

Town of Sandwich
The Oldest Town on Cape Cod



Sandwich Conservation Commission

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SANDWICH CONSERVATION COMMISSION REGULATIONS

The Sandwich Conservation Commission in an attempt to maintain consistency with the Board's actions, decision process and to ensure equal treatment of all parties who have business with the Commission or its staff, will occasionally adopt policies to achieve this end.

Sandwich Conservation Commission Regulation No. 1 - Pond Elevations

The Sandwich Conservation Commission accepts and adopts the following pond elevations found under Section 3610, Article III of the Town of Sandwich Zoning Bylaws. These elevations shall be shown as the upland edge of pond on **all plans** for all Request for Determinations of Applicability and Notices of Intent filed with the Town of Sandwich Conservation Commission.

| Water Body | Elevation (NGVD)* |
|-------------------------|-------------------|
| Goodspeed Cemetery Pond | 69 |
| Upper Hog Pond | 64 |
| Lawrence Pond | 65 |
| Peters Pond | 71 |
| Pimlico Pond | 67 |
| Upper Shawme Pond | 28 |
| Lower Shawme Pond | 20 |
| Snake Pond | 72 |
| Spectacle Pond | 67 |
| Triangle Pond | 66 |
| Weeks Pond | 72 |

If a higher upland edge of water on any above listed pond is present or has been observed and documented that elevation shall be used as “edge of waterbody”.

The highest elevation shall be determined by site survey and designated on plans presented to the Conservation Commission.

Further, the waters of any other fresh water pond(eg. Wakeby Lake) shall be determined by the contour of the highest observed elevation established by measuring the existing elevation and adjusting that elevation by using the methods specified in the USGS Water Resources Investigation 83-4112, and subsequent amendments, if any, as if the waters of the pond were the ground water.

* - National Geodetic Vertical Datum.

REV.
06/95, 07/11

Sandwich Conservation Commission Regulation No. 2 - Enforcement Actions

The Conservation Officer(s) for the Town of Sandwich and employees or agents of the Conservation Commission may at their discretion issue Stop Work Orders (verbal and written), Enforcement Orders, Violation Orders, Administrative Orders, civil and criminal court actions, or undertake any other enforcement action authorized by law where there is a suspected violation of the Wetlands Protection Act-Chapter 131 section 40, its regulations, the Town of Sandwich Wetlands Bylaw, Chapter 7, its regulations, a Determination of Applicability, an Order of Conditions, an Enforcement Order or other enforcement action has occurred. If a situation exists where immediate action is necessary on the part of an enforcing person, an Enforcement Order may be signed by a single member or by the enforcing person for the Commission, provided said Order is ratified by a majority of the members of the Conservation Commission at the next regularly scheduled meeting. The Officer(s) or agents may issue a non-criminal fine(s) or take other criminal action against person(s) who violate(s) or who is found to be in violation of any provision of the Town of Sandwich Wetlands Bylaw, its regulations, permits, Orders of Conditions, or determinations issued hereunder, or fails to comply with an Enforcement Order, fails to restore illegally filled wetlands, or fails to remove unauthorized fill in a resource area. The Officer(s) or agents may issue a Commonwealth of Massachusetts non-criminal fine(s) or take other criminal action against person(s) who violate(s) or is found to be in violation of any provision of the Wetlands Protection Act, its regulations, permits, Orders of Conditions or determinations issued hereunder, fails to comply with an Enforcement Order, fails to restore illegally filled wetlands, or fails to remove unauthorized fill in a resource area.

Any person(s) who build or rebuild a structure, build or rebuild a portion of a structure, build or rebuild a deck, build or rebuild a shed, cut trees or other vegetation, excavate or fill an area, or conduct other activities within the Commission's jurisdiction without first receiving the pertinent approval(s), (Determination of Applicability/Order of Conditions) will be required to file a full Notice of Intent along with all supporting data and double permit fee (established under the Town of Sandwich Wetlands Bylaw, Chapter 7, as determined by the Wetlands Bylaw Regulations) and receive an Order of Conditions before recommencing or completing the work. Any person(s) who violates a valid Determination of Applicability or Order of Conditions will be required to file a full Notice of Intent with all supporting data and double permit fee (established under the Town of Sandwich Wetlands Bylaw, Article XXI, as determined by the Wetlands Bylaw Regulations) and receive an Order of Conditions before recommencing or completing the work. The Notice of Intent will be filed within thirty (30) days of the issuance of the Enforcement Order. Fees will be paid prior to the issuance of the permit.

REV; 06/95, 07/11

Sandwich Conservation Commission Regulation No. 3 - Clarification of Notice to Abutters

The purpose of this regulation is to clarify the Notice to Abutters procedure required by the Sandwich Wetlands Protection Bylaw.

The Sandwich Wetlands Protection Bylaw, Chapter 7, Section 7.25 of the Town of Sandwich Bylaws, referred to as the Bylaw, requires any persons filing a Request for Determination of Applicability, an Abbreviated Notice of Intent, a Notice of Intent, or a Request to Amend a valid existing Order of Conditions to notify the immediate property owners abutting the subject property, its location (street number, lot number, and street), hearing date, time and location, a summary of the project details and where the filing and supporting data may be reviewed prior to the public hearing by United States Postal Service Certified Mail or by receipted hand delivery.

For the purpose of the Wetlands Bylaw, an immediate abutter shall be considered any property owner whose land is directly adjacent to the subject property and across a street or way (public or private) from the subject parcel(s). Applicants shall provide the Commission a copy of the appropriate Sandwich Assessor's Map (most recent issue) identifying the subject parcel(s) and its abutters.

As a matter of reference, as per Chapter 472 of the Acts of 1993 the WPA requires that all abutters within one hundred (100) feet of the property line of the subject parcel including across a street or way, in another municipality and/or across a water body be notified by United States Postal Service Certified Mail or by receipted hand delivery of the filing of a Notice of Intent. Said notification shall be at the applicant's expense and include the location where a copy of the Notice of Intent may be examined, and where the date, time and place of the public hearing may be obtained. Notification shall take place at the time of filing, no later. Proof of the notification shall be filed at the filing of the Notice of Intent.

06/95, 07/11

Sandwich Conservation Commission Regulation No. 4 - *Notification of Public by Commission Office.*

The Sandwich Conservation Commission staff will not be responsible for notifying or contacting members of the public, applicants, their representatives, abutters, aggrieved parties, or other concerned persons of dates and times for hearings, continuances or the status or availability of Orders of Conditions and Determinations of Applicability. The Commission recommends that interested parties contact the office regarding these matters.

REV
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Sandwich Conservation Commission Regulation No. 5 - Presumptions for Subsurface Sewage Disposal Systems that meet Title V or More Stringent Local Board of Health Requirements.

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Sandwich Conservation Commission Regulation No. 6 - Procedure for Emergency Repair of Failed Septic Systems Cesspools or other Vessel for the Disposal of Sewage.

1. The owner, agent or applicant must request a letter from the Sandwich Board of Health Agent declaring the situation an emergency and approving the repair of the system.
2. The owner, agent or applicant must apply for an Emergency Certification at the Conservation Commission office and pay the applicable fee. An Emergency Certification is issued under the Wetlands Protection Act and the Sandwich Wetlands Bylaw. Up to three (3) working days are needed to process the Emergency Certification issued under the Wetlands Bylaw.
3. Upon receipt of the Emergency Certification, the applicant, owner or agent will post the Emergency Certification Number at the street side of the subject lot as detailed in the Certification conditions.
4. Within **ten (10) working days** of the completion of the repair the applicant, owner or agent shall file a Notice of Intent with supporting documentation to obtain a permit for the work after the fact.

Sandwich Conservation Commission Regulation No. 7 - Limiting Hearings at the Bi-Monthly Meetings.

In an attempt to provide an equitable and a more comprehensive review for an applicant's project, the Sandwich Conservation Commission will limit the number filings scheduled for a bi-monthly meeting to five (5), including Requests for Determination, Notices of Intent and Amended Order Hearings but excluding continued hearings.

The filings will be accepted on a first come - first served basis. If an application is filed and accepted by the Commission's office prior to the deadline date but the docket is filled for that meeting, the filing will be placed on the next available meeting (bi-monthly) agenda.

The Conservation Officer/Agent will contact the representative/owner in writing to advise them of the scheduled meeting date and time. The correspondence may contain information regarding the filing's non-compliance with the Commission's Submission Regulations or other required information. Omitted or corrected information, including revised plans must be delivered to the office by 12:00 noon of the Friday prior to the meeting date unless stated otherwise in the correspondence.

The applicant or his/her representative will be requested to sign a waiver, waiving the twenty one (21) day issuance of a finding deadline in the case of a Request for Determination or hearing deadline in the case of a Notice of Intent as established under (Wetland Protection Act) 310 CMR 10.05 (3) or (5) respectively and the Sandwich Wetlands Protection Bylaw, Chapter 7, section 7.25 part 3. The waiver form will be provided by the Sandwich Conservation Commission.

Persons (the applicant or his/her representative) aggrieved by this delay may file an appeal with the Department of Environmental Protection (DEP) at the Southeast Regional Office in Lakeville, MA. and the Barnstable Superior Court to receive a Superseding Determination of Applicability or a Superseding Order of Conditions.

Sandwich Conservation Commission Regulatory Regulation No. 8 - Acceptance of Permit Bonds or Escrow Accounts.

The Conservation Commission may require a Conservation Permits Bonds or Conservation Escrow Accounts for work in sensitive areas to insure any adverse impacts are mitigated to the satisfaction of the Conservation Commission or its designee or to insure the areas of interest are properly revegetated (Town of Sandwich Wetlands Bylaw, Chapter 7, section 7.50).

To insure the applicant or owner is responsible for work that occurs on his/her property the Commission requires the Bond or Escrow to be obtained by the applicant or owner. Bonds acquired by the Contractor(s) or owner's representative are not acceptable.

Sandwich Conservation Commission Regulatory Regulation No. 9 - Regulating Activity in the Jurisdictional Buffer Zone.

Part 1

Pursuant to the regulation of activities under Town of Sandwich Wetland Protection Bylaw, Chapter 7 of the Town of Sandwich Bylaws within the one hundred (100) foot jurisdictional buffer zone of resource areas listed in 310 CMR 10.02 (1), (a), (b), (c), (d), (e) and (f) and within all (100) hundred foot jurisdictional buffer zone of any resource areas listed in the Town of Sandwich Wetland Protection Bylaw, Chapter 7, Section 7.10 jurisdiction, the following shall be satisfied:

At a minimum, an undisturbed buffer area of, a minimum of fifty (50) feet in width shall be provided between wetland resource areas and the upland limit of any site disturbance. [It is recommended that the proposed structure(s) within the buffer zone be located no closer than twenty (20) feet from the landward edge of the buffer, so that the proposed construction, landscaping and maintenance activities may ensue without a buffer zone violation].

This regulation shall not be construed to preclude elevated walkways, narrow (twenty four (24) inches or less) access paths, restricted vista pruning or construction of water dependent structures within the buffer zone, any of which may be permitted at the Conservation Commission's discretion.

This regulation notwithstanding, the Conservation Commission will consider proposals for activities within the buffer zone on a site specific basis. Each will be reviewed according to its merit and the degree to which wetland interests have been protected and preserved at the site.

The Conservation Commission finds that the uniform provision of an undisturbed buffer zone width of fifty (50) feet will serve to insulate wetland resource areas from adverse impacts, stemming from development elsewhere in the buffer zone. In cases where the slope of undisturbed buffer exceeds eighteen (18) percent, or in any instance where the scope or nature of a project is likely to require a greater distance to wetland resource areas, the Commission reserves the right to increase the width of the undisturbed buffer zone.

Part 2

The Massachusetts Wetlands Protection Act (MGL Chapter 131 s. 40), its attendant regulations (310 CMR 10.00), and Chapter 7 of the Town of Sandwich Bylaws were promulgated to protect wetland resource areas and the values or interests they serve. This statute, regulations and bylaw extends the Conservation Commission's regulatory authority over activities in the resource areas and landward within their one hundred (100) foot buffer zone.

Sandwich Conservation Commission Regulatory Regulation No. 9, Page 2.

The role that a protective buffer zone plays in the maintenance of viable wetland resource areas has been frequently discussed in the scientific literature. Omernik (1977) thoroughly documented the dramatic increase in nitrogen and phosphorous loading to wetlands and waterbodies as their adjacent watershed are cleared. Water quality, it was demonstrated, can be better maintained if protective buffer strips are preserved along stream edges.

As surface runoff from developed sites flows toward a wetland resource area, the buffer zone can provide a site where transition zone vegetation can uptake unbound nutrients preventing nuisance algal blooms in adjacent waters (Harris and Gosselink, 1989).

Nutrients are by no means the only pollutant which may degrade wetland resource areas. Surface runoff from developed sites carries a diverse and potent pollution load; hydrocarbons, lawn chemicals, metals, bacteria and viruses are common constituents (Diamond and Nilson, 1988). While it has been demonstrated that wetlands can play an effective role in "cleansing" pollutant loads (Nickerson, 1978), little is known of the assimilative capacity of wetland systems in accommodating the broad spectrum of non point pollutants in a given watershed. Indeed, evidence of our overwhelming of the natural thresholds for wetland resiliency abound.

The transitional assemblage of trees, shrubs, and ground cover (containing both wetland and upland plant species) frequently found in buffer zones 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. Put another way, similar habitats provide a gradual transition zone that is not as inhospitable as an abrupt habitat "edge" (Harris, 1984b). It seems that the relationship between the width of the transitional buffer zone along a bordering marsh, for example, and the provision of optimum wildlife habitat for native marsh fauna is a proportional one. On the other hand, more common edge species, including many opportunistic exotics and generalists may find their habitat proportionally diminished.

Cumulative effects result from individually minor but collectively significant actions taking place over a period of time (Council on Environmental Quality, 1978). While Chapter 7 provides that the Commission may deny any project which will have a significant cumulative effect on a wetland or its values, our permitted activities (i.e. site disturbance) are difficult to measure on the scale of cumulative impacts (i.e. watershed) (Gosselink & Lee). Thus, techniques employed for individual permit review are not aggressive enough to identify or resolve potential significant cumulative impacts, even though it may be clear that the collective impact of many such proposals could

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adversely affect or imperil a wetland resource area. A reasonable hedge against the cumulative impact is to maintain an undisturbed buffer of suitable width along the upland edges of wetland resource areas.

The Town of Sandwich's coastline has long provided an active interface for the power of the seas and the buffering reserves of its coastal resource areas (marshes, dunes, beaches, barrier beaches, and banks).

The concern for the continued adequacy of the aforementioned resource areas to buffer, store or contain floodwaters has recently been elevated in the face of the predictions for sea level rise in the next century. Due to an increasing warm atmosphere, a rise in mean sea level of 20-40 cm has been predicted by the year 2100 (Oerlemans, 1989). However, other projections find mean sea level will increase by 66 cm in the same period (Steward, 1989). However, it is important to note that only the relative rate of increase in sea level is being debated, not the tendency to a sustained increase in the centuries ahead. The effect of an accelerated rise in sea level will be an appreciable acceleration in the coastal erosion processes and their notable manifestations; land erosion, storm damage, flooding, and loss of coastal wetland resource areas.

Additionally, impacts to coastal resource areas may be incurred as a result of site development. Rill erosion of coastal banks and sedimentation of salt marshes may result from a lack of appropriate drainage conveyance systems or erosion control practices for surface flows.

In the face of scientific concern over the accelerated rate of sea level rise, and so that upland induced impacts to coastal resource area may be minimized, the imposition of a contiguous undisturbed buffer area of suitable width is found both advisable and necessary.

The Massachusetts Audubon Society has recommended the imposition of three hundred (300) foot wide natural undisturbed buffers in areas that directly abut critical resource areas. Projects proposed for prohibition within the buffer zone include both non-dependent activities (building construction, and sewage disposal systems) and some water dependent activities (e.g. bulkheads, revetments) (Brady and Buchsbaum, 1989). Minimum buffer zone widths as mandated by other Northeast states for areas of critical environmental concern range from two hundred (200) feet in Maine, Maryland, and New Jersey.

LITERATURE CITED

Brady, Pond R. Buchsbaum, 1989, Buffer zones; the environments last defense. Massachusetts Audubon Society.

Gosselink, J. and L. Lee. 1989. Cumulative impact in Bottomland Hardwood Forests. Journal Society of Wetland Scientists (9): 95-174.

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Nickerson, N. 1978. Freshwater wetlands: their nature and importance to man. New England Environment Network. 8p

Oerlemans, J. 1989. A projection of future sea level. Climatic Change (15): 151-74

Omerick, J. 1977. Nonpoint source stream nutrient level relationships: a nation-wide study. Corvallis Environmental Research Lab. Office of Research Development, U.S. Environmental Protection Agency, Corvallis, OR EPA-600/3-77-105.

Stewart, R. 1989. Causes and estimates of sea level rise with changing climate. In Oceanography 1988, UNAM Press, Mexico. pp 65-68.

Sandwich Conservation Commission Regulatory Regulation No. 10 - *Public Hearing Procedures.*

Read hearing as advertised.

Collect white certified mail slips for DEP and abutters if not previously submitted.

Receipt/review of the hard copy of the File Number.

If applicant represented by agent, copy of representative letter if not previously submitted.

Project proponents state names and professional status for the record.

Proponents give brief overview of the project.

Chairman asks individual Commissioners for questions or comments.

Chairman requests questions from audience. Audience members to state name, address and relationship to project and question(s).

Commissioners asked for follow up questions.

Matter to be continued for further information.

Matter to be taken under advisement to later in evening, or vote to approve or deny project.

Conditions set on project. Bond, if necessary is to be set.

Sandwich Conservation Commission Regulatory Regulation No. 11 - Requirement for Pile Driven Foundations in Coastal Areas.

Part I

Referencing 310 CMR 10.28 (3) (a-e); 310 CMR 10.29 (3) and especially 310 CMR 10.28 (4), when proposing to install an elevated foundation in a *FEMA* still-water flood zone within a coastal resource area (Barrier Beach, Coastal Dune), the Sandwich Conservation Commission has determined that a driven pile and helical screws (anchors) foundation(s) are the best measure available to minimize any adverse effects to the coastal resource area(s).

In reviewing and permitting various applications for construction of elevated foundations in the coastal resource areas, the Sandwich Conservation Commission has observed that in many cases where a concrete foundation was proposed the installer (applicant or contractor) disregarded the blueprint as designed by the Structural Engineer and made modifications to the structure causing the "as built structure" to be substantially different than the design and in violation of the Order of Conditions, under the Act, the bylaw and their regulations. Typically the violations involved construction of lateral connections between individual piers which further inhibits the lateral movement of sand in the coastal system.

Providing the applicant produces documentation substantially supporting the claims in cases of a clearly demonstrated hardship, where the structure is so situated that it is impractical or impossible to install a pile driven foundation, the Sandwich Conservation Commission will weigh the installation of a foundation consisting of individual concrete pier units in (A, AE or AO only) stillwater flood zones. No grade beam foundations will be considered in coastal resource areas.

Part II

Coastal Dunes (310 CMR 10.28) are any natural hill, mound or ridge of sediment landward of a coastal beach deposited by wind action or storm overwash. Coastal dunes may also be composed of sediments deposited by artificial means which serves the purpose of storm damage prevention, flood control or wildlife habitat.

Coastal dunes and Barrier Beaches are found to be significant to the interests of storm damage prevention and flood control by supplying sand to coastal beaches and protecting inland coastal areas from the flooding effects of storm waves and storm elevated sea levels mostly due to the fact they are higher than the coastal beaches which the border. In order to protect this function, coastal dune volume must be maintained while allowing the coastal dune shape to conform to natural wind and water flow patterns. On retreating shorelines, the ability of the coastal dunes bordering the coastal beach to move landward at the rate of shoreline retreat allows these dunes to maintain their form and volume, which in turn promotes their function of protecting against storm damage or flooding.

Sandwich Conservation Commission Regulatory Regulation No. 11, Page 2.

A Barrier Beach (310 CMR 10.29) is a narrow low lying strip of land generally consisting of coastal beaches, and coastal dunes extending roughly parallel to the trend of the coast. It is separated from the mainland by a narrow body of fresh, brackish or saline water or a marsh system. A barrier beach may be joined to the mainland at one or both ends.

Barrier Beaches are found to be significant to the interests of storm damage prevention and flood control because they provide a buffer to storm waves and to sea levels elevated by storms protecting landward areas. Barrier Beaches in Massachusetts undergo a landward migration caused by the landward movement of sediment by wind, storm wave overwash and the tidal current process. The continuation and enhancement of these processes maintains the volume of the landform which is necessary to carry out the storm and flood buffer function.

Sandwich Conservation Commission Regulatory Regulation No. 12 - Issuance of Certificates of Compliance and Issuance of Partial Releases.

1. No request for a Certificate of Compliance will be reviewed until all necessary filing fees, if any, are submitted to the Commission.
2. A Certificate of Compliance cannot be granted for an expired Order of Conditions.
3. When granted, a Certificate of Compliance will be issued to either the original applicant or the current landowner.
4. The following information must be submitted, using WPA Form 8A, to the Commission in writing, in addition to the requirements of the Order of Conditions, when requesting a Certificate of Compliance.
 - * The name and address of the current land owner.
 - * The name and address of the individual/trust or corporation to whom the compliance is to be granted.
 - * The street address and lot number for the project.
 - * The DEP file number.
 - * A statement certifying compliance with the Order of Conditions and the approved plan as required by the Order of Conditions.(May be more than one person)
5. The person (owner, contractor, representative,& Engineer of Record), certifying compliance with the Order of Conditions must have inspected the site, read the Order of Conditions and all referenced documents, and reviewed the contents of the Commission's files on the project.
6. The Commission may hold the issuance of a Certificate of Compliance if the project in question is part of (or related to) another project which is not currently in compliance.

The Sandwich Conservation Commission does not issue Partial Certificates of Compliance.

Sandwich Conservation Commission Regulatory Regulation No. 13 - Requirement to Elevate Structures (Foundation, Walkway, Deck Support, Anchor/Support Structure, Dock) in Coastal Resource Areas.

Part I

Referencing the Town of Sandwich Wetlands Bylaw, when a foundation structure (any type of foundation, is proposed to be installed in or on a coastal resource area as defined in 310 CMR 10.00, more specifically a Coastal Beach (310 CMR 10.27), a Coastal Dune (310 CMR 10.28), a Barrier Beach (310 CMR 10.29), and a *FEMA* velocity zone within a coastal resource area (Barrier Beach, Coastal Dune), and/or a *FEMA* still-water flood zone within a coastal resource area (Barrier Beach, Coastal Dune), the Sandwich Conservation Commission has determined that a properly installed driven pile (wood or steel) or a helical screw anchor foundation, commonly known as a Techno Metal Post (or approved similar) foundation, designed by a MA certified structural engineer, are the best measure available to minimize any adverse effects to the coastal resource area(s). Sono tubes and concrete footings are not permitted. The lowest horizontal member of said structure must be elevated a minimum of twenty four (24) inches over existing grade, at installation.

When an structure (walkway, dock, deck support, anchor/support structure (for propane tank) or accessory structure (shed)) is proposed to be installed in or on a coastal resource area as defined by 310 CMR 10.00, more specifically Land Under the Ocean (310 CMR 10.25), a Coastal Beach (310 CMR 10.27), a Coastal Dune (310 CMR 10.28), a Barrier Beach (310 CMR 10.29), a Salt Marsh (310 CMR 10.32), and a *FEMA* velocity zone within a coastal resource area (Barrier Beach), and/or a *FEMA* still-water flood zone within a coastal resource area (Barrier Beach), the Sandwich Conservation Commission has determined that a properly installed driven pile (wood or steel) or a helical screw anchor, commonly known as a Techno Metal Post (or an approved similar), designed by a MA certified engineer as the best measure available to minimize any adverse effects to the coastal resource area(s). When the structure is a new elevated walkway, deck, support structure and/or shed, the lowest horizontal member must be a minimum of twenty four (24) inches over existing grade, at installation. When a hardship is clearly demonstrated to the Conservation Commission, the Commission may reduce the minimum height requirement to a height of less than twenty four (24) inches but in no case less than eighteen (18) inches over existing grade, at installation. When the structure is a pier, dock or deck installed in or over a Salt Marsh, the lowest horizontal structural member shall be elevated to a minimum height of sixty (60) inches over the marsh, as measured, directly under the proposed structure.

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Part II

Land Under the Ocean (310 CMR 10.25) means land extending from the mean low water line seaward to the boundary of the municipality's jurisdiction and includes land under estuaries. Nearshore Areas of land under the ocean means that land extending from the mean low water line to the seaward limit of a municipality's jurisdiction, but in no case beyond the point where the land is 80 feet below the level of the ocean at mean low water.

Land under the ocean are found to be significant to the protection of marine fisheries and, where there are shellfish, to protection of land containing shellfish. Nearshore areas of land under the ocean are likely to be significant to storm damage prevention, flood control, and protection of wildlife habitat. Land under the ocean provides feeding areas, spawning and nursery grounds and shelter for many coastal organisms related to marine fisheries. Nearshore areas of land under the ocean help reduce storm damage and flooding by diminishing and buffering the high energy effects of storms. Submerged bars dissipate storm wave energy. Such areas provide a source of sediment for seasonal rebuilding of coastal beaches and dunes. Nearshore areas of land under the ocean also provide important food for birds. For example, waterfowl feed heavily on vegetation (such as eel grass, widgeon grass, and macrophytic algae) and invertebrates (such as polychaetes and mollusks) found in estuaries and other shallow submerged land under the ocean.

A Coastal Beach (310 CMR 10.27) means unconsolidated sediment subject to wave, tidal and coastal storm action which forms the gently sloping shore of a body of salt water and includes tidal flats. Coastal beaches extend from the mean low water line landward to the dune line, coastal bankline or the seaward edge of existing man-made structures, when these structures replace one of the above lines, whichever is closest to the ocean.

A Tidal Flat is any nearly level part of a coastal beach which usually extends from the mean low water line landward to the more steeply sloping face of the coastal beach or which may be separated from the beach by land under the ocean.

Coastal beaches dissipate wave energy by their gentle slope, their permeability and their granular nature, which permit changes in beach form in response to changes in wave conditions. Coastal beaches serve as a sediment source for dunes and subtidal areas. Steep storm waves cause beach sediment to move offshore, resulting in a gentler beach slope and greater energy dissipation. Less steep waves cause an onshore return of beach sediment, where it will be available to provide protection against future storm waves. A coastal beach at any point serves as a sediment source for coastal areas downdrift from that point. The oblique approach of waves moves beach sediment alongshore in the

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general direction of wave action. Thus, the coastal beach is a body of sediment which is moving along the shore. Coastal beaches serve the purposes of storm damage prevention and flood control by dissipating wave energy, by reducing the height of storm waves, and by providing sediment to supply other coastal features, including coastal dunes, land under the ocean and other coastal beaches. Interruptions of these natural processes by man-made structures reduce the ability of the coastal beach to perform these functions.

Coastal Dunes (310 CMR 10.28) are any natural hill, mound or ridge of sediment landward of a coastal beach deposited by wind action or storm overwash. Coastal dunes may also be composed of sediments deposited by artificial means which serves the purpose of storm damage prevention, flood control or wildlife habitat.

Coastal dunes and Barrier Beaches are found to be significant to the interests of storm damage prevention and flood control by supplying sand to coastal beaches and protecting inland coastal areas from the flooding effects of storm waves and storm elevated sea levels mostly due to the fact they are higher than the coastal beaches which the border. In order to protect this function, coastal dune volume must be maintained while allowing the coastal dune shape to conform to natural wind and water flow patterns. On retreating shorelines, the ability of the coastal dunes bordering the coastal beach to move landward at the rate of shoreline retreat allows these dunes to maintain their form and volume, which in turn promotes their function of protecting against storm damage or flooding.

A Barrier Beach (310 CMR 10.29) is a narrow low lying strip of land generally consisting of coastal beaches, and coastal dunes extending roughly parallel to the trend of the coast. It is separated from the mainland by a narrow body of fresh, brackish or saline water or a marsh system. A barrier beach may be joined to the mainland at one or both ends.

Barrier Beaches are found to be significant to the interests of storm damage prevention and flood control because they provide a buffer to storm waves and to sea levels elevated by storms protecting landward areas. Barrier Beaches in Massachusetts undergo a landward migration caused by the landward movement of sediment by wind, storm wave overwash and the tidal current process. The continuation and enhancement of these processes maintains the volume of the landform which is necessary to carry out the storm and flood buffer function.

Salt Marsh (310 CMR 10.32) means a coastal wetland that extends landward up to the highest high tide line, that is, the highest spring tide of the year, and is characterized by plants that are well adapted to or prefer living in, saline soils. Dominant plants within salt marshes are salt meadow cord grass (*Spartina patens*) and/or salt marsh cord grass (*Spartina alterniflora*). A salt marsh may contain tidal creeks, ditches and pools. Spring Tide means the tide of the greatest amplitude during the approximately 14-day tidal cycle.

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It occurs at or near the time when the gravitational forces of the sun and the moon are in phase (new and full moons).

Salt marshes are significant to protection of marine fisheries, wildlife habitat, and where there are shellfish, to protection of land containing shellfish, and prevention of pollution and are likely to be significant to storm damage prevention and ground water supply. A salt marsh produces large amounts of organic matter. A significant portion of this material is exported as detritus and dissolved organics to estuarine and coastal waters, where it provides the basis for a large food web that supports many marine organisms, including finfish and shellfish as well as many bird species. Salt marshes also provide a spawning and nursery habitat for several important estuarine forage finfish as well as important food, shelter, breeding areas, and migratory and overwintering areas for many wildlife species.

Salt marsh plants and substrate remove pollutants from surrounding waters. The network of salt marsh vegetation roots and rhizomes binds sediments together. The sediments absorb chlorinated hydrocarbons and heavy metals such as lead, copper, and iron. The marsh also retains nitrogen and phosphorous compounds, which in large amounts can lead to algal blooms in coastal waters. The underlying peat also serves as a barrier between fresh ground water landward of the salt marsh and the ocean, thus helping to maintain the level of such ground water. Salt marsh cord grass and underlying peat are resistant to erosion and dissipate wave energy, thereby providing a buffer that reduces wave damage.