



Coastal Resiliency

This guidance is intended to clarify how the Coastal Resiliency Goal and Objectives of the Regional Policy Plan (RPP) are to be applied and interpreted in Cape Cod Commission Development of Regional Impact (DRI) project review. This technical bulletin presents specific methods by which a project can meet these goals and objectives.

Coastal Resiliency Goal: To prevent or minimize human suffering and loss of life and property or environmental damage resulting from storms, flooding, erosion, and relative sea level rise.

- ***Objective CR1 – Minimize development in the floodplain***
- ***Objective CR2 – Plan for sea level rise, erosion, and floods***
- ***Objective CR3 – Reduce vulnerability of built environment to coastal hazards***

The applicability and materiality of these goals and objectives to a project will be determined on a case-by-case basis considering a number of factors including the location, context (as defined by the Placetype of the location), scale, use, and other characteristics of a project.

THE ROLE OF CAPE COD PLACETYPES

The RPP incorporates a *framework for regional land use policies and regulations based on local form and context* as identified through categories of Placetypes found and desired on Cape Cod.

The Placetypes are determined in two ways: some are depicted on a map contained within the RPP Data Viewer located at www.capecodcommission.org/RPPDataViewer adopted by the Commission as part of the Technical Guidance for review of DRIs, which may be amended from time to time as land use patterns and regional land use priorities change, and the remainder are determined using the character descriptions set forth in Section 8 of the RPP and the Technical Guidance.

The project context, as defined by the Placetype of the location, provides the lens through which the Commission will review the project under the RPP. Additional detail can be found in the Cape Cod Placetypes section of the Technical Guidance.



TABLE OF CONTENTS

Introduction	CR-4
Summary of Methods	CR-5
Detailed Discussion of Methods for Meeting Objective CR1	CR-7
Development in the Floodplain	CR-7
Redevelopment in the Floodplain	CR-7
Detailed Discussion of Methods for Meeting Objective CR2	CR-9
Development Proximate to Coastal Banks	CR-9
Redevelopment Proximate to Coastal Banks	CR-10
Accommodating Sea Level Rise	CR-10
Detailed Discussion of Methods for Meeting Objective CR3	CR-12
Development and Redevelopment in Coastal Resource Areas	CR-12
Coastal Resource Restoration	CR-12
General Application Requirements	CR-13
Definitions	CR-13
References	CR-13

INTRODUCTION

Over the last several decades Cape Cod has seen considerable growth and development, much of it in the coastal zone. Thirty percent of the region's assessed property value is located within coastal hazard areas, totaling approximately \$9 billion and including roughly 13,000 single family homes. This means that some of the most scenic and desirable development sites are located in areas that are vulnerable to some kind of coastal hazard: storm surge, erosion, flooding, and sea-level rise.

Cape Cod's coastlines are active with non-water dependent development. Since the vast majority of the coastline is privately owned, decisions about how to prepare for and respond to coastal threats has fallen on the property owner. The Regional Policy Plan encourages a shift to more coordinated preparation and planning for coastal threats, and toward reducing hazards within the coastal zone.

Flood hazard areas are those areas defined and delineated by the Federal Emergency Management Agency as V and A Zones – areas impacted by storm driven wave action and/or inundated by flood waters, respectively. The V and A zone maps (FEMA Flood Maps) are delineated by FEMA, and adopted by communities who participate in the National Flood Insurance Program (NFIP). FEMA uses these areas for participation in the NFIP, but they are more broadly employed as delineations of flood hazard areas, and used here for both planning and regulatory purposes (see also Resources).

SUMMARY OF METHODS

GOAL | COASTAL RESILIENCY

To prevent or minimize human suffering and loss of life and property or environmental damage resulting from storms, flooding, erosion, and relative sea level rise.

OBJECTIVE CR1 – Minimize development within the floodplain

METHODS

For all DRI's in the floodplain:

- Must limit new development in V zones to water dependent uses and only where the applicant can show that there is no feasible alternative and that development impacts are minimized and mitigated.
- Must limit new non-water-dependent infrastructure to only installations where the applicant can demonstrate an overriding public purpose.
- Where development is proposed, applicant must demonstrate that there is no feasible alternative, and minimize and mitigate impacts to coastal resources in order to protect their natural beneficial functions (including but not limited to hazard mitigation and habitat).

Additional methods for DRI's in the floodplain:

- Limit new development in A zones;
 - Redevelopment within the floodplain may occur where the applicant can show that there is no feasible alternative and that impacts are minimized and mitigated.
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OBJECTIVE CR2 – Plan for sea level rise, erosion, and floods

METHODS FOR PROJECTS ON OR NEAR COASTAL BANKS

- Must limit new development on or within 100 ft of a coastal bank to water dependent uses and only where the applicant can show that there is no feasible alternative and that impacts are minimized and mitigated.
 - Redevelopment on or within 100 ft of a coastal bank may occur where applicant can show that there is no feasible alternative and that impacts are minimized and mitigated.
 - Design development projects to accommodate sea level rise
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OBJECTIVE CR3 – Reduce vulnerability of built environment to coastal hazards

METHODS

- Project avoids or minimizes siting new development in coastal resource areas.
- Project removes existing development in coastal resource areas.
- Project restores or rehabilitates salt marsh, beach, dune or floodplains, or restores the ability for coastal resources to migrate naturally.

OBJECTIVE CR3 AREAS OF EMPHASIS BY PLACETYPE

Natural Areas | No new development, areas should be protected to allow coastal resources to provide natural beneficial functions

Rural Development Areas | No new development, areas should be protected to allow coastal resources to provide natural beneficial functions; existing development may be reconstructed

Suburban Development Areas and Historic Areas | No new development; existing development may be reconstructed

Maritime Areas and Community Activity Centers | Water dependent and maritime industries and uses where impacts are minimized and mitigated.

Industrial Activity Centers & Military and Transportation Areas | No new development; Water dependent and maritime industries and uses where impacts are minimized and mitigated.

DETAILED DISCUSSION OF METHODS FOR MEETING OBJECTIVE CR1

Objective CR1 – Minimize development within the floodplain

Development in the Floodplain

Every effort should be made to avoid new development within the floodplain. Every development site on Cape Cod has unique characteristics, but in general, development within the floodplain is vulnerable to coastal storms, and increasingly will be vulnerable to the effects of sea level rise. Damage from coastal threats has impacts on property owners, neighbors, emergency responders, and on the ability of the environment to provide important ecosystem services upon which the community relies.

New development in V zones, (also known as high-hazard areas), is not allowed. Exceptions may be made for water dependent uses where there are no feasible alternatives and the impacts have been minimized and mitigated.

New development within A zones may be permitted where the applicant can demonstrate that there is no feasible alternative and that the impacts have been minimized, but in general, new development in the floodplain is discouraged. Non-water-dependent infrastructure should not be constructed within the floodplain unless there is an overriding public purpose in doing so. Where public infrastructure is proposed to remedy an existing problem or need within the floodplain, it should not result in the promotion of additional development within the floodplain.

Green infrastructure and restoration projects within the floodplain are supported, provided the applicant can demonstrate that impacts have been minimized and mitigated. Maintenance of existing public infrastructure and water dependent structures is also allowed.

Redevelopment in the Floodplain

Redevelopment may be permitted in A and V zones where fire or disaster has damaged structures. The applicant should evaluate removing development or relocating it on the site to reduce hazard exposure. Where relocation is not possible, redevelopment may be permitted on site provided there is no increase in gross floor area, impervious footprint, or intensity of use from the prior use or structure. Intensity of use includes,

but is not limited to, increases in wastewater flow, impervious area, or parking spaces, or conversion from seasonal to year-round use.

All reconstruction must comply with current applicable regulations, including building code.

DETAILED DISCUSSION OF METHODS FOR MEETING OBJECTIVE CR2

Objective CR2 – Plan for sea level rise, erosion, and floods

Development Proximate to Coastal Banks

New development is not generally permitted on a coastal bank. Exceptions may be made for water dependent development provided the applicant shows that there is no feasible alternative, that the impacts to the natural functions of coastal resources are both minimized and mitigated, and that the development is designed to address anticipated sea level rise. Exceptions may also be made for the following activities, provided the applicant demonstrates that best available measures are utilized to minimize adverse impacts on all critical coastal resources and that the activity meets the goals and objectives related to any underlying resource areas present:

- Beach, dune, and bank nourishment and non-structural restoration projects that do not impair the natural beneficial functions of the resource, including temporary fencing and other devices composed of natural material intended to facilitate the resources' natural beneficial function. Monitoring and maintenance plans may be required.
- Appropriately designed and sited pedestrian walkways and elevated decks with appropriate orientation, height, and spacing between planks to allow sufficient sunlight penetration to maintain underlying vegetation and resource migration.
- Maintenance and use of existing public boat launching facilities.
- Maintenance of existing public infrastructure.
- Maintenance required to preserve the aesthetics or structural integrity of existing marine infrastructure.
- Projects that restore or rehabilitate salt marsh, freshwater wetlands, fish runs, or shellfish beds.
- Underground utility crossings that do not disturb protected resources.

All non-water dependent development proximate to a coastal bank must be set back from the top of the coastal bank at least 30 times the average annual erosion rate of the shoreline or 100 feet, whichever is greater. Development should be located as far landward of resource areas and coastal hazard areas as is feasible within a site.

The average annual rate of shoreline erosion is determined by averaging the erosion over the previous 30-year period, at a minimum, or other time frame determined by the Commission, to appropriately reflect current and future shoreline conditions.

Calculating a setback from the top of the coastal bank of at least 70 times the average annual erosion rate of the bank is encouraged. Doing so reflects the typical 70-year lifetime of a residential building, based on a study conducted for the Federal Insurance Administration to establish reliable estimates for the life of residential coastal structures.

Redevelopment Proximate to Coastal Banks

Redevelopment may be permitted on or within 100 feet of a coastal bank provided the applicant shows there is no feasible alternative, that there is no increase in impacts to the natural functions of coastal resources, and that the redevelopment is designed to address anticipated sea level rise. The applicant should evaluate relocating development on the site to reduce hazard exposure and impacts to natural functions of coastal resources. Redevelopment should be designed to have no adverse impact on the function of the bank as a natural sediment source to the coastal system.

Accommodating Sea Level Rise

Development and redevelopment must be designed to address anticipated sea level rise. Structures should be elevated to coordinate anticipated sea level rise with the design life of the structure. Residences are typically designed for 70 year life, though many well-built structures on Cape Cod have persisted for over one hundred years. Structures should be designed and built well to weather the elements and avoid short-term obsolescence (which also results in waste of resources). Within A zones, the lowest horizontal structural member should be elevated at least one-foot above base flood elevation (BFE), or two feet above existing grade, whichever is higher. Within V zones, the lowest horizontal structural member should be elevated at least two feet above the BFE. Where development activity may be allowed on beaches and dunes, structures should be built on open pilings to allow for storm flowage, wave action, and resource migration.

FEMA recognizes that certain historic properties may not be suitable for elevation where the setting for the building is important in defining its historic character. The

Commission may also apply flexibility in requiring elevation of a historic structure where doing so would significantly alter the building's historic qualities.

The most recent Mean Sea Level datum available for a site should be used to determine base flood elevation and inform all coastal construction activities. When determining Mean Sea Level, applicants should use the 1988 datum of NAVD88.

DETAILED DISCUSSION OF METHODS FOR MEETING OBJECTIVE CR3

Objective CR3 – Reduce vulnerability of built environment to coastal hazards

Development and Redevelopment in Coastal Resource Areas

Recognizing the multiple values coastal resources provide, including ecosystem services such as storm-hazard mitigation, habitat, and recreation, development in coastal resource areas is discouraged. Projects within the Natural Areas Placetype are not allowed so as to allow coastal resources to provide their natural beneficial functions. Projects proposed in coastal resource areas located within a Community Activity Center should strive to comply with the requirements set forth in this technical bulletin; however, new development may be permitted provided the applicant shows there is no feasible alternative location and that the project is designed to minimize impacts to the natural functions of coastal resources and to address anticipated sea level rise.

In coastal resources areas, prior to considering redevelopment the applicant should evaluate the potential for removing development from the site. Removal of development from sensitive coastal resource areas is encouraged.

Coastal Resource Restoration

Consistent with objective CR2, activities intended to restore the natural beneficial functions of one or more coastal resource areas are permitted. Natural and/or non-structural methods for coastal restoration are encouraged. Activities might include, but are not limited to, beach, dune and bank nourishment, salt marsh restoration, temporary fencing and other approaches employing natural materials designed to re-establish or create natural forms and functions.

GENERAL APPLICATION REQUIREMENTS

Applicants are required to submit the following as part of their DRI application:

- Site plan showing delineation of all coastal resources and the 100 ft buffer to those delineations.
- If development is proposed within coastal resource areas or buffers, plans detailing the development proposed should be provided, including site plans of existing and proposed conditions, and planting plan for restoration of the site.
- Narrative discussing the alternatives considered, and plans of the alternatives, as appropriate.

DEFINITIONS

Base Flood Elevation – the elevation to which floodwater is anticipated to rise during the base flood. Base flood elevations (BFEs) are shown on Flood Insurance Rate Maps (FIRMs). The BFE is the regulatory requirement for the elevation or floodproofing of structures. The relationship between the BFE and a structure’s elevation determines the flood insurance premium.

REFERENCES

Regional Policy Plan Data Viewer