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9th Edition Massachusetts Residential Code Requirements in Floodplains

This unofficial document was prepared to serve as a guide for using the flood standards in the Massachusetts Building Code 9th Edition Residential Volume. It includes *flood standards only* from the 2015 International Residential Code for Chapters 1 - 4 with embedded Massachusetts amendments (in blue). In the event of any conflict or questions refer to the official Code with Massachusetts amendments.

All Massachusetts amendments are in blue type.

Chapter 1 - Scope and Administration

R102.7.1 Additions, alterations or repairs. *Additions, alterations* or repairs to any structure shall conform to the requirements for a new structure without requiring the existing structure to comply with the requirements of this code, unless otherwise stated. *Additions, alterations*, repairs and relocations shall not cause an existing structure to become unsafe or adversely affect the performance of the building.

R104.10.1 Flood Hazard Areas. The building official shall not grant modifications to any provision related to flood hazard areas as established by 780 CMR without the granting of a variance by the Building Code Appeals Board.

R105.3.1 Action on Application. The building official shall examine or cause to be examined applications for permits and amendments, and shall issue or deny the permit, within 30 days of filing. If the application or the construction documents do not conform to the requirements of 780 CMR and all pertinent laws under the building official's jurisdiction, the building official shall deny such application in writing, stating the reasons therefore. The building official's signature shall be attached to every permit. The following requirements, where applicable, shall be satisfied before a building permit is issued:

1. Zoning: in accordance with M.G.L. c. 40A or St. 1956, c. 665.
2. Railroad Right-of-way: in accordance with M.G.L. c. 40, § 54A.
3. Water Supply: in accordance with M.G.L. c. 40, § 54;
4. Debris Removal: in accordance with M.G.L. c. 40, § 54
5. Workers Compensation Insurance: in accordance with M.G.L. c. 152, § 25C(6).
6. Hazards to Air Navigation: in accordance with M.G.L. c. 90, § 35B.

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7. Construction in coastal dunes, in accordance with flood construction requirements of 780 CMR.

R105.3.1.1 Determination of Substantially Improved or Substantially Damaged Existing Buildings in Flood Hazard Areas. For applications for reconstruction, rehabilitation, addition, alteration, repair or other improvement of existing buildings or structures located in a flood hazard area as established by section 322.1.1, the building official shall examine or cause to be examined the construction documents and shall make a determination with regard to the value of the proposed work. For buildings that have sustained damage of any origin, the value of the proposed work shall include the cost to repair the building or structure to its pre-damaged condition. If the building official finds that the value of proposed work equals or exceeds 50% of the market value of the building or structure before the damage has occurred or the improvement is started, the proposed work is a substantial improvement or restoration of substantial damage and the building official shall require existing portions of the entire building or structure to meet the requirements of section R322. For the purpose of this determination, a substantial improvement shall mean any repair, reconstruction, rehabilitation, addition or improvement of a building or structure, the cost of which equals or exceeds 50% of the market value of the building or structure before the improvement or repair is started. Where the building or structure has sustained substantial damage, repairs necessary to restore the building or structure to its pre-damaged condition shall be considered substantial improvements regardless of the actual repair work performed. The term shall not include either of the following:

1. Improvements to a building or structure that are required to correct existing health, sanitary or safety code violations identified by the building official and that are the minimum necessary to ensure safe living conditions.
2. Any alteration of a historic building or structure, provided that the alteration will not preclude the continued designation as a historic building or structure. For the purposes of this exclusion, a historic building shall be any of the following:
 - 2.1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places.
 - 2.2. Determined by the Secretary of the U.S. Department of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district.
 - 2.3. Designated as historic under a state or local historic preservation program that is approved by the U.S. Department of the Interior.

R105.3.1.1.1 Determination of Substantial Repair of a Foundation. When work to repair or replace a foundation results in the repair or replacement of a portion of the foundation with a perimeter along the base of the foundation that equals or exceeds

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50% of the perimeter of the base of the foundation measured in linear feet, or repair or replacement of 50% of the piles, columns or piers of a pile, column or pier supported foundation, the building official shall determine it to be substantial repair of a foundation. Applications determined by the building official to constitute substantial repair of a foundation shall require all existing portions of the entire building or structure to meet the requirements of section R322.

R107.1.4 Information for Construction in Flood Hazard Areas. For buildings and structures located in whole or in part in flood hazard areas as established by Table R301.2(1), construction documents shall include:

1. Delineation of flood hazard areas, floodway boundaries and flood zones and the design flood elevation, as appropriate.
2. The elevation of the proposed lowest floor, including basement; in areas of shallow flooding (AO Zones), the height of the proposed lowest floor, including basement, above the highest adjacent grade.
3. The elevation of the bottom of the lowest horizontal structural member in coastal high hazard areas (V Zone).
4. If design flood elevations are not included on the community's Flood Insurance Rate Map ("FIRM"), the building official and the applicant shall obtain and reasonably utilize any design flood elevation and floodway data available from other sources.

R109.3 Building Permit Valuations. The applicant for a permit shall provide an estimated value of project cost at time of application. If, in the opinion of the building official, the valuation is underestimated on the application, the permit shall be denied, unless the applicant can show detailed estimates to meet the approval of the building official. Final building permit valuation shall be set by the building official.

R110.3.3 Floodplain Inspections. For construction in flood hazard areas as established by Table R301.2(1), upon placement of the lowest floor, including basement, and prior to further vertical construction, the building official shall require submission of documentation, prepared and sealed by a registered design professional, of the elevation of the lowest floor, including basement, required in section R322.

R110.3.6.1 Elevation Documentation. If located in a flood hazard area, the documentation of elevations required in section R322.1.10 shall be submitted to the building official prior to the final inspection.

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COASTAL DUNE. A coastal wetland resource area subject to the construction requirements of section R322.4.

COASTAL WETLAND RESOURCE AREA. Any coastal wetland resource area subject to protection under the Wetlands Protection Act, M.G.L. c. 131, § 40, and the Wetlands Protection Act Regulations, 310 CMR 10.21 through 10.35. Coastal wetland resource areas include barrier beaches, coastal beaches, coastal dunes, rocky intertidal shores, tidal flats, land subject to 100 year coastal storm flowage, coastal banks, land containing shellfish, lands subject to tidal action, and lands under an estuary, salt pond or certain streams, ponds, rivers, lakes or creeks within the coastal zone that are anadromous/catadromous fish runs. Coastal wetland resources are shown on a map entitled “Map of Coastal Wetland Resources For Building Officials.” Once a coastal wetland resource is identified, coastal dunes within that resource are delineated in accordance with guidance provided on the map.

Table R301.2(1) CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA

Ground Snow Load		Table R301.2(4)
Wind Design	Speed	Table R301.2(4)
	Topographic effects	No
	Special Wind Regions	No
	Windborne debris zone	Any area within a windborne debris region, as defined in Chapter 2 of 780 CMR 51.00: <i>Massachusetts Residential Code</i>
Seismic Design Category		No
Subject to Damage From	Weathering	Severe
	Frost line depth	48 inches. For shallow foundations, see R403.3(2).
	Termite	See Figure R301.2(6).
Winter Design Temperature		Dry bulb
Ice Barrier Underlayment Required		For roofing, see R905.2.7.
Flood Hazards		See section 322.
Air Freezing Index		For shallow foundations, see R403.3(2).
Mean Annual Temperature		See https://www.ncdc.noaa.gov/sotc/global/201607

Chapter 3 – Building Planning

SECTION R301 DESIGN CRITERIA

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R301.1 Application. Buildings and structures, and parts thereof, shall be constructed to safely support all loads, including dead loads, live loads, roof loads, flood loads, snow loads, wind loads and seismic loads as prescribed by this code. The construction of buildings and structures in accordance with the provisions of this code shall result in a system that provides a complete load path that meets the requirements for the transfer of loads from their point of origin through the load-resisting elements to the foundation. Buildings and structures constructed as prescribed by this code are deemed to comply with the requirements of this section.

R301.2.4 Floodplain Construction. Buildings and structures constructed in whole or in part in flood hazard areas (including AO or V Zones) or coastal dunes as established in section R322.1.1, and substantial improvement and restoration of substantial damage of buildings and structures in flood hazard areas or coastal dunes, shall be designed and constructed in accordance with section R322. Buildings and structures that are located in more than one flood hazard area or coastal dune shall comply with the most restrictive provisions of all those flood hazard areas and coastal dunes. Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.

R301.2.4.1 Alternative provisions. As an alternative to the requirements in Section R322, ASCE 24 is permitted subject to the limitations of this code and the limitations therein.

R309.3 Flood Hazard Areas and Coastal Dunes. For buildings located in flood hazard areas or coastal dunes, as established by section R322.1.1. garage floors shall be:

1. Elevated to or above the design flood elevation as determined in accordance with section R322.2; or
2. Located below the design flood elevation provided that the floors are at or above grade on not less than one side, are used solely for parking, building access or storage, meet the requirements of section R322.2 and are otherwise constructed in accordance with 780 CMR 51.00: Massachusetts Residential Code.

SECTION R322 FLOOD-RESISTANT CONSTRUCTION

R322.1 General. Buildings and structures constructed in whole or in part in flood hazard areas and coastal dunes, and substantial improvement and restoration of substantial damage of buildings and structures in those areas shall be designed and constructed in accordance with the provisions contained in this section. Buildings and structures located in more than one flood hazard area and coastal dunes shall comply with the most restrictive provisions. Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.

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See section R105.3.1.1 for substantial improvements and damage and see section R309 for garage requirements. Flood hazard areas include the following:

1. AO zones, where shallow flooding exists without waves;
2. A zones; and
3. V zones, where high velocity wave action exists and wave heights are greater than or equal to three feet.

R322.1.1 Base Flood Elevation, Flood Maps, Delineations and Definitions. For base flood elevation and mapping resources see the following:

1. Flood hazard areas and base flood elevations are identified on a community's current effective Flood Insurance Rate Map ("FIRM") or Flood Hazard Boundary Map ("FHBM"), whichever is applicable, and further defined in the current effective Flood Insurance Study ("FIS") where applicable.
2. Floodways are delineated on a community's current effective FIRM or Flood Boundary & Floodway Map, whichever is applicable, and further defined in the current effective FIS.
3. If a community has received a preliminary FIRM and FIS from FEMA, and has been issued a Letter of Final Determination ("LFD") from FEMA, the community shall use the preliminary FIRM and FIS to determine applicable flood zones, base flood elevations and floodways as of the date of the LFD.
4. Coastal wetlands resource areas are defined on the "Map of Coastal Wetland Resources for Building Officials."

R322.1.2 Structural systems. Structural systems of buildings and structures shall be designed, connected and anchored to resist flotation, collapse or permanent lateral movement due to structural loads and stresses from flooding equal to the design flood elevation.

R322.1.3 Flood-resistant construction. Buildings and structures erected in areas prone to flooding shall be constructed by methods and practices that minimize flood damage.

R322.1.4 Establishing the Design Flood Elevation. The design flood elevation in Massachusetts shall be as follows:

1. For AO Zones, the design flood elevation shall be the elevation of the highest adjacent grade plus the flood depth specified on the FIRM plus one foot or the elevation

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of the highest adjacent grade plus three feet if no flood depth is specified. See section R322.2 for requirements.

2. For A Zones, the design flood elevation shall be the base flood elevation plus one foot. See section R322.2 for requirements.

3. For V Zones, the design flood elevation shall be the base flood elevation plus two feet. See section R322.3 for requirements.

4. For coastal dunes, see section R322.4 for requirements.

R322.1.4.1 Determination of design flood elevations. If design flood elevations are not specified, the *building official* is authorized to require the applicant to comply with either of the following:

1. Obtain and reasonably use data available from a federal, state or other source; or

2. Determine the design flood elevation in accordance with accepted hydrologic and hydraulic engineering practices used to define special flood hazard areas. Determinations shall be undertaken by a registered *design professional* who shall document that the technical methods used reflect currently accepted engineering practice. Studies, analyses and computations shall be submitted in sufficient detail to allow thorough review and approval.

R322.1.4.2 Reserved.

R322.1.5 Lowest Floor and Basement. The lowest floor shall be the lowest floor of the lowest enclosed area, including basement, and excluding any unfinished flood-resistant enclosure that is useable solely for vehicle parking, building access or limited storage provided that such enclosure is not built so as to render the building or structure in violation of this section. A basement is the portion of a building, including crawl spaces, having its floor below exterior grade on all sides. This definition of “basement” is limited in application to the provisions of section R322.

R322.1.6 Protection of Mechanical, Plumbing and Electrical Systems. Electrical systems, equipment and components; heating, ventilating, air conditioning; plumbing appliances and plumbing fixtures; duct systems; and other service equipment shall be located at or above the elevation required in section R322.2, R322.3 or R322.4. If replaced as part of a substantial improvement, electrical systems, equipment and components; heating, ventilating, air conditioning and plumbing appliances and plumbing fixtures; duct systems; and other service equipment shall meet the requirements of this section. Systems, fixtures, and equipment and components shall not be mounted on or penetrate through walls intended to break away under flood loads.

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Exception: Locating electrical systems, equipment and components; heating, ventilating, air conditioning; plumbing appliances and plumbing fixtures; duct systems; and other service equipment only within flood hazard areas including A and AO Zones is permitted below the elevation required in section R322.2 provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation in accordance with ASCE 24. Electrical wiring systems are permitted to be located below the required elevation provided that they conform to the provisions of the electrical part of 780 CMR 51.00: Massachusetts Residential Code for wet locations.

R322.1.7 Reserved

R322.1.8 Flood-resistant materials. Building materials and installation methods used for flooring and interior and exterior walls and wall coverings below the elevation required in Section R322.2 or R322.3 shall be flood damage-resistant materials that conform to the provisions of FEMA TB-2.

R322.1.9 Manufactured Homes. The bottom of the frame of new and replacement manufactured homes on foundations that conform to the requirements of section R322.2 or R322.3 and R322.4, as applicable, shall be elevated to or above the elevations specified in section R322.2 (flood hazard areas including AO and A Zones) or R322.3 in coastal high-hazard areas (V Zones) and R322.4 in coastal dunes. The anchor and tiedown requirements of the applicable state or federal requirements shall apply. The foundation and anchorage of manufactured homes to be located in identified floodways shall be designed and constructed in accordance with ASCE 24.

R322.1.10 As-built Elevation Documentation. A registered design professional shall prepare and seal documentation for submittal of the elevations specified in section R322.2, R322.3 or R322.4.

R322.1.11 Construction Documents. The construction documents shall include documentation that is prepared and sealed by a registered design professional that the design and methods of construction to be used meet the applicable criteria of this section.

R322.2 Flood Hazard Areas (Including A and AO Zones). Buildings and structures constructed in whole or in part in A and AO Zones shall be designed and constructed in accordance with sections R322.2.1 through R322.2.3.

R322.2.1 Elevation Requirements.

1. Buildings and structures in A Zones, shall have the lowest floors elevated to or above the design flood elevation.

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2. In AO Zones buildings and structures shall have the lowest floor (including basement) elevated to a height of not less than the design flood elevation.

3. Basement floors that are below grade on all sides shall be elevated to or above design flood elevation.

R322.2.2 Enclosed Area Below Design Flood Elevation. Enclosed areas, including crawl spaces, that are below the design flood elevation and are not basements shall:

1. Be used solely for parking of vehicles, building access or storage.

2. Be provided with flood openings that meet the following criteria and are installed in accordance with section R322.2.2.1:

2.1. The total net area of openings shall be not less than one in² (645 mm²) for each ft² (0.093 m²) of enclosed area where the enclosed area is measured on the exterior of the enclosure walls, or the openings shall be designed as engineered openings and the construction documents shall include a statement by a registered design professional that the design of the openings will provide for equalization of hydrostatic flood forces on exterior walls by allowing for the automatic entry and exit of floodwaters as specified in section 2.6.2.2 of ASCE 24.

2.2. Openings shall be not less than three inches (76 mm) in any direction in the plane of the wall.

R322.2.2.1 Installation of Openings. The walls of enclosed areas shall have openings installed such that:

1. There shall be not less than two openings on different sides of each enclosed area; if a building has more than one enclosed area below the design flood elevation, each area shall have openings on exterior walls.

2. The bottom of each opening shall be not more than one foot (305 mm) above the higher of the final interior grade or floor and the finished existing exterior grade immediately under each opening.

3. Openings shall be permitted to be installed in doors and windows; doors and windows without installed openings do not meet the requirements of this section.

R322.2.3 Foundation design and construction. Foundation walls for buildings and structures erected in flood hazard areas shall meet the requirements of Chapter 4.

Exception: Unless designed in accordance with Section R404:

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1. The unsupported height of 6-inch (152 mm) plain masonry walls shall be not more than 3 feet (914 mm).
2. The unsupported height of 8-inch (203 mm) plain masonry walls shall be not more than 4 feet (1219 mm).
3. The unsupported height of 8-inch (203 mm) reinforced masonry walls shall be not more than 8 feet (2438 mm). For the purpose of this exception, unsupported height is the distance from the finished *grade* of the under-floor space to the top of the wall.

R322.2.4 Tanks. Underground tanks shall be anchored to prevent flotation, collapse and lateral movement under conditions of the base flood. Above-ground tanks shall be installed at or above the elevation required in Section R322.2.1 or shall be anchored to prevent flotation, collapse and lateral movement under conditions of the base flood.

R322.3 Coastal High-hazard Areas (Including V Zones). Buildings and structures constructed in whole or in part in V Zones shall be designed and constructed in accordance with sections R322.3.1 through R322.3.6.

R322.3.1 Location and Site Preparation. New buildings and buildings that are determined to be substantially improved pursuant to section R105.3.1.1 shall be located landward of the reach of mean high tide.

R322.3.2 Elevation Requirements.

1. Buildings and structures shall be elevated so that the bottom of the lowest portion of horizontal structural members supporting the lowest floor, with the exception of pilings, pile caps, columns, grade beams and bracing, is elevated to the design flood elevation.
2. Basement floors that are below grade on all sides are prohibited.
3. The use of fill for structural support is prohibited.
4. Minor grading, and the placement of minor quantities of fill, shall be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways. Fill is prohibited unless such fill is constructed and/or placed to avoid diversion of water and waves toward any building or structure.
5. Walls and partitions enclosing areas below the design flood elevation shall meet the requirements of sections R322.3.4 and R322.3.5.
6. For lateral additions in V Zones that are not a substantial improvement, only the addition shall be elevated so that the bottom of the lowest horizontal structural member

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of the lowest floor with the exception of pilings, pile caps, columns, grade beams and bracing, is located at an elevation that is at least the design flood elevation.

R322.3.3 Foundations. Buildings and structures erected in coastal high-hazard areas and shall be supported on pilings or columns and shall be adequately anchored to such pilings or columns. The space below the elevated building shall be either free of obstruction or, if enclosed with walls, the walls shall meet the requirements of section R322.3.4. Pilings shall have adequate soil penetrations to resist the combined wave and wind loads (lateral and uplift). Water-loading values used shall be those associated with the design flood. Wind-loading values shall be those required by 780 CMR 51.00: Massachusetts Residential Code. Pile embedment shall include consideration of decreased resistance capacity caused by scour of soil strata surrounding the piling. Pile systems design and installation shall be certified in accordance with section R322.3.6. Spread footing, mat, raft or other foundations that support columns shall not be permitted where soil investigations that are required in accordance with section R401.4 indicate that soil material under the spread footing, mat, raft or other foundation is subject to scour or erosion from wave-velocity flow conditions. If permitted, spread footing, mat, raft or other foundations that support columns shall be designed in accordance with ASCE 24. Slabs, pools, pool decks and walkways shall be located and constructed to be structurally independent of buildings and structures and their foundations to prevent transfer of flood loads to the buildings and structures during conditions of flooding, scour or erosion from wave-velocity flow conditions, unless the buildings and structures and their foundations are designed to resist the additional flood load.

R322.3.4 Walls Below Design Flood Elevation. Walls and partitions are permitted below the elevated floor, provided that such walls and partitions are not part of the structural support of the building or structure and:

1. Electrical, mechanical and plumbing system components are not to be mounted on or penetrate through walls that are designed to break away under flood loads; and
2. Are constructed with insect screening or open lattice; or
3. Are designed to break away or collapse without causing collapse, displacement or other structural damage to the elevated portion of the building or supporting foundation system. Such walls, framing and connections shall have a resistance of not less than ten lbs. per ft² (479 Pa) and not more than 20 lbs. per ft² (958 Pa) as determined using allowable stress design; or
4. Where wind loading values of 780 CMR 51.00: Massachusetts Residential Code exceed 20 lbs. per ft² (958 Pa), the construction documents shall include documentation prepared and sealed by a registered design professional that:

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4.1 The walls and partitions below the design flood elevation have been designed to collapse from a water load less than that which would occur during the base flood.

4.2 The elevated portion of the building and supporting foundation system have been designed to withstand the effects of wind and flood loads acting simultaneously on structural and nonstructural building components. Water-loading values used shall be those associated with the design flood. Wind-loading values shall be those required by 780 CMR 51.00: Massachusetts Residential Code; or

5. Walls intended to break away under flood loads as specified in Item 3 or 4 have flood openings that meet the criteria in section R322.2.2, Item 2.

R322.3.5 Enclosed areas below design flood elevation. Enclosed areas below the design flood elevation shall be used solely for parking of vehicles, building access or storage.

R322.3.5.1 Protection of building envelope. An exterior door that meets the requirements of Section R609 shall be installed at the top of stairs that provide access to the building and that are enclosed with walls designed to break away in accordance with Section R322.3.4.

R322.3.6 Reserved.

R322.3.7 Tanks. Underground tanks shall be anchored to prevent flotation, collapse and lateral movement under conditions of the base flood. Above-ground tanks shall be installed at or above the elevation required in Section R322.3.2. Where elevated on platforms, the platforms shall be cantilevered from or knee braced to the building or shall be supported on foundations that conform to the requirements of Section R322.3.

R322.4 Coastal Dunes. Buildings or structures constructed in whole or in part in coastal dunes shall be designed and constructed in accordance with sections R322.4.1 through R322.4.6.

R322.4.1 Construction Documents. For buildings and structures, including new or replacement manufactured homes, lateral additions, foundations that are replaced in total or repaired so as to constitute substantial repair of a foundation, or substantial repair or improvement of a building or structure that has incurred substantial damage as a result of flooding and/or storms, proposed on a parcel of land that is located wholly or partially within a coastal wetland resource area shown on the map entitled "Map of Coastal Wetland Resources For Building Officials," the building official shall require submission of one of the construction documents specified in section R322.4.1 (a) through (d) along with a notarized statement by the applicant that the order, determination or notice is in effect and is not the subject of any administrative appeals before the Department of Environmental Protection or the Division of Administrative Law

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Appeals. No building permit shall be issued unless and until a construction document that conforms to the requirements of this section is submitted.

(a) An order of conditions establishing the boundaries of all coastal wetland resource areas in a plan referenced in and accompanying the order. The order shall determine whether the coastal wetland resource areas are significant to any of the interests identified in the Wetlands Protection Act, M.G.L. c. 131, § 40 including the interests of flood control and storm damage prevention. If the order indicates that the proposed construction work is located within a coastal dune that is significant to the interests of flood control and/or storm damage prevention, the order of conditions shall allow the proposed construction.

(b) An order of resource area delineation stating that the proposed construction work is outside the boundaries of all coastal wetland resource areas as shown on a plan referenced in and accompanying the order.

(c) A determination of applicability stating that the proposed construction work is outside the boundaries of all coastal wetland resource areas as shown on a plan referenced in and accompanying the determination or will not fill, dredge or alter a coastal wetland resource area.

(d) A notice of non-significance evidencing that the proposed construction work is within a coastal wetland resource area as shown on a plan referenced in and accompanying the notice and stating that the coastal wetland resource area is not significant to any of the interests identified in M.G.L. c. 131, § 40: Removal, Fill, Dredging or Altering of Land Bordering Waters (the Wetlands Protection Act).

R322.4.2 Structural Elevation. The elevation of the bottom of the lowest horizontal structural member, as required by the lowest floor elevation inspection in subsection R109.1.3, shall be submitted.

R322.4.3 Additional Documentation. Documentation for buildings located in more than one zone shall meet the requirements of all zones.

R322.4.4 Elevation Requirements. For new buildings and structures, new foundations, replacement or substantial repair of a foundation, or repair of a substantially damaged structure where damage is the result of a storm or flooding the entire structure shall be elevated so that the bottom of the lowest horizontal structural member of the lowest floor is located at the elevation required by the order of conditions of the local conservation commission in accordance with the Wetlands Protection Act, M.G.L. c. 131, § 40: Removal, Fill, Dredging or Altering Land Bordering Waters (the Wetland Protection Act) and Wetlands Protection Regulations, 310 CMR 10.21 through 10.35: Additional Regulations for Coastal Wetlands. For lateral additions that are not a substantial improvement, only the addition shall be elevated so that the bottom of the lowest horizontal structural member of the lowest floor is located at the elevation

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required by the order of conditions of the local conservation commission in accordance with M.G.L. c. 131, § 40 and Wetlands Protection Regulations, 310 CMR 10.21 through 10.35.

R322.4.5 Foundations. Foundations for work meeting the elevation requirements of section R322 shall consist of open pilings without footings to allow the movement of the dune.

Exception: Where surface or subsurface conditions consist of non-erodible soil that prevents the use of pile foundations, spread footings or mat foundations may be permitted. Such foundations shall be anchored to prevent sliding, uplift or overturning of the footing and the non-erodible soil it is attached to and be designed to withstand any combination of loads. No other use of alternate materials, design and methods of construction and equipment as described in R104.11 is permitted.

R322.4.6 Enclosed Areas Below Design Flood Elevation. Enclosures are not permitted below the lowest horizontal structural member of the lowest floor.

Chapter 4 – Foundations

R408.7 Flood resistance. For buildings located in flood hazard areas as established in Table R301.2(1):

1. Walls enclosing the under-floor space shall be provided with flood openings in accordance with Section R322.2.2.
2. The finished ground level of the under-floor space shall be equal to or higher than the outside finished ground level on at least one side.

Exception: Deleted.

NOTE:

Some other chapters and appendices have standards that relate to location in a flood hazard area. In many cases the standards refer back to standards located in R322. In some cases the MA amendments refer to standards in one of the *specialized codes*. In each case the user should refer to the official Code, with Massachusetts amendments and/or the appropriate *specialized code*.