetation because of an Imminent Risk to Public Health and Safety, inkind replacement shall be to the extent practicable as determined by the Commission (See Section 9 of these Regulations for Emergency Certification).*

*C. "In-kind replacement" shall refer to a combination of species type and surface area as defined by the area delineated by the drip line of the affected plant(s). "In-kind" means the same type and*

*quantity of plant species that was removed, extensively pruned, or damaged, unless compelling evidence is presented in writing that explains why the resource area values under the Bylaw are promoted through an alternative proposal, and planted within the same resource area or another resource area located in close proximity on the project site. Notwithstanding the foregoing, only non-invasive plant species shall be planted as replacements.*

*D. The criteria for removal of vegetation follow. In all instances, the reasons for removal must be expressed in writing before the removal. In administering this standard, the Commission shall consider species selection, location, and timing of the plantings.*

*(1) Health of Vegetation*

*Vegetation in a state of irreversible decay, or undesirable vegetation present as a result of unintentional lack of maintenance may be offered as a reason(s) for removal.*

*(2) Bank or Slope Stabilization*

*A bank or slope stabilization plan requires the restructuring of soils occupied by vegetation.*

*(3) Invasive Species*

*The vegetation being removed is an aggressive, invasive, or non-native species as confirmed by wetlands scientist or as listed on a wetlands plant list acceptable to the Commission, such as, but not limited to that published by the United States Fish and Wildlife Service.*

*(4) Ecological Restoration*

*The vegetation is being removed as part of a project whose primary purpose is to restore or otherwise improve the natural capacity of a resource area to protect and sustain the interests of the Bylaw; also called Resource Area Enhancement.*

*(5) Vegetation Replacement*

*The vegetation is being removed and replaced elsewhere on the project site or within the same resource area, only if the Commission determines that such removal and replacement does not decrease the resource area's contribution to the resource area values protected by the Bylaw.*

*(6) Imminent Risk to Public Health and Safety*

*The vegetation is an imminent risk to public health or safety or property as confirmed in writing and submitted to the Commission by the Arlington Tree Warden, Fire Department Representative, Public Safety Officer, or a certified arborist.*

*E. Application for Removal. For all projects, the application for vegetation removal shall be submitted as part of the application for permit or Notice of Intent as described by the Bylaw and these regulations. At a minimum, the application will include:*

*(1) Narrative*

*The narrative shall describe the existing conditions, the proposed planting plan, the list of existing and proposed species, the size of existing and proposed species, and number of plants before and after the revegetation event. The narrative shall also provide the rationale for the removal, by addressing the criteria D1 through D6 above, and discuss the proposed maintenance plan (see (7) below).*

*(2) Affirmation of the Revegetation Activities*

*All plans for revegetation must be accompanied by written testimony and scaled diagram from a certified arborist or wetland scientist or landscape architect. At a minimum, this document must include the following information:*

*(a) Is the vegetation removal necessary? (See D. above)*

*(b) How much surface area of the vegetation will be removed (ft<sup>2</sup>-based on drip line)?*

*(c) How many individual plants will be removed by species; i.e., is the species list submitted with the NOI correct?*

*(3) Planting Plan*

*The proposed planting plan must be drawn to scale and identify properly the resource area and buffer zone and the project site. It must include the locations of each replacement species and the number of each species proposed for planting (in table form). The planting plan and procedures shall comply with the American Standards for Nurserymen, Inc. or equivalent. It must also include the location of the erosion control devices used during the restoration event. A brief narrative must accompany this planting*

*plan describing the storage location of all motorized equipment. The planting plan shall show the estimated tree canopies after 15 years of growth, the specific names, sizes and locations of trees to be planted, and the total area of square feet of the area shaded by tree canopies. In determining the shaded area, measure the shaded area assuming that the shaded area is only that area directly under the drip line.*

*(4) Existing Species List*

*Each species existing before the restoration shall be listed in terms of area of coverage (ft<sup>2</sup>) and number of individual plants and either height or dbh as specified in the tables below.*

*(5) Replacement Species List*

*The replacement of vegetation shall be according to the following table (derived from the American Standards for Nurserymen, Inc.), unless the Applicant proves that the amount of replacement vegetation will not survive or contribute in the long-term to resource area values. A rationale for the species and size choice must be provided if the replacement is not "in-kind". Native species are the preferred; invasive species are not allowed.*

*Replacement plant materials shall conform to the requirements described in the latest edition of American Standard for Nursery Stock, which is published by the American Association of Nurseryman ("AAN").*

*Replacement size shall be most common available substantial size, as approved by the Commission.*

*Vegetation replacement is not considered successful until the replacement plants have survived three full growing seasons.*

*For extensive pruning or removal of vegetation because of an Imminent Risk to Public Health and Safety, in-kind replacement shall be to the extent practicable as determined by the Commission (See Section 9 of these Regulations for Emergency Certification).*

*(a) Tree:*

*Existing Replacement*

*Trunk (dbh) Quantity*

*3 to 8 inches - 1*

*8 to 20 inches - 2*

*> 20 inches - 3*

*(b) For all trees:*

*1. If a plant is well grown with a single stem, well-shaped and bushy, and has sufficient well-spaced side branches to give it weight and good bud qualities, it is an acceptable plant.*

*2. On multi-stem trees, height shall be defined as the measurement taken from the ground level to the average uppermost point of growth of the plant.*

3. All replacement plants shall have ball sizes which are of a diameter and depth to encompass enough of the fibrous and feeding root system as necessary for the fully recovery of the plant once planted.

4. Sapling trees shall include deciduous trees with a dbh of 1 inch and less; evergreens of 2 feet or less and shall be replaced at the discretion of the Commission so as to reach an equivalent area of coverage and soil retention.

(c) For Shrubs:

The replacement of shrubs (bushes) shall be with bushes and shrubs of equivalent size. For bushes, the replacement must be well grown with a single stem, well-shaped and bushy, and have sufficient well-spaced side branches to give it weight and good bud quality as per the American Association of Nurserymen standards.

(6) Rationale for Removal - Describe why the interests of wetlands protection are advanced by the revegetation plan.

(7) Maintenance Plan - Vegetation replacement is not considered successful until the replacement plants have survived three full growing seasons. The maintenance plan shall describe how the restoration will be evaluated annually for three years and reported to the Commission. The Commission reserves the right to require a revised replanting plan, or additional plantings on an annual basis in the event that the revegetation plants decay or die.

F. The Commission may require one or more of the following measures to protect vegetation during work:

(1) Tree protection fencing – Prior to commencing work, four (4) foot-high snow fencing shall be installed and secured with wooden stakes (2" x 4" or 2" x 3") or 6-foot steel channel posts so as to create an enclosure at the dripline of tree(s) or other distance as the site conditions allow to be protected. Such fencing shall be securely erected, be vertically plumb and be maintained for the duration of the project and shall protect individual trees or groups of trees.

(2) Tree protection blanket – "BarkSavers" or similar armored blankets shall be installed and maintained according to product specifications.

(3) No existing trees shall be used for crane stay, guys or other fastening.

(4) Vehicles shall not be parked below the canopy of any existing tree or where damage may result to existing trees or tree roots.

(5) Construction materials shall not be stored beneath existing trees.

(6) Following completion of work, have a certified arborist monitor the health of trees on site for possible damage and take measures to repair damage.

(7) Prior to work, preparation of a tree protection plan showing summary of all trees on site (including dbh, species, extent of canopy, roots and health) and specifying whether each tree shall be saved or lost.

G. The Commission may require the placement of permanent bounds (e.g., granite or metal) to demarcate all or part of a resource area or vegetation mitigation area.

H. The requirements of this section shall be met commensurate with the nature, scope, type, and cost of the proposed project or activity.

## **Section 25 – Adjacent Upland Resource Area**

### **A. Findings.**

(1) *The Adjacent Upland Resource Area usually is significant to wildlife, plant or wildlife habitat, to public and private water supply, to groundwater supply, to flood control, to storm damage prevention, to prevention of pollution, to erosion control and sedimentation control, to natural character and recreation, and to mitigation of potential climate change impacts.*

(2) *Trees in the Adjacent Upland Resource Area provide important functions not provided by any other plant type. Trees provide shade to moderate water temperatures, levels of dissolved oxygen and water flow. They serve as windbreaks to moderate wind stress and shear during storms, and provide nesting, roosting and perching areas for birds, and other wildlife. The transitional assemblage of trees, shrubs and groundcover (containing both wetland and upland elements) frequently found in Adjacent Upland Resource Areas has been found significant to the support of a greater number of native and specialist wildlife species in the interior of resource areas, which they border. Trees and other vegetation, if undisturbed or minimally disturbed, slow the rate of surface runoff providing flood control and reducing down-gradient storm damage. In these ways, trees also mitigate potential climate change impacts due to extreme heat and heavy storm and rain events.*

(3) *Lands within the Adjacent Upland Resource Area are best left in an undisturbed and natural state.*

(4) *There is overwhelming scientific consensus that significant physical, chemical, or biological alterations to Adjacent Upland Resource Areas will have significant physical, chemical, or biological impacts on associated or adjacent wetland resource areas such as banks, creeks, streams, rivers, ponds, lakes, and wetlands. Adjacent Upland Resource Areas are presumed important to the protection of these resources because activities undertaken in close proximity to wetlands and other resource areas protected by the Bylaw have a high likelihood of adverse impact upon those areas, either immediately, as a consequence of construction, or over time, as a consequence of daily operation or existence of the activities. These adverse impacts from construction activities, impervious surfaces, and use can include, without limitation, erosion, siltation, loss of groundwater recharge, loss of flood control or storm damage prevention, poor water quality, harm to wildlife and wildlife habitat, and loss of resource resiliency for potential impacts of climate change. The ability of the Adjacent Upland Resource Area to protect a wetland resource, and to provide habitat, increases with buffer width and continuity.*

(5) *Generally, vegetated buffers within the Adjacent Associated Upland Resource Area and next to the adjacent resource area of less than 25 feet wide are ineffective in protecting adjacent wetlands or providing wildlife habitat functions. Vegetated buffers often larger than 25 feet are necessary to provide wildlife habitat and to protect adjacent resource areas from continuing activities such as inputs of sediments and nutrients, to protect from direct human disturbance, to protect sensitive species from adverse impacts, and to protect adjacent resource areas from the adverse effects of climate change and changing water quality, including but not limited to nutrient concentrations, temperature, salinity, and dissolved oxygen concentrations.*

*B. Definition and Boundary. The Adjacent Upland Resource Area is the area adjacent to a resource area specified in Section 2, A(1) through (4) and is the land within 100 feet (measured horizontally) of any of the aforesaid resource areas.*

*C. Alternatives to Work in Adjacent Upland Resource Area. A growing body of research evidence suggests that even "no disturbance" areas reaching beyond 25 feet from wetlands, streams, rivers, and other water bodies may be insufficient to protect many important*

*characteristics and values. Problems of nutrient runoff, water pollution, siltation, erosion, vegetation change, and habitat destruction are greatly exacerbated by activities within 100 feet of wetlands. Thus, work and activity in the Adjacent Upland Resource Area shall be avoided and discouraged and reasonable alternatives pursued. Only when the Applicant proves through a written alternative analysis that reasonable alternatives are not available or practicable, the Commission may, in its discretion, allow temporary, limited, or permanent disturbance as appropriate and consistent with this Section depending on the characteristics of the Adjacent Upland Resource Area, including but not limited to the following:*

- (1) slope*
- (2) soil characteristics*
- (3) drainage patterns*
- (4) extent and type of existing native vegetation*
- (5) extent and type of invasive vegetation*
- (6) amount of impervious surface*
- (7) wildlife and wildlife habitat*
- (8) intensity and extent of use*
- (9) intensity and extent of adjacent and nearby uses*
- (10) capacity to provide resiliency to climate change*

*This approach is intended to allow flexibility for use of property while maintaining necessary levels of protection of the resource values protected by the Bylaw.*

*D. No activities or work, other than passive passage and resource area enhancement, are permitted within the first 25 feet of the Adjacent Upland Resource Area (measured horizontally from a resource area specified in Section 2, A(1) through (4)). Except as part of Resource Area Enhancement or an Ecological Restoration Project, no vegetation may be disturbed, and leaf litter and natural debris shall remain in place. This No-Disturbance area shall at a minimum contain the same amount of area of undisturbed and natural vegetation from its pre-project state. A previously disturbed or previously developed 25-foot area shall be restored to a naturally vegetated state to the greatest extent practicable.*

*E. No new structure(s) shall be placed in the first 50 feet of the Adjacent Upland Resource Area (measured horizontally from a resource area specified in Section 2, A(1) through (4)), unless approved by the Commission in evaluation of existing total impervious surface (see Section F. below) within the 50-foot area compared to the proposed impervious surface, and other considerations for the improvement of the resource area and climate change resiliency.*

*F. Impervious surface.*

*(1) The total area of impervious surface within the Adjacent Upland Resource Area shall not increase over existing total area unless mitigation is provided and there is no impact on Resource Area values.*

*(2) Impervious surfaces shall not intrude farther into the Adjacent Upland Resource Area than pre-project conditions unless the Commission in its sole discretion determines that the total area of impervious surface is significantly decreased or other mitigation is provided that serves to protect the resource area values. Impervious surface shall be kept as close as possible to the outer (upland) boundary of the Adjacent Upland Resource Area.*



*G. The following activities may not be conducted in any portion of the Adjacent Upland Resource Area: changing of oil, refueling, or damage to other vegetation not scheduled for Removal.*

*H. Certain Proposed Activities in Adjacent Upland Resource Area.*

*The Adjacent Upland Resource Area should be left intact in a naturally vegetated state to the maximum extent practicable and as provided in these regulations. However there are some activities that may be permitted by the Commission that are not likely to have a significant or cumulative effect on the resource area values of the Bylaw, nor are they expected to have a significant effect on the ability of the resource area resilience to climate change, provided the other provisions of these Regulations are met. These proposed activities must be reviewed by the Conservation Commission Administrator to determine the appropriate permitting procedures, and to determine what, if any, mitigation is required. These activities are:*

- (1) Fencing, provided it will not constitute a barrier to wildlife movement;*
- (2) Plantings of native species of trees, shrubs, or groundcover, but excluding lawns that would require mowing, regardless of species composition;*
- (3) The conversion of impervious surfaces to vegetated surfaces, provided erosion and sedimentation controls are implemented during construction;*
- (4) Activities that are temporary in nature, have negligible impacts, and are necessary for planning and design purposes (e.g., installation of monitoring wells, exploratory borings, sediment sampling and surveying);*
- (5) Nonpermanent wildlife watching blinds; or*
- (6) Short-term scientific or educational activities.*

### ***Section 31 – Climate Change Resilience***

*A. The impacts of climate change can adversely affect each Resource Area’s ability to provide and promote the resource area values protected by the Bylaw. (See definitions of “adaptation” and “alter” and “impacts of climate change” in Section 4 above). Resource Areas are critical to building a community’s resilience/adaptation to the impacts of climate change due to their ability to provide for flood control, storm damage prevention, and other Resource Area Values.*

*B. The Applicant shall, to the extent practicable and applicable as determined solely by the Commission, integrate considerations of adaptation planning into their project to promote climate change resilience so as to protect and promote resource area values into the future. These considerations are especially important in Land Subject to Flooding (floodplain) and Riverfront Area and other Resource Areas which protect the interest of Flood Control and Storm Damage Prevention, including Adjacent Upland Resource Areas. These Resource Areas may be directly impacted by extreme weather events expected to be more prevalent or more intense due to climate change, in surface runoff of pollutants, and in wildlife habitat due to changes in temperature.*

*The Applicant shall consider the project’s adaptation to potential climate change impacts by addressing the following:*

- (1) Describe project design considerations to limit storm and flood damage during extended periods of disruption and flooding as might be expected in extreme weather events. See*

*Vegetative Wetlands Section 21, Land Subject to Flooding Section 23, and Adjacent Upland Resource Area Section 25, of these Regulations.*

*(2) Describe project stormwater surface runoff, which may increase due to storm surges and extreme weather events, and how this will be managed / mitigated to prevent pollution (including nutrients from fertilizers, roadway runoff, etc.) from entering the resource area with consideration of eliminating impervious surfaces as feasible. See Stormwater Management Section 33 of these Regulations.*

*(3) Describe project vegetation / planting plans and other measures to improve the resiliency of the wildlife habitat of the resource area to withstand potential temperature and rainfall changes (drought and excess) due to climate change. See Vegetation Removal and Replacement Section 24 of these Regulations.*

*(4) Describe measures to protect proposed structures and minimize damage to structures due to the impacts of climate change.*

#### **IV. Municipal and Environmental Contacts**

For additional information about the above featured bylaws and ordinances, we suggest connecting with the local municipal staff or environmental organization staff in the region. Suggested contacts are included below:

##### *Coldwater Fisheries - Sudbury, MA*

Lori Capone, Conservation Coordinator  
Town of Sudbury  
CaponeL@sudbury.ma.us  
978-440-5470

Alison Field-Juma, Executive Director  
OARS - For the Sudbury, Assabet and Concord Rivers  
afieldjuma@oars3rivers.org  
978-369-3956

##### *Flood Hazard Protection - Chatham, MA*

Aly Sabatino, Principal Planner  
Town of Chatham  
ASabatino@chatham-ma.gov  
508-945-5168

Jay Briggs, Building Commissioner  
Town of Chatham  
JBriggs@chatham-ma.gov  
508-945-5160

Don Keeran, Assistant Director of APCC  
Association to Preserve Cape Cod (APCC)  
dkeeran@apcc.org  
508-619-3185



Greywater - Mashpee, MA

Glen Harrington, Health Agent, R.S., CHO  
Town of Mashpee  
GHarrington@mashpee.ma.gov  
508-539-1426

Don Keeran, Assistant Director of APCC  
Association to Preserve Cape Cod (APCC)  
dkeeran@apcc.org  
508-619-3185

Illicit Water Withdrawals - Norton, MA

Jennifer Carlino, Conservation Director  
Town of Norton  
Conservation@nortonmaus.com  
508-285-0276

Canoe River Aquifer Advisory Committee  
Town of Norton  
508-285-0275

Impervious Cover - Permeable Paving and Parking - Mashpee, MA

Evan Lehrer, Town Planner  
Town of Mashpee  
ELeherer@mashpeema.gov  
508-539-1414

Don Keeran, Assistant Director of APCC  
Association to Preserve Cape Cod (APCC)  
dkeeran@apcc.org  
508-619-3185

Private Wells and Nonessential Outdoor Watering Restrictions - Wenham, MA

Erik Mansfield, Water Superintendent  
Town of Wenham  
emansfield@wenhamma.gov  
978-468-5520 Ext. 6

Wayne Castonguay, Executive Director  
Ipswich River Watershed Association  
wcastonguay@ipswichriver.org  
978-412-8200

Stormwater Management - Westwood, MA

Karon Catrone, Conservation Agent

Town of Westwood  
kcatrone@townhall.westwood.ma.us  
781-251-2580

Julie Wood, Deputy Director  
Charles River Watershed Association  
jwood@crwa.org  
781-788-0007 x225

Water Savings Cost Estimates - Natick, MA  
Marianne Iarossi, AICP, Open Space Planner & Conservation Agent  
Town of Natick  
miarossi@natickma.org  
508-647-6450

Julie Wood, Deputy Director  
Charles River Watershed Association  
jwood@crwa.org  
781-788-0007 x225

Wetlands Protection - Arlington, MA  
Emily Sullivan, Environmental Planner & Conservation Agent  
Town of Arlington  
esullivan@town.arlington.ma.us  
781-316-3012

Patrick Herron, Executive Director  
Mystic River Watershed Association  
patrick@mysticriver.org  
781-316-3438

## **V. Case Studies**

### Case Study #1: Private Wells and Nonessential Outdoor Water Use Restrictions

Nonessential outdoor water use restriction bylaws that include private wells are critical to ensuring effective and equitable water conservation during dry summer months. The ability to limit nonessential water use is a critical tool for communities to protect public water supplies and the environment, especially during times of drought. In the majority of communities in Massachusetts, private wells are exempt from outdoor nonessential watering restrictions. Private wells generally draw on the same groundwater reserves that support public water supplies and sustain streams and rivers. Private wells should be included as resources subject to nonessential outdoor watering restrictions to protect the water resources within the community to the greatest extent possible.

**Wayland** is an example of a community that has the potential to strengthen their existing nonessential outdoor water use regulations with the addition of private well bylaw language.

Currently, entities subject to Wayland’s nonessential outdoor water use restrictions include the following:

*Chapter 190, Article 1, Section 190-3, General Bylaws*

*WATER USERS or WATER CONSUMERS: All public and private users of the town public water system, irrespective of any person's responsibility for billing purposes for water used at any particular facility.*

In comparison, **Wenham’s** nonessential outdoor water use bylaw explicitly includes private wells as subject to nonessential outdoor water use restrictions. The following highlighted language from Wenham, if inserted as amendment to Wayland’s original bylaw, would strengthen the overall intent and effectiveness of Wayland’s water conservation efforts:

*Chapter 190, Article 1, Section 190-3, General Bylaws*

*WATER USERS or WATER CONSUMERS: All public and private users of the town public water system, irrespective of any person's responsibility for billing purposes for water used at any particular facility. Restrictions shall apply to all water used in the town of Wenham, to include Town water and water supplied by private wells.*

*Case Study #2: Stormwater*

Stormwater bylaws play a crucial role in conservation and water management in municipal regulation. Responsible for the establishment of standards that regulate systems for groundwater recharge and infiltration, erosion control measures, and minimization of pollutants, these measures can serve as a particularly useful tool for promotion of low impact development (LID) design processes that are more sustainable, environmentally conscious, and safe for communities in Massachusetts.

**Natick** is an example of a municipality with stormwater bylaws that are less effective in sustainable design and oversight; the town’s stormwater bylaw explicitly stipulates regulations *only* for land disturbance greater than 40,000 square feet, makes no mention of LID feature implementation, and fails to define standards consistent with best practice. Their bylaw currently includes the below language:

*Article 79A - Stormwater Mgmt. & Erosion Control*

*STORMWATER MANAGEMENT AND EROSION CONTROL BY-LAW*

*Section 4*

*Applicability*

*This By-Law shall apply to all land-disturbing activities within the jurisdiction of the Town of Natick. Except as permitted by the Conservation Commission, or as otherwise provided in this By-Law, no person shall perform any activity that results in land disturbance of 40,000 square feet or more.*

*A. Regulated Activities*

*Regulated activities shall include, but not be limited to:*

- 1. Land disturbance of greater than 40,000 square feet, associated with construction or reconstruction of structures.*

2. 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 40,000 square feet or more of land,
3. Paving or other change in surface material over an area of 40,000 square feet or more causing a significant reduction of permeability or increase in runoff,
4. Construction of a new drainage system or alteration of an existing drainage system or conveyance serving a drainage area of more than 40,000 square feet,
5. Any other activity altering the surface of an area exceeding 40,000 square feet that will, or may, result in increased stormwater runoff flowing from the property into a public way or the municipal storm drain system, or
6. Construction or reconstruction of structures where more than 40,000 square feet of roof drainage is altered.

#### *B. Erosion and Sedimentation Control Requirement*

*A project which includes land disturbance of less than 40,000 s.f. shall be considered to be in conformance with this By-Law if soils or other eroded matter have been or will be prevented from being deposited onto adjacent properties, rights-of-ways, public storm drainage system, or wetland or watercourse. The design, installation, and maintenance of erosion and sediment control operations and facilities shall adhere to the standards specified in the Regulation to the By-Law.*

#### *C. Exempt Activities*

*The following activities are exempt from the requirements of this By-Law:*

1. Normal maintenance and improvement of land in agricultural use as defined by the Wetland Protection Act.
2. Repair of septic systems when required by the Board of Health for the protection of public health and compliance with Section 4, Paragraph B.
3. Normal maintenance of existing landscaping, gardens or lawn areas associated with a single family dwelling provided such maintenance does not include the addition of more than 50 cubic yards of soil material, construction of any walls, alteration of existing grades by more than one foot in elevation, or alteration of drainage patterns.
4. The construction of fencing that will not alter existing terrain or drainage patterns.
5. Construction of utilities other than drainage (gas, water, electric, telephone, etc.) that will not alter terrain or drainage patterns.
6. Projects wholly within the jurisdiction of the Conservation Commission and requiring an Order of Conditions.

#### *Section 5*

##### *Administration*

*The Conservation Commission shall administer, implement and enforce this By-Law. Any powers granted to or duties imposed upon the Conservation Commission through this By-Law may be delegated in writing by the Conservation Commission to its employees or agents.*

#### *Section 6*

##### *Regulations*

*The Conservation Commission may adopt, and periodically amend rules and regulations to effectuate the purposes of this By-Law. Failure by the Conservation Commission to promulgate such rules and regulations shall not have the effect of suspending or invalidating this By-Law.*

## *Section 7*

### *Permits*

*Permit issuance is required prior to any activity disturbing 40,000 or more square feet of land. The site owner or his agent shall apply for the permit with the Conservation Commission. While application may be made by a representative, the permittee must be the owner of the site.*

#### *A. Applications*

*An application shall be made to the Conservation Commission in a form and containing information as specified in this By-Law and in the Regulations adopted by the Conservation Commission and shall be accompanied by payment of the appropriate application and review fees.*

#### *B. Fees*

*Fees shall be established by Conservation Commission to cover expenses connected with public notice, application review, and monitoring permit compliance. The fee shall be sufficient to also cover professional review. The Conservation Commission is authorized to retain a Registered Professional Engineer or other professional consultant to advise the Commission on any or all aspects of these plans. Applicants must pay review fees before the review process may begin. The applicant for a Land Disturbance Permit may be required to cover the costs of said consultant through an account established pursuant to GL. c. 44§53G.*

#### *C. Information Requests*

*The Conservation Commission may request such additional information as is necessary to enable the Conservation Commission to determine whether the proposed land disturbance activity will protect water resources and comply with the requirements of this By-Law.*

#### *D. Determination of Completeness*

*The Conservation Commission shall make a determination as to the completeness of the application and adequacy of the materials submitted. No review shall take place until the application has been found to be complete.*

#### *E. Coordination with Other Boards*

*On receipt of a complete application for a Land Disturbance Permit the Conservation Commission shall distribute one copy each to the Planning Board, Department of Public Works, Board of Health, and the Building Inspector for review and comment. Said agencies shall, in their discretion, investigate the case and report their recommendations to the Conservation Commission. The Conservation Commission shall not hold a hearing on the Land Disturbance Permit until it has received reports from said agencies or until said agencies have allowed twenty (20) days to elapse after receipt of the application materials without submission of a report thereon.*

#### *F. Entry*

*Filing an application for a land disturbance permit grants the Conservation Commission or its agent, permission to enter the site to verify the information in the application and to inspect for compliance with permit conditions, to the extent permitted by law.*

#### *G. Hearing*

*Within thirty (30) days of receipt of a complete application for a Land Disturbance Permit, the Conservation Commission shall hold a public hearing and shall take final action within thirty (30) days from the close of the hearing unless such time is extended by agreement between the applicant and the Conservation Commission. Notice of the public hearing shall, at least seven (7) days prior to said hearing, be given by publication in a local paper of general circulation, and by posting. The Conservation Commission shall be responsible for publishing the notice in the local newspaper and posting the notice at the Town Hall. The Conservation Commission shall make the application available for inspection by the public during business hours at the Town of Natick Conservation Office.*

#### *H. Action*

*The Conservation Commission may:*

- 1. Approve the Application and issue a permit if it finds that the proposed plan will protect water resources and complies with the requirements of this By-Law;*
- 2. Approve the Application and issue a permit with conditions, modifications or restrictions that the Conservation Commission determines are required to ensure that the project will protect water resources and complies with the requirements of this By-Law; or*
- 3. Disapprove the application and deny a permit if it finds that the proposed plan will not protect water resources or fails to meet the objectives of and to comply with the requirements of this By-Law. If the Conservation Commission finds that the applicant has submitted insufficient information to describe the site, the work, or the effect of the work on water quality and runoff volume, the Conservation Commission may disapprove the application, denying a permit.*

#### *I. Project Changes*

*The permittee, or his or her agent, must notify the agent of the Conservation Commission in writing of any change or alteration of a land-disturbing activity before the change or alteration occurs. If the agent of the Conservation Commission determines that the change or alteration is significant, based on the design requirements listed in Part II or Part III of the Regulations adopted by the Conservation Commission under this by-law, the agent of the Conservation Commission may require that an amended application or a full application be filed in accordance with this Section. If any change or alteration from the Land Disturbance Permit occurs during land disturbing activities, the agent of the Conservation Commission may require the installation of interim erosion and sedimentation control measures before approving the change or alteration.*

### *Section 8*

#### *Erosion and Sedimentation Control Plan*

*The Erosion and Sedimentation Control Plan shall contain sufficient information to describe the nature and purpose of the proposed development, pertinent conditions of the site and the adjacent areas, and proposed erosion and sedimentation controls. The applicant shall submit such material as is necessary to show that the proposed development will comply with the design*

*standards and contain the information listed in the Regulations adopted by the Conservation Commission for administration of this By-Law.*

#### *Section 9*

##### *Stormwater Management Plan*

*The Stormwater Management Plan shall contain sufficient information to describe the nature and purpose of the proposed development, pertinent conditions of the site and the adjacent areas, and proposed best management practices for the permanent management and treatment of stormwater. The Stormwater Management Plan shall contain sufficient information for the Conservation Commission to evaluate the environmental impact, effectiveness, and acceptability of the measures proposed by the applicant for reducing adverse impacts from stormwater. The Plan shall be designed to meet the Massachusetts Stormwater Management Standards set forth in the Massachusetts Stormwater Management Policy and DEP Stormwater Management Handbook Volumes I and II. The Stormwater Management Plan shall fully describe the project in drawings, and narrative. The applicant shall submit such material as is required by the Regulations adopted by the Conservation Commission for the administration of this By-Law.*

#### *Section 10*

##### *Operation and Maintenance Plans*

*A. An Operation and Maintenance Plan - (O&M Plan) for the permanent storm water management system is required at the time of application for all projects. The maintenance plan shall be designed to ensure compliance with this By-Law and that the Massachusetts Surface Water Quality Standards contained in 314 CMR 4.00 are met in all seasons and throughout the life of the system. The Operation and Maintenance plan shall include any requirements deemed necessary by the Conservation Commission to insure compliance with said plan, including without limitation a covenant. The Conservation Commission shall make the final decision of what maintenance option is appropriate in a given situation. The Conservation Commission will consider natural features, proximity of site to water bodies and wetlands, extent of impervious surfaces, size of the site, the types of stormwater management structures, and potential need for ongoing maintenance activities when making this decision. Once approved by the Conservation Commission the Operation and Maintenance Plan shall be recorded at the South Middlesex Registry of Deeds by the permittee, shall run with the land, shall remain on file with the Conservation Commission and shall be an ongoing requirement. The Operation and Maintenance Plan shall conform to the requirements listed in the Regulations adopted by the Conservation Commission for the administration of this By-Law. Stormwater management easements shall be provided by the property owner(s) in areas and as necessary to carry out the required maintenance.*

##### *B. Changes to Operation and Maintenance Plans*

- 1. The owner(s) of the stormwater management system must notify the Conservation Commission or its agent of changes in ownership or assignment of financial responsibility.*
- 2. The maintenance schedule in the Maintenance Agreement may be amended to achieve the purposes of this By-Law by mutual agreement of the Conservation Commission 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, persons with operational responsibility, and persons with administrative responsibility. Once the amended*

*Plan is signed the Conservation Commission shall file it at the Registry of Deeds at the expense of the current owner(s).*

## *Section 11*

### *Inspection and Site Supervision*

#### *A. Preconstruction Meeting*

*Prior to clearing, excavation, construction, or any land disturbing activity requiring a permit, the applicant, the applicant's technical representative, the general contractor, pertinent subcontractors, and any person with authority to make changes to the project, shall meet with the Conservation Commission or its designated agent to review the permitted plans and proposed implementation.*

#### *B. Commission Inspection*

*The Conservation Commission or its designated agent shall make inspections as hereinafter required and shall either approve that portion of the work completed or shall notify the permittee wherein the work fails to comply with the approved plans and any conditions of approval. One copy of the approved plans and conditions of approval, signed by the Conservation Commission shall be maintained at the site during the progress of the work. In order to obtain inspections, the permittee shall notify the Agent of the Conservation Commission at least three (3) working days before each of the following events:*

- 1. Erosion and sediment control measures are in place and stabilized;*
- 2. Rough Grading has been substantially completed;*
- 3. Final Grading has been substantially completed;*
- 4. Bury Inspection: prior to backfilling of any underground drainage or stormwater conveyance structures.*
- 5. Close of the Construction Season; and*
- 6. Final landscaping (permanent stabilization) and project final completion.*

#### *C. Permittee Inspections*

*The permittee or his/her agent shall conduct and document inspections of all control measures no less than weekly or as specified in the permit, and prior to and following anticipated storm events. The purpose of such inspections will be to determine the overall effectiveness of the control plan, and the need for maintenance or additional control measures. The permittee or his/her agent shall submit monthly reports to the Conservation Commission or designated agent in a format approved by the Conservation Commission. The Conservation Commission may require, as a condition of approval, that an Environmental Site Monitor, approved by the Conservation Commission, be retained by the applicant to conduct such inspections and prepare and submit such reports to the Conservation Commission or its designated agent.*

#### *D. Access Permission*

*To the extent permitted by law, or if authorized by the owner or other party in control of the property, the Conservation Commission, its agents, officers, and employees may enter upon privately owned property for the purpose of performing their duties under this By-Law and may make or cause to be made such examinations, surveys or sampling as the Conservation Commission deems reasonably necessary to determine compliance with the permit.*



### *Section 12 Surety*

*The Conservation Commission may require the permittee to post before the start of land disturbance activity, a surety bond, irrevocable letter of credit, cash, or other acceptable security. The form of the bond shall be approved by town counsel, and be in an amount deemed sufficient by the Conservation Commission to insure that the work will be completed in accordance with the permit. If the project is phased, the Conservation Commission may release part of the bond as each phase is completed in compliance with the permit but the bond may not be fully released until the Conservation Commission has received the final report as required by Section 13 and issued a certificate of completion.*

### *Section 13*

#### *Final Reports*

*Upon completion of the work, the permittee shall submit a report (including certified as-built construction plans) from a Registered Professional Engineer (P.E.) or Registered Professional Land Surveyor certifying that all erosion and sedimentation control devices, and approved changes and modifications, have been completed in accordance with the conditions of the approved permit. Any discrepancies should be noted in the cover letter.*

### *Section 14*

#### *Enforcement*

*A. The Conservation Commission or an authorized agent of the Conservation - Commission shall enforce this By-Law, regulations, orders, violation notices, and enforcement orders, and may pursue all civil and criminal remedies for such violations.*

#### *B. Orders*

*1. The Conservation Commission or an authorized agent of the Conservation Commission may issue a written order to enforce the provisions of this By-Law or the regulations there-under, which may include: a. a requirement to cease and desist from the land-disturbing activity until there is compliance with the By-Law and provisions of the land-disturbance permit; b. maintenance, installation or performance of additional erosion and sedimentation control measures; c. monitoring, analyses, and reporting; d. remediation of erosion and sedimentation resulting directly or indirectly from the land-disturbing activity*

*2. If the enforcing person determines that abatement or remediation of erosion and sedimentation is required, the order shall set forth a deadline by which such abatement or remediation must be completed. Said order shall further advise that, should the violator or property owner fail to abate or perform remediation within the specified deadline, the Town of Natick may, at its option, undertake such work, and the property owner shall reimburse the Town's expenses.*

*3. Within thirty (30) days after completing all measures necessary to abate the violation or to perform remediation, the violator and the property owner shall be notified of the costs incurred by the Town of Natick, including administrative costs. The violator or property owner may file a written protest objecting to the amount or basis of costs with the Conservation Commission 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 Conservation Commission 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, as provided in G.L. Ch. 59, § 57, after the thirty-first day following the day on which the costs were due.*

#### *C. Criminal Penalty*

*Any person who violates any provision of this By-Law, regulation, order or permit issued thereunder, shall be punished by a fine of not more than \$ 300.00 for each offense. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.*

#### *D. Non-Criminal Disposition*

*As an alternative to criminal prosecution or civil action, the Town of Natick may elect to utilize the non-criminal disposition procedure set forth in G.L. Ch.. 40, §21D in which case the Conservation Commission or authorized agent shall be the enforcing person. The penalty for each violation shall be \$300.00. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.*

#### *E. Appeals*

*All decisions or orders of the Conservation Commission shall be final. Further relief shall be to a court of competent jurisdiction.*

#### *F. Remedies Not Exclusive*

*The remedies listed in this By-Law are not exclusive of any other remedies available under any applicable federal, state or local law.*

#### *Section 15*

##### *Certificate of Completion*

*The Conservation Commission will issue a Certificate of Completion upon receipt and approval of the final reports and/or upon otherwise determining that all work of the permit has been satisfactorily completed in conformance with this By-Law. The Certificate of Completion shall be recorded at the Registry of Deeds by the Owner(s).*

#### *Section 16*

##### *Severability*

*If any provision, paragraph, sentence, or clause of this By-Law or the application thereof to any person, establishment or circumstance shall be held invalid for any reason, all other provisions shall continue in full force and effect to the extent permitted by law.*

The following language from **Westwood** would serve to make the Natick bylaw more effective, conscious of site disturbance at smaller scales:

*This Bylaw shall apply to all activities that result in disturbance of five thousand (5,000) square feet of land or more that drains to the municipal separate storm sewer system (MS4). Except as authorized by the Stormwater Authority in a Land Disturbance Permit or as otherwise provided in these regulations, no person shall perform any activity that results in disturbance of five thousand (5,000) square feet of land or more. There are two levels of reviews based on the amount of land proposed to be disturbed as part of a single project as follows:*

*(1) Administrative Land Disturbance Review is required for projects disturbing at least five thousand (5,000) square feet but less than one-half (1/2) acre (21,780 square feet) of land.*

*(2) A Land Disturbance Permit is required for disturbance of one-half (1/2) acre (21,780 square feet) or more of land or proposed use is listed as a land use of higher potential pollutant loads as defined in the Massachusetts Stormwater Management Standards, regardless of the amount of land to be disturbed.*

### Case Study #3: Greywater

Greywater municipal regulation is exceedingly rare in Massachusetts, and few communities mention these systems in bylaw language. However, greywater systems promoting reuse and water conservation can be crucial in limiting the inflow of waste water in municipal systems and in fostering sustainability.

**Westford** is just one of many municipalities in Massachusetts that make no mention of greywater systems in its board of health regulations. Special permitting is required for greywater construction in the Commonwealth (primarily on the outdated presumption that these systems are dangerous) and the practice is accordingly prohibited in the town.

**Mashpee**, however, is unique in its support for these networks. Westford might benefit from stipulations laid out in Mashpee's Board of Health Regulations for greywater permitting so as to promote greywater reuse and protect natural water sources from unnecessary and avoidable pollutants. Potential language additions in Westford could include:

#### **REGULATIONS:**

*1. The Board of Health hereby approves the use of composting toilets for the collection and disposal of blackwater with the following conditions:*

*a. The composting compartment must be inspected annually by a Department of Environmental Protection (DEP) approved inspector of composting systems. A copy of the inspection report shall be submitted to the Board of Health within 30 days of the inspection.*

*b. The composted material shall be removed at intervals according to the manufacturer's specifications. The compost shall be transported by a DEP approved hauler AND disposed of at a DEP approved location.*

*2. In recognition of the fact that the majority of pathogenic organisms are found in blackwater, while some still exist in greywater, the Board of Health approves the following greywater discharge systems and conditions:*

*a. The filtered greywater may be discharged internally into a DEP and Board of Health approved greenhouse absorption system OR;*

*b. The filtered greywater may be discharged externally into a DEP and Board of Health approved soil absorption system with nitrogen removal capability.*

*c. The soil absorption system shall be located a minimum of 75 feet from any wetland or bordering vegetated wetland as verified by the Mashpee Conservation Commission. This contrasts with the standard setback requirement of 100 feet for 72 the traditional Title V soil absorption system in recognition of the lower pathogenic content in greywater.*

- d. *The bottom of the soil absorption system shall be a minimum of 4 feet above groundwater, adjusted if applicable.*
- e. *If there does not exist a minimum of 4 feet of naturally occurring permeable soil between the bottom of the leaching facility and groundwater, then there shall exist a minimum of 2 feet of naturally occurring permeable soil between the bottom of the soil absorption system and groundwater with an additional 3 feet of naturally occurring permeable soil below the groundwater elevation.*
- f. *The leaching area requirement for the greywater discharge system may be reduced to 60% of the standard Title V area requirement.*
- g. *The soil absorption system and the greywater filtering system must be inspected annually by a DEP approved greywater discharge system inspector. The filters must be replaced at intervals according to the manufacturer's specifications. A copy of the inspection report must be submitted to the Board of Health within 30 days of the inspection.*
- h. *No garbage grinders shall be allowed to be installed. Therefore a septic tank is not required.*
- i. *For new construction, a standard Title V system must be approvable on-site. This standard Title V system must meet State requirements only.*
- j. *Plans for gray/blackwater septic systems must be drawn by a licensed professional engineer or registered sanitarian.*
- k. *Any variance from these regulations must be submitted in writing by the plan designer and will be considered by the Board of Health on a case-by-case basis.*
- l. *Failure to submit the annual inspection reports to the Board of Health within 30 days of their completion shall constitute a determination by the Board of Health that the system is in failure. The Board may, at which time, hire an inspector to conduct the inspection with all associated costs borne by the owner. Failure to pay for these costs will result in the board's condemnation of the septic systems and the placing of a lien against the property.*

#### Case Study #4: Illicit Water Withdrawals

Excessive water withdrawals can make vulnerable rivers and streams go dry. While the state permits water withdrawals through the Massachusetts Water Management Act, the threshold for the Act is 100,000 gallons per day (gpd). Commercial users looking to avoid the regulatory system may seek to withdraw water illicitly by drawing directly from the source. Excessive withdrawals lead to diminished river flows, poorer water quality and the degradation of local natural habitats such as wetlands.

**Billerica's** general bylaws make no mention of illicit water withdrawals currently. To strengthen their existing bylaw language to protect local rivers and streams, Billerica could incorporate sections of **Norton's** illicit water withdrawal bylaw. Norton's bylaw makes explicit the prohibition of water withdrawals from waters within the community for any commercial purposes. The bylaw also provides flexibility for the local Board of Water/Sewer Commissioners to establish a separate hydrant or outlet for commercial water use as needed.

#### *§ 163-11 General Bylaws*

*Withdrawal prohibited; exceptions; designation of public hydrants or outlets.*

*A. The extraction or withdrawal of water for commercial purposes of water from any pond, stream, river, watercourse, surface, or subsurface water into a tank vehicle, or into any tank contained in or on a vehicle, shall be prohibited.*

*B. This bylaw shall not apply to municipal fire apparatus.*

*C. The Board of Water/Sewer Commissioners may, but need not, designate one or more public water hydrants or other public water outlets in the Town of Norton to furnish water for commercial purposes to a tank vehicle or a tank contained in or on a vehicle. Said hydrant(s) or outlet(s) shall not allow any backflow into the public water system and shall be under the supervision and control of the Board of Water/Sewer Commissioners.*

#### Case Study #5: Wetlands

Wetlands protect drinking water, prevent storm damage, and provide fish, shellfish, and wildlife habitats. Wetlands also support commercial fishing, tourism, recreation, and educational opportunities. These valuable resource areas are found in every community across Massachusetts and are an important part of a watershed. The purpose of the Massachusetts Wetlands Protection Act is to protect public health, safety, and welfare by preserving the ability of wetlands to absorb floodwaters, filter pollutants, recharge water supplies, and support fisheries and wildlife. The state Act and accompanying state wetlands regulations limit development in or near wetlands, rivers, and floodplains and require filing for a permit from the local conservation commission for projects in and near these areas. While the state law provides a foundation for wetlands protection, it does not adequately protect certain areas, such as buffer strips adjacent to wetlands. Wetlands with strong conservation protections will help to improve water quality, quantity and biodiversity in a watershed.

**Northampton's** wetlands bylaw could be strengthened by incorporating language that explicitly includes the reporting on considerations of adaptation planning in a proposed project to promote climate change resilience to protect and promote resource area values in the future, similar to language currently in place in **Arlington's** wetlands bylaw regulations. Proposed additions to Northampton's bylaw could include the following:

*A. The impacts of climate change can adversely affect each Resource Area's ability to provide and promote the resource area values protected by the Bylaw. Resource Areas are critical to building a community's resilience/adaptation to the impacts of climate change due to their ability to provide for flood control, storm damage prevention, and other Resource Area Values.*

*B. The Applicant shall, to the extent practicable and applicable as determined solely by the Commission, integrate considerations of adaptation planning into their project to promote climate change resilience so as to protect and promote resource area values into the future. These considerations are especially important in Land Subject to Flooding (floodplain) and Riverfront Area and other Resource Areas which protect the interest of Flood Control and Storm Damage Prevention, including Adjacent Upland Resource Areas. These Resource Areas may be directly impacted by extreme weather events expected to be more prevalent or more intense due to climate change, in surface runoff of pollutants, and in wildlife habitat due to changes in temperature.*

*The Applicant shall consider the project's adaptation to potential climate change impacts by*

*addressing the following:*

- (1) Describe project design considerations to limit storm and flood damage during extended periods of disruption and flooding as might be expected in extreme weather events.*
- (2) Describe project stormwater surface runoff, which may increase due to storm surges and extreme weather events, and how this will be managed / mitigated to prevent pollution (including nutrients from fertilizers, roadway runoff, etc.) from entering the resource area with consideration of eliminating impervious surfaces as feasible.*
- (3) Describe project vegetation / planting plans and other measures to improve the resiliency of the wildlife habitat of the resource area to withstand potential temperature and rainfall changes (drought and excess) due to climate change.*
- (4) Describe measures to protect proposed structures and minimize damage to structures due to the impacts of climate change.*

## **VI. Best Practices for Passing a New Bylaw or Ordinance**

While it is beneficial to have access to suggested bylaw or ordinance language, communities may still find it difficult to get their proposed amendments “across the finish line” (i.e. passed through town or city council meetings).

Based on our conversations with municipalities and local organizations, we offer the following suggestions for best practices when trying to pass or amend a bylaw or ordinance:

- **Connect proposed changes with existing bylaw or ordinance language in another community.** Municipal officials may be more likely to support pursuing amendments to existing language or adopt new language if they can easily point to neighboring communities that have implemented said changes. In addition, communities that have “gone first” in implementing changes may serve as resources for their peers in providing suggestions for effective implementation and lessons learned. It is worthwhile to reach out to surrounding communities to compare policies and determine if there is potential for improvements to be made.
- **Alignment with the MVP program.** Timing for proposed water-related bylaw and ordinance changes can be critical. Based on conversations with municipalities and agency staff, we recommend that communities strongly consider making improvements to their bylaws or ordinances as either a component of the Massachusetts Vulnerability and Preparedness (MVP) Program preparedness or action grants. Depending on the stipulations for the relevant grant cycle, there are often opportunities to apply for bylaw and ordinance development funding for both preparedness and action grants. In addition, for communities that are already part of the MVP program but are seeking opportunities to apply for the action grant cycles again, it may be beneficial for a community to amend their bylaws prior to their next application round to make the best case possible for their community.
- **Regulations versus bylaw or ordinance upgrades.** It is worthwhile to first spend some time determining whether a change is needed to a bylaw or ordinance, or if said bylaw or ordinance has corresponding regulations that can be adjusted instead. This can sometimes mean the difference between a change going before a public meeting (regulations change)

or a town or city council meeting, which can be far more challenging and time-consuming to address (bylaw or ordinance change). Rules may vary depending on the community so be sure to determine what your local guidance indicates first.

- **Connection to climate change.** Particularly for water-related bylaws and ordinances, it can be helpful in securing public support to provide a transparent and immediate connection between a proposed amendment and climate change. What one person may view as a helpful improvement may be seen as unnecessary semantics to another so it is essential to make proposed amendments seem urgent, necessary and effective in combating larger issues like climate change.
- **Connections with state and federal permits.** To comply with certain state and federal permits, it may be necessary for a community to implement a particular bylaw or ordinance. Similarly, local elected officials may be more likely to support a proposed amendment if there is a clear and apparent link to an existing permit and the measures necessary to stay in compliance. For this reason, we encourage advocates of a proposed bylaw or ordinance to make the appropriate connections between the local policy and the corresponding permit to show that the proposed change is both relevant and necessary.
- **Provide public education materials as early as possible.** Take advantage of existing educational tools and templates and make those publicly available as soon as a proposed change is in final draft form. Transparency about the potential impacts of the proposed change and the connection between this change and broader issues (i.e. state and federal permitting, longevity of local drinking water supply, climate change resiliency) will be necessary to shore up local support. For example, we suggest exploring Mass Audubon's *Shaping the Future of Your Community Program* webpage, which provides resources and guidance for sustainable planning and development, including information regarding wetlands and zoning bylaw tools. In addition, we also suggest exploring the Neponset River Watershed Association and Metropolitan Area Planning Council report, *Checklist for Evaluating Your Municipal Stormwater Bylaw under the 2016 EPA Massachusetts Small MS4 General Permit*, which provides suggestions for updating local stormwater bylaws to be in compliance with the most recent federal stormwater permit.

## VII. Conclusion

In Massachusetts, as a home rule state, it is often at the local level that residents and organizations can have some of the most significant influence on policies that dictate the health of our river systems. From bylaws and ordinances that encourage sustainable land use practices to smart development, to water conservation and wetland protections, there are substantial opportunities to improve the local laws and regulations that dictate the future of our waterways. This paper was intended to serve as a starting point for considering some of the current innovative bylaws and ordinances in Massachusetts that seek to address issues that harm water quality or streamflow for our rivers and streams. We hope this resource will serve as a launch point for communities, local organizations and residents to consider the possibilities for strengthening their local policies to truly protect and conserve our water resources in Massachusetts.