



**Regulatory Plan and Case Studies**

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**On behalf of**  
**Woods Hole Oceanographic Institution**

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## **I. Introduction**

*ResilientWoodsHole* set out to “develop a plan for implementing Falmouth’s Coastal Resiliency Advisory Committee’s Regulatory Recommendations for Woods Hole and document actual case studies of regulatory bottlenecks and/or inconsistencies with resilient solutions.” This work includes identifying existing regulatory impediments to coastal resilient development and outlining ways in which existing regulations, bylaws and ordinances can be modified to allow for and encourage climate adaptation projects.

Accordingly, this memorandum sets forth existing regulatory framework that impacts development in coastal areas most affected by climate change, explains how the regulatory framework can be inconsistent with resilient solutions, and suggests various ways in which the existing framework can be modified or altered to encourage coastal resilient solutions.

## **II. Local Laws**

### **A. Falmouth Zoning Bylaw**

The Falmouth Zoning Bylaw contains numerous provisions that place additional burdens on applicants seeking to strengthen coastal resiliency. Several of these provisions are discussed in detail below.

#### **1. Wetlands Regulations**

The Falmouth Zoning Bylaw contains a section titled “Wetlands Regulations” (Article XVII). Article XVII requires Applicants to obtain special permit relief from the Falmouth Select Board for dredging, excavating, filling, or similar work in a stream or tidal water. Work involving filling, excavating, diking, bulkheading or riprapping within a marsh or along the shore of streams and bodies of water, which alters the shoreline or creates separation, also requires a special permit from the Select Board. Further, in determining whether a special permit is warranted, the Select Board is to consider what is “desirable to protect and conserve the shellfish and other aquatic resources of the Town.”

Thus, certain coastal projects in Falmouth must obtain both Conservation Commission approval and Select Board approval. Unlike Conservation Commission members, Select Board members usually lack expertise in wetlands issues. Additionally, the special permit criteria is vague, requiring the Select Board to issue a decision after giving “due regard to the effect on the immediate area and the general welfare of the town.” Without specific standards or criteria to apply, there is a risk that this section will be applied arbitrarily, with inconsistent outcomes.

#### **2. Floodplain Zone**

The Zoning Bylaw also contains a Floodplain Zone (Article XVIII), defined by reference to FEMA FIRM maps. The Floodplain Zone provisions promote coastal resiliency by requiring new construction and substantial improvements be elevated to the base flood elevation.

However, as there is no corresponding ability in the Bylaw to authorize an increase in the overall building height of these structures that must be elevated, the Bylaw has opposite effect of discouraging new construction and substantial improvements, such as climate adaptations, to existing structures. Moreover, the floodplain provisions are quite rigid, with only limited circumstances in which the requirements may be altered by special permit. These circumstances include nonresidential structures, the nature of which requires their location within the Floodplain District, and restoration and reconstruction of structures listed in the National Register of Historic Places or the State Inventory of Historic Places. Rather than encouraging coastal resiliency for these historic structures, the Zoning Bylaw allows them to remain subject to increased flooding and storm damage.

Finally, in some situations, there may be alternative resiliency measures that could adequately protect the property at issue and surrounding properties from flooding. *Adding flexibility to these provisions through the special permit process, with defined parameters, would allow the special permit granting authority to review potential alternative resiliency measures on a site-specific basis, and account for technological advances in other methods that may improve resiliency.*

### 3. Definition of Building Height

The Falmouth Zoning Bylaw currently measures building height from the “mean level of natural grade across the actual building line, across all street sides of the proposed building.” Significantly, there are no exceptions for any buildings – existing or proposed – within the floodplain. This is at odds with the Bylaw’s Floodplain Zone Regulations, FEMA, and the State Building Code, which require that new buildings and substantial improvements to existing buildings be elevated.

The additional construction costs associated with elevating a building within the floodplain, coupled with the loss of useable space resulting from the need to elevate, often render projects within the floodplain uneconomical or infeasible. Moreover, without the ability to increase the overall building height of these structures either by right or by special permit, variance relief is the only option. This is, by definition, extraordinarily difficult to obtain. As a result, existing structures – many of which pose a flood risk – remain in their current condition because there is simply not enough incentive to elevate.

By way of example, in Provincetown, which has a similar definition of building height as Falmouth, an applicant proposed to demolish and rebuild a dilapidated structure in the Velocity Zone. However, because the applicant had to elevate the structure to comply with FEMA and the State Building Code yet was still held to a maximum of 35 feet as measured from *average natural grade*, they had to obtain a variance to exceed the building height under zoning. Although the variance was owing to the fact the land and structures are located within the Velocity Zone, the applicant has spent considerable legal fees seeking to uphold the variance following an appeal by an abutter. This could have been avoided if properties within the floodplain were able to either measure building height from Base Flood Elevation or Design Flood Elevation; or if special permit relief (as opposed to variance relief) was available for properties within the floodplain.

*We would suggest that maximum building height for buildings within the FEMA A and V zones should be measured from Base Flood Elevation (A Zones) or Design Flood Elevation (V Zones), with the ability to further increase height if necessary to improve coastal resiliency and protect the site or neighboring sites from stormwater damage. This is consistent with the draft Massachusetts Model Floodplain Bylaws, prepared by Shannon Hulst, Deputy Director of the Cape Cod Cooperative Extension & Woods Hole Sea Grant.*

4. Setbacks

Minimum setback requirements can hinder coastal resiliency efforts by limiting how far a building may be moved landward. The Zoning Bylaw provides for minimum front, side, and rear setbacks. However, where a property contains wetlands, it would be preferable to allow an applicant to reduce the minimum landward setbacks in order to provide a greater distance from a building to the wetland resource. Accordingly, *coastal resilient development would benefit from a provision in the Bylaw authorizing a reduction in the minimum setback requirements to allow for a greater distance between structures and wetland resource areas.*

5. Site Plan Review

Site plan review provisions currently do not account for flooding considerations and coastal resiliency. *When a project undergoes site plan review, the town should consider the potential for future sea level rise and minimizing the potential for property damage from flooding and re-directing flood waters onto adjacent properties, as doing so would encourage coastal resiliency design and construction.*

6. Special Permit Criteria

*Like site plan review, special permit criteria could be revised to incorporate consideration of sea level rise and flood risk. Doing so would give the special permit granting authority greater flexibility in allowing projects aimed at improving coastal resiliency. For example, if an applicant sought to exceed the maximum building height or reduce the minimum front yard setback to construct a more resilient structure, the special permit granting authority would be able to consider how doing so would account for future sea level rise, minimize the potential for property damage, and maintain the natural capacity of the land.*

**B. Falmouth Historic Bylaw**

In their current form, the Falmouth Historic District regulations are void of any reference to coastal resiliency. Moreover, with seven historic districts in the Town and very subjective criteria, the Historic District regulations could serve as a major hurdle for many landowners seeking to improve their properties to make them more resilient to climate change and sea level rise.

1. Criteria for Determining “Appropriateness”

Currently, the Historic District regulations do not allow members of the Historical Commission to consider sea level rise or coastal resiliency in determining the “appropriateness” of an exterior architectural change. Rather, all criteria are based purely on aesthetics: scale,

massing, shape, size, and general design. This means that any project aimed at elevating a structure within the Historic District is likely to come under scrutiny as it may differ in appearance from other nearby historic properties. *Incorporating coastal resiliency into the criteria for determining whether a project is “appropriate” would require the Historical Commission to look beyond aesthetics and give due consideration to projects seeking to account for sea level rise and flooding, thus further protecting the historical asset.*

By way of comparison, the Historic District regulations currently require the Commission to “consider the policy of the Commonwealth of Massachusetts to encourage the use of solar energy systems and to protect solar access.” A similar provision requiring the Commission to consider and encourage projects or features that would improve coastal resiliency would likely eliminate some of the current hurdles faced by property owners in the Historic District seeking to make such improvements.

## 2. Exceptions for Limited Projects Aimed at Coastal Resiliency

*In addition to incorporating consideration of sea level rise and coastal resiliency, the Historic District regulations could also benefit from the addition of an exclusion for certain limited projects aimed at resiliency and adaptation work. This could include an exclusion for the elevation of historic structures above base flood elevation or the addition of any floodproofing measures that may affect the exterior aesthetic of a building.*

### C. **Falmouth Wetlands Bylaw**

#### 1. Existing 25-foot setback to the FEMA Floodplain

The Falmouth Wetlands Regulations currently define the landward boundary of the FEMA Velocity Zone as 25 feet landward of the boundaries shown on the FEMA Flood Insurance Rate Map. We understand that the rationale for this locally stricter provision is to account for the potential for future sea level rise. Consequently, with limited exceptions, construction of any new structures or additions or substantial improvements to existing structures are prohibited within 25 feet of the Velocity Zone, regardless of elevation or physical processes affecting the evolution of the wave or propagation of flooding. Further, this 25-foot presumptive boundary is based on a site’s pre-resilient condition – the Regulations do not account for the situation where a resiliency project’s post-development condition will change the location of the boundary. As a result, this has the effect of discouraging redevelopment projects, including renovation or replacement of existing structures located in the locally defined Velocity Zone, even for the purposes of resiliency and adaptation projects. Thus, this provision encourages leaving vulnerable structures “as is” rather than encouraging projects that promote resiliency and adaptation in the flood zone. Further, this definition conflicts with other regulatory definitions and requirements (e.g., the Building Code and the Wetlands Protection Act), causing confusion because of the differing requirements. Lastly, by discouraging resiliency and adaptation projects, especially for existing buildings and structures in the flood plain, it does not protect the interest of “storm damage prevention,” an interest to be protected pursuant to the local wetlands bylaw and the Wetlands Protection Act.

## 2. Streamlined Process for Limited Circumscribed Projects

*As with other regulations discussed herein, adding a streamlined process for limited circumscribed projects aimed at resiliency and adaptation work –whether it be akin to a determination of applicability or a form of administrative review – would encourage these projects, reduce the time it would take to obtain approvals, and minimize the risk of opposition from abutters.*

### **III. State Laws**

A number of Massachusetts state laws regulate development and redevelopment on or near coastlines and have the potential – whether intended or not – to hinder coastal resilience. These statutes and regulations are discussed in greater detail below.

#### **A. Wetlands Protection Act and Accompanying Regulations**

The Massachusetts Wetlands Act, G.L. c. 131, § 40 and its accompanying regulations at 310 CMR 10.00 regulate wetlands and land within 100 feet of wetlands. Although Land Subject to Coastal Storm Flowage (LSCSF)<sup>1</sup> is identified as a coastal wetland and an area subject to protection under the Wetlands Act, presently there are no specific performance standards for regulating activities within this resource area, either in the Act or in the accompanying Regulations. Massachusetts DEP has been considering adding performance standards, a draft of which is intended to be released in the coming year. *These performance standards should be drafted in a way to incorporate predicted sea level rise into project design and construction and allow for and support resilient building and design practices for both new and existing buildings.*

Additional wetland resource areas which are relevant to the ability to adopt resiliency measures include the regulations concerning Coastal Beaches, Coastal Dunes, Barrier Beaches, Coastal Banks, Land under the Ocean, as well as Riverfront Area. For example, while the performance standards at 310 CMR 10.30 for a Coastal Bank prioritize the coastal bank's role in storm damage prevention or flood control by serving, where a coastal bank also serves as a sediment source to downdrift beaches, the regulations only allow for new coastal engineering structures when required to prevent storm damage to buildings constructed prior to 1978, thus limiting the ability of a municipality to consider all options and new technologies developed over time which may be protective of all interests.

The performance standards under the Wetlands Regulations for these resource areas have the potential to inhibit the implementation of coastal resiliency and adaptation features because they do not evolve to reflect changing technology that supports adaptation, they are not regularly updated to reflect changing science regarding predicted levels of sea level rise and storm intensity, and they do not always contain sufficient flexibility to allow circumscribed projects aimed at improving coastal resiliency and adaptation. Additionally, the broad regulatory definition of a coastal engineering structure may prevent the installation of nature-based solutions, including living shorelines. Consequently, projects that may improve conditions from

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<sup>1</sup> LSCSF is defined as land subject to any inundation caused by coastal storms up to and including that caused by the 100-year storm, surge of record or storm of record, whichever is greater. 310 CMR 10.04.



a resiliency standpoint are nonetheless prohibited because they do not fit squarely within the regulations, allowing the perfect to be the enemy of the good.

## **B. The Massachusetts Public Waterfront Act (Chapter 91)**

In Massachusetts, proposed activities such as dredging, beach nourishment, structures and uses within waterways, flowed tidelands, and filled tidelands, except for landlocked tidelands, require authorization from the Department of Environmental Protection in the form of a Chapter 91 License or Permit. *See* 310 CMR 9.04-9.05. The Chapter 91 regulations and indeed, Chapter 91 itself, are designed to protect the public’s right to use “tidelands” the public trust lands below the mean high-water line of tidal waters plus historically filled tidelands.<sup>2</sup> The statute and regulations prioritize access to the water, whether by preserving space for water dependent uses or creating pedestrian and recreational access to the water. Fundamentally, this goal can conflict with resiliency goals and requires a balancing of priorities. For example, elevating certain water-dependent industrial uses, marinas, and waterfront structures may undermine their ability to access the waterfront. Similarly, resiliency structures may fail to meet the standards set forth in 310 CMR 9.35(3) as they may interfere with the public’s right to access fishing, fowling and with public rights to walk or otherwise pass freely on private tidelands. Additionally, the Chapter 91 licensing process is lengthy and expensive and thus may inherently discourage some resiliency and adaptation projects from being pursued by smaller property owners. *This could be addressed by exempting limited types of resiliency projects from review under Chapter 91, defining such projects as water dependent activities, and/or issuing a general permit similar to the Army Corps of Engineers review process.*

For example, the regulations at 310 CMR 9.32 are specific as to what structures may be allowed within tidelands, and only allow the Department to license fill or structures for shoreline stabilization if reasonable measures are taken to avoid, minimize, and mitigate any encroachment in a waterway. Of course, this may not always be feasible depending on the specific circumstances. The same standard applies for the installation of drainage, ventilation, or utility structures, as well as minor or incidental fill necessary to accommodate the replacement or reconstruction of existing public roadways or existing railroad tracks. As sea levels rise, this standard may require flexibility to accommodate access where existing roads either flood or erode.

Section 310 CMR 9.37 sets forth the Department’s engineering standards. For new buildings for non-water dependent uses intended for human occupancy within a flood zone, the regulations require that a project be designed to incorporate projected sea level rise during the design life of the buildings. At a minimum such projects shall be based on historical rates of increase in sea level in New England coastal areas. The standard is somewhat vague and may conflict with other regulatory standards to the extent it is based on “historic” sea level rise rather than “projected” sea level rise. Section 9.51 of the regulations sets forth the standards for conservation of capacity for water-dependent uses and establishes certain dimensional requirements for new or expanded buildings for non-water dependent uses, including limitations

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<sup>2</sup> Private tidelands consist of the area between the mean high water line and the mean low water line, and are typically owned by private coastal landowners. However, the Colonial Ordinance of 1641 reserved three specific rights of public use within the private tidelands: “fishing, fowling, and navigation.” These rights have been broadened and expanded over the years by the Supreme Judicial Court.

on height and requirements for open space and a setback known as the “water dependent use zone.” The Department measures height consistent with a municipality’s zoning ordinance, which, as described in detail below, may or may not allow for increased height for flood elevation.

Additionally, one of the ways in which a municipality could implement its resiliency goals is through a Municipal Harbor Plan. Municipal Harbor Plans allow a municipality to provide alternative standards to those set forth in the Chapter 91 regulations by requiring project proponents to implement offsetting public benefits. For example, a Municipal Harbor Plan could allow a structure to be constructed to a height greater than allowed under the regulations or could propose reduced open space on a site in exchange for the construction of a coastal resiliency feature or greater open space in another area. Municipal Harbor Plans are currently subject to litigation before the Supreme Judicial Court regarding the ability to alter the standards in the Chapter 91 regulations and thus there is some uncertainty regarding the future availability of this tool.

The Department is currently working with a stakeholder group to evaluate proposals for modifications to the regulations to address resiliency, among other things. No draft regulations have yet issued, but the Department’s presentation regarding the proposal and stakeholder comments are available on the Department’s website.<sup>3</sup>

#### **IV. Federal Laws**

##### **A. Federal Emergency Management Agency (FEMA)**

FEMA manages the National Flood Insurance Program (NFIP), which was established by Congress with the passage of the National Flood Insurance Act of 1968. The performance standards of the NFIP are contained in Title 44 of the U.S. Code of Federal Regulations at Section 60.3. FEMA has issued various Technical Bulletins aimed at providing guidance concerning the building performance standards of the NFIP, including Technical Bulletin No. 5 titled “Free-of-Obstruction Requirements,” which provides guidance on the NFIP regulations concerning obstructions to flood waters below elevated buildings and on building sites in Coastal High Hazard Areas (Zones V, VE, and V1-30 and VO) on a community’s Flood Insurance Rate Map (FIRM), as well as the requirements for construction in a V Zone to minimize flood damage potential. As set forth in the Bulletin, the free-of-obstruction requirements were instituted to minimize the transfer of flood forces to an elevated building’s foundation and also to minimize the diversion or deflection of floodwater or waves that could damage the elevated building or neighboring buildings. The Bulletin also discusses how the presence or absence of obstructions can affect NFIP flood insurance premiums.

##### **1. The Community Rating System**

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<sup>3</sup> See: <https://www.mass.gov/regulations/310-CMR-900-the-massachusetts-waterways-regulation>

Implemented in 1990, the Community Rating System (“CRS”) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Importantly, meeting the minimum NFIP floodplain management requirements does not necessarily result in the lowest NFIP flood insurance premiums. Further, if a project requires variance relief from a more onerous provision of a local bylaw, the granting of a variance can negatively impact a municipality’s CRS, even if the project fully complies with all FEMA and state standards.

Thus, changes to local bylaws should be evaluated for consistency with the CRS so that the more stringent bylaws encourage more resilient/adaptable designs, but when compliance with state law can be achieved, a town’s CRS won’t be negatively impacted even if relief is needed from a stringent local bylaw provision. *One possible solution is creating a different standard or standards in the local bylaws for resiliency/adaption projects to allow relaxing of the strict standard without the need for a variance.*

## **B. Army Corps**

Section 404 of the Federal Clean Water Act, 33 U.S.C. § 1344 requires a permit for the discharge of dredged or fill material into the waters of the United States (in tidal areas that is the annual high tide line or adjacent wetlands if present) from the Army Corps of Engineers. Additionally, Section 10 of the Rivers and Harbors Act of 1899 requires a permit from the Army Corps for construction and other work within navigable waterways. The Army Corps does not directly regulate work in the 100-year floodplain, however, when a permit is required for work in waters of the U.S. or navigable waters it can evaluate effects on flooding. The New England District has issued general permits for 23 types of activities subject to Sec. 404 or Sec. 10 or both. Work authorized by the 23 general permits require a notice to the Army Corps for compliance. None of the 23 general permits specifically address resiliency or adaptation projects. For projects not covered by the general permits, which includes many larger projects, an individual permit from the Army Corps is required. Although not strictly in conflict with resiliency projects, this presents an additional regulatory hurdle which increases the expense and time associated with permitting such projects. *The current suite of 23 general permits is set to expire in April 2023 and it is suggested that the Army Corps of New England consider a general permit specific for resiliency and adaptation projects, including structures and fill in waters of the U.S. and navigable waters of the U.S.*

## **V. Conclusion**

As climate change continues to impact the Massachusetts coastline, the existing regulatory framework should be closely examined and revised to account for sea level rise and coastal resiliency. These include changes to zoning bylaws to reflect the need to increase overall building height to account for sea level rise and flooding; changes to zoning bylaws and historic bylaws to require regulatory boards to consider coastal resiliency when reviewing applications; incorporating flexibility to give regulators the ability to make exceptions for coastal resilient design that may not otherwise comply with existing state and local regulations; and creating streamlined processes for limited projects aimed at strengthening coastal resiliency.

Moreover, as illustrated herein, coastal projects oftentimes require multiple layers of federal, state, and local approvals. The sheer number of required approvals from different authorities not only adds time and expense to a project, but also increase the possibility of inconsistencies amongst the various regulatory frameworks. Accordingly, as regulatory authorities contemplate how they can amend existing regulatory framework to encourage coastal resiliency, they should simultaneously ensure consistency amongst the various regulations and enforcement agencies.

Collectively, the changes recommended throughout this memorandum would reduce the number of existing regulatory hurdles, thereby encouraging landowners and communities to invest in coastal resilient development.

## Summary of Recommendations

### **I. Local Bylaws and Regulations**

- a. Falmouth Zoning Bylaws
  - i. Streamline permitting process, including considering eliminating special permit requirements under Zoning Bylaw's Wetlands Regulations.
  - ii. Create ability to seek special permit relief under Floodplain Overlay for resiliency projects.
  - iii. Amend Zoning Bylaw's definition of building height for buildings located in a flood zone; allow for increased height by right or by special permit.
  - iv. Allow for reduced setbacks either by right or by special permit to further coastal resilient development.
  - v. Create coastal resiliency consideration as part of the Site Plan Review and Special Permit criteria.
- b. Falmouth Historic Bylaw
  - i. Include coastal resiliency into the criteria for the issuance of a Certificate of Appropriateness.
  - ii. Create an exemption for limited projects aimed at resiliency and adaptation.
- c. Falmouth Wetlands Bylaw
  - i. Develop a limited project or carve-outs from the stricter standards, including the 25-foot V-zone presumption, for resiliency and adaptation projects.

### **II. State Laws**

- a. Wetlands Protection Act and Accompanying Regulations
  - i. Proposed LSCSF standards drafted to incorporate predicted sea level rise into project design and construction to allow for resilient building and design practices for both existing and new buildings.
  - ii. Adopt resiliency measures into regulations concerning Coastal Beaches, Coastal Dunes, Barrier Beaches, Coastal Banks, Land Under Ocean, and Riverfront Area.
  - iii. Regularly evaluate and update performance standards as resiliency science advances and to reflect changing technologies.
  - iv. Amend broad regulatory definition of a coastal engineering structure to allow installation of nature-based solutions, including living shoreline.
  - v. Add a "limited project" for resiliency / adaptation projects that improve overall public safety, reduce storm damage and prevent or alleviate flooding, similar to what exists for ecological restoration projects.
- b. Massachusetts Public Waterfront Act (Chapter 91)
  - i. Create exemption for limited types of resiliency projects.
  - ii. Define limited types of resiliency projects as water dependent activities.
  - iii. Issue general permit for limited types of resiliency projects, similar to Army Corps of Engineers review process.

**III. Federal Laws**

a. Army Corps

- i. Consider a general permit specific for resiliency and adaptation projects as part.

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